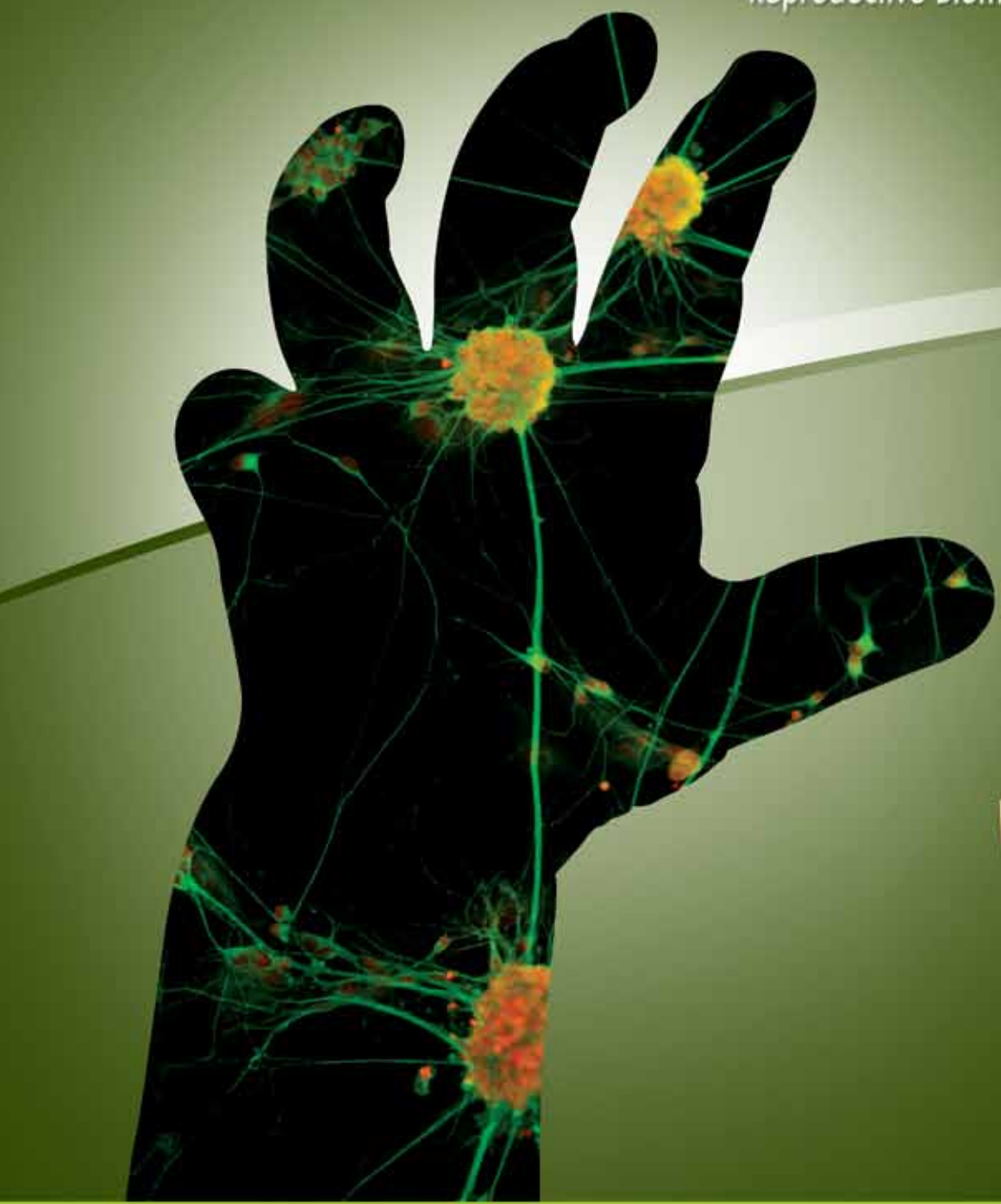
THE FOURTEENTH ROYAN INTERNATIONAL RESEARCH AWARD

Reproductive Biomedicine & Stem Cell



SEPTEMBER 2013

TEHRAN - IRAN

THE FIFTEENTH

ROYAN

INTERNATIONAL RESEARCH AWARD

Reproductive Biomedicine & Stem Cell Deadline for Application: April, 2014

Kazemi Prize, 2014

In commemoration of Dr. Kazemi, the late founder of Royan Institute

SEPTEMBER, 2014

TEHRAN - IRAN

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TEHRAN

In the name of **GOD**

The Fourteenth

ROYAN

INTERNATIONAL RESEARCH AWARD

Dr Saeid Kazemi Ashtiani
The Late Founder of ROYAN Institute

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FOREWORD

Thank God that our colleagues at Royan Institute have done their best in running this prestigious international scientific program on reproductive and stem cell to get closer to the ACECR goals and thereby approach their objectives in developing science and extending international collaborations.
Holding Royan 14th International Research Award and making itgenerally accepted by the national and international researchers is a confirmation to the success of this program.
This is the achievement of Royan directors and colleagues as well as the award scientific and executive board that I express my deepest thank to.
I hope this scientific movement, whose leaders are young Iranian researchers, be effective in promoting the science and solving the society's health problems.
I firmly believe, such scientific event will remind the memorial of Dr Saeid Kazemi's, the late founder of Royan Institute.

Yadegari MH, PhD
President of Academic Center for Education, Culture and Research (ACECR)

INTRODUCTION

What determines the value of a scientific award which exceeds its amount and gives it an identity? Free participation and competition as well as fair review and judgment seems to be the two main foundations of this value.

During the fourteen years of holding this award, Royan Institute has always tried to strengthen the spiritual value of the prize. Thus, each year with a proper notification, the institute has facilitated the participation and fair competition of national and international researchers. It, also, has provided fair and unbiased judgment via using credible scientists worldwide.

Meanwhile, an honorable announcement of winning such prize by the winners of previous awards in oral and written reports as well as bringing them up in their CVs had a crescive value each year.

This year, award secretariat has received 206 projects from about 39 countries which indicate its welcoming by researchers and scientists. The received projects were evaluated through some phases and the winners were announced later. However, since award regulation necessitates the winners to attend award ceremony and present the result of their projects in Royan international twin-congress, some of them were excluded from the final list of winners according to their own request. Therefore, four national besides four international winners were honored at the ceremony.

Hereby, remembering Dr. Saeid Kazemi Ashtiani, the late founder of Royan Institute, I would like to express my sincere appreciation to the executive committee, scientific, and jury board for their extraordinary contribution in better holding the 14th award like previous years.

Gourabi H, PhD
Award Chairman and Royan Institute President

ROYAN AWARDS

Royan International Research Award was founded by the late director of Royan Institute, Dr Saeid Kazemi Ashtiani with the aim of encouraging researchers, appreciating their efforts and preparing a friendly scientific atmosphere for them to exchange their knowledge and experiences. Kazemi had wonderful ideas to bring researchers together and motivate them to increase their efforts and perform high level researches via this research award. Royan's staff lost their beloved director in January 2006 by heart attack, May he rest in peace.
This annual award is extending into a higher quality event every year, increasing the scientific level and number of the submitted papers. The research papers are evaluated through an intense jury procedure by Award's national and international Jury board to whom our special thanks goes. Each year the prominent researches with outstanding help in solving problems in reproduction and stem cell fields, are announced, appreciated and rewarded.
As comparing the researches in different fields is very difficult and finding the best researches with variations in methods, implements and results is almost impossible, from the eighth award the same prizes are distributed among winners in different fields of reproductive biomedicine and stem cell such as: female infertility, epidemiology, ethics, andrology, embryology, reproductive imaging, reproductive genetics, stem cell biology and technology, regenerative medicine, and biotechnology.

Nomination and Selection Procedure of Award

The submitted research articles are categorized according to nine scientific groups: female infertility, reproductive genetics, epidemiology, ethics, embryology, andrology, reproductive imaging, stem cell biology and technology and biotechnology. Each article is ranked according to its relevancy, impact factor, and an innovation score.
After the articles are sorted, each scientific group selects their nominees and sends them to national and international referees for evaluation.

Each referee evaluates at most 5 research articles, related to his/her field of interest, qualitatively in Likert scale according to these norms:

- Relevancy to the award subjects
- Creativity and innovation
- Methodology and research design
- Problem solving
- Applicability on human

Evaluation of the articles by the juries has been discussed in the board of juries and their decisions have been approved by scientific board of the institute. Finally, international and national winners are selected and invited to present their researches in Royan twin congress on Reproductive Biomedicine and Stem Cell Biology and Technology which is held almost in September every year and will receive their prizes in special opening ceremony of congress.

Note: *It is obligatory for the winners to attend the ceremony and present their research articles in the congress.*

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10	**Anand,** Akshay	India	Recruitment of Stem Cells into the Injured Retina After Laser Injury
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WINNERS

INTERNATIONAL WINNER

Andrology / Reproductive Genetics

Search for Genetic Causes of Male Infertility

Objective: We are convinced that better infertility treatment will only be achieved with a better under understanding of the molecular mechanisms specific to each patient. To that effect we want to indentify genes involved in male infertility

Results: Our team has identified and characterized several genes implicated in the genesis of two form of male infertility: macrozoospermia and globozoospermia. We showed that mutations in AURKC were responsible for macrozoospermia and that a homozygous deletion of the DPY19L2 was found in approximately 70% of globozoospermia patients. Before the characterization of these two genes the microdeletions of the Y chromosome were the only genetic defects described to alter spermatogenesis. We showed that AURKC deletions were are approximately as frequent in infertile men of North African descent as the Y chromosome microdeletions. We showed that Dpy19l2 is part of a new family of proteins permitting to establish a link between the nucleus and different organelles in the cytoplasm.

Conclusion: The strategy of homozygocity mapping and exome sequencing has allowed us to identify several genes responsible for different infertility phenotype. We are convinced that many more genes will be identified in the near future.

Keywords: Male Infertility, DNA Sequencing, Spematogenesis

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After getting BSc in Cell Biology and Physiology at Grenoble, Dr Pierre F. Ray was one of the first to receive an ERASMUS grant and went to England in 1990. He obtained his Masters in Biotechnology from the University of East Anglia (UEA) and started his PhD on Pre-Implantation Genetic Diagnosis (PGD) at the Hammersmith Hospital in London in the pioneering team of PGD. At the end of his thesis, Dr Ray moved to the University of Southern California (USC) in Los Angeles as a postdoc to work in the laboratory of Professor Arnheim. He was then recruited as Assistant Professor at Munnich Hospital University to create and take responsibility for the Laboratory of Molecular DPI at Necker Hospital.
After being graduated in 2003, Dr Ray developed a research focused on the genetics of infertility and created the "Genetics and Infertility Therapy" team in the laboratory MIGA (FRE 3405 CNRS-UJF).

WINNERS

INTERNATIONAL WINNER

Female Infertility

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Paola Panina obtained a BSc in Biological Sciences and a post-graduate specialization in Microbiology both from the University of Parma, and a PhD in Biotechnology from the University of Brescia. From 1988 to 1992, as a Member of the Basel Institute for Immunology and then as a scientist at the University of Strasbourg, she significantly contributed to the unveiling of the molecular mechanisms of antigen processing and presentation. In 2002 she co-founded Bioxell SpA, a biopharmaceutical company, where as Director of Preclinical Research she coordinated research and development of novel therapeutic agents for inflammatory diseases, including endometriosis. Since 2010, she is Head of the Reproductive Sciences Lab, San Raffaele Scientific Institute, with a focus on the physiopathology of the reproductive female tract. Paola Panina is the author of several peer-reviewed publications and international patents.

The Selective Vitamin D Receptor Agonist Elocalcitol Reduces Development of Endometriosis and Formation of Peritoneal Adhesion in a Mouse Model

Objective: Endometriosis is a chronic disorder characterized by the presence of endometrial tissue outside the uterus. Endometrial cells from retrograde menstruation implant on peritoneal surfaces and elicit an inflammatory response, associated with angiogenesis, fibrosis, neuronal infiltration, and anatomical distortion. Affecting an estimated 176 million women worldwide, the condition is still an unmet clinical need since an optimal drug that allows for pain management and continued attempts to conceive does not exist. An ideal treatment should not only eradicate lesions but also prevent post-surgical recurrences and eliminate peritoneal adhesions Since both eutopic and ectopic endometrium express the vitamin D receptor (VDR), and VDR agonists are endowed with anti-proliferative, anti-inflammatory, and anti-fibrotic properties, we evaluated the effect of elocalcitol, a VDR agonist with low calcemic liability, in a mouse model of experimentally induced endometriosis.

Results: Mice with induced endometriosis were administered with elocalcitol (100 μg/kg) or vehicle orally, once a day, for different times. In this model, elocalcitol reduced total lesion weight up to 70% upon treatment for one week before and two weeks after disease induction. Peritoneal adhesions were not detected in elocalcitol-treated mice. Interestingly, a therapeutic effect was also observed on already established lesions. Elocalcitol was shown to reduce the capacity of mouse endometrial cells to adhere to collagen. In addition, a decreased state of peritoneal inflammation in treated mice was demonstrated by the inhibition of macrophage recruitment and inflammatory cytokine secretion.

Conclusion: The VDR agonist elocalcitol inhibits lesion development in a validated mouse model of endometriosis, and exerts a protective effect on both the implantation and organization of transferred endometrial tissue. The realistic objective to suppress, rather than eliminate implant growth, can be achieved with an anti-inflammatory drug such as elocalcitol that may represent a safe treatment in limiting the growth of pre-existing lesions and treat recurrences. Further experiments using primate models as well as clinical trials will be helpful in evaluating the therapeutic potential of elocalcitol in women with endometriosis. Based on the results of this study, a possible translation into the clinical setting would be to administer elocalcitol during the perimenstrual and menstrual phase of the cycle. In this phase, all the potential activities of the compound (inhibition of inflammation, inhibition of endometrial cell adhesion, inhibition of lesion organization) could be exerted with the maximal efficacy

Keywords: Endometriosis, Inflammation, Adhesion, VDR Agonist

WINNERS

INTERNATIONAL WINNER

Embryology

Role of Actin Cytoskeleton During Mouse Sperm Acrosomal Exocytosis

Objective: Mammalian sperm must undergo a process termed capacitation to become competent to fertilize an egg. Capacitation renders the sperm competent by priming the cells to undergo a rapid exocytotic event called acrosomal exocytosis that is stimulated by the zona pellucida (ZP) of the egg or progesterone. Over the years, several biochemical events have been associated with the capacitation process; however, the question that has remained unanswered in investigations of capacitation is: What is the underlying reaction or set of reactions that transform the sperm cell from a state unresponsive to ZP or progesterone-stimulated acrosomal exocytosis to the state primed to respond to these stimuli? Our preliminary results demonstrate that the actin cytoskeleton plays a role in this process. Our long-term goal of this research: to elucidate the molecular mechanism whereby the actin cytoskeleton controls acrosomal exocytosis in mammalian sperm. In this proposal, we evaluate the establishment and stabilization of the primed state of acrosomal exocytosis that develops during the course of sperm capacitation. Additionally, we will examine the roles of intracellular calcium and actin in the destabilization of the primed state of acrosomal exocytosis that results in the propagation of the fusion of the outer acrosomal and plasma membranes. There are several human health-related reasons these studies are significant. For example, an understanding this process may lead to a better understanding of certain cases of male infertility and to the development of pharmacological approaches to interfere with this process, leading to new contraceptive agents. Most importantly, since actin has been implicated in exocytosis occurring in many types of somatic cells, information gathered from studying the less complicated sperm system will likely impact our understanding of secretion in other organ systems such as endocrine or digestive tissues.

Results: We have investigated the pathways governing the establishment and stabilization of the primed state of acrosomal exocytosis that develops during the course of sperm capacitation through the formation of intermediate stages of exocytosis.

Conclusion: We have investigated the connection between capacitation and acrosomal exocytosis, because it is not known why sperm do not undergo acrosomal exocytosis if they are not fully capacitated. Moreover, we propose a testable model of how actin helps to establish a metastable state during capacitation to prepare sperm for acrosomal exocytosis and how calcium may cause the dissociation of the peri-acrosomal cytoskeleton, effecting the complete fusion of the outer acrosomal membrane and the plasma membrane.

Keywords: Sperm, sp56, Acrosomal Exocytosis, Acrosome, Actin

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Dr Buffone is currently an Associate Researcher (equivalent to assistant professor) at the Institute for Experimental Biology and Medicine in Buenos Aires, Argentina. He has obtained his PhD at the University of Buenos Aires, in Argentina and then, he moved to USA as a postdoc to work with first, with George Gerton and then, with Dr Richard Schultz, both at the University of Pennsylvania. After 5 years, he returned to Argentina as an independent researcher to run his own laboratory. Dr Buffone has numerous publications in gamete biology using mouse and human sperm. His main research interest is in capacitation-related events associated with mammalian sperm acrosomal exocytosis.

WINNERS

INTERNATIONAL WINNER

Stem Cell Biology and Technology

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Antonio Uccelli was born in Genoa (Italy) in 1964 where he obtained his medical doctoral degree in 1987. He completed his residency of neurology at the University of Genoa in 1993. In 1992 he attended, as post-doctoral fellow, the Laboratory of Neuroimmunology - Department of Neurology - University of California San Francisco (UCSF) directed by Professor S.L. Hauser. From 1993 to 2011 he had a faculty position in the Department of Neurology of the University of Genoa. Since February 2012 he is the Coordinator of the Residency School of Neurosurgery of the University of Genoa. Since December 2011 he is Associate Professor of Neurology of the University of Genoa. Since 1995 he is the Director of the Neuroimmunology Unit of his Department focusing his research activities on multiple sclerosis and more recently on adult stem cells. In 2001 he received the Rita Levi Montalcini Award, yearly assigned to the best Italian researcher in the field of MS. Since 2001 he joined the Center of Excellence for Biomedical Research of the University of Genoa directed by Professor Benatti. Since 2008 he is the Director of the Neuroimmunobiology Laboratory of the Advanced Biotechnology Center of Genoa. Since 2009 he is the Director of the Center for Research and Cure of Multiple Sclerosis of the University of Genoa. Prof Uccelli is co-author of 115 peer-reviewed scientific publications with a Total impact factor: 709,088; mean IF/publication: 6,22). Dr Uccelli's C.I. (Citation Index) is 5.511, H Index is 31, G Index is 72 and E Index 52. He has been invited to give seminar and keynote lectures at many Academic sites and conferences all over the world. Since 1995 he has received numerous scientific grants from national and international agencies.

Mesenchymal Stem Cells Shape Microglia Effector Functions Through the Release of CX3CL1

Objective: Mesenchymal stem cells (MSC) display a remarkable ability to modulate the immune response and protect the central nervous system (CNS) mainly through the release of soluble factors in a paracrine fashion, affecting the functional behavior of cells in the tissues. Here we investigated the effect of the interaction between MSC and microglia in vitro and we dissected the molecular and cellular mechanisms of this cross talk.

Results: We demonstrated that MSC impair microglia activation by inflammatory cues through the inhibition of the expression and release of inflammatory molecules and stress associated proteins. We showed that MSC significantly increase microglial expression and release of molecules associated with a neuroprotective phenotype such as CX3CR1, NURR1, CD200R and IGF1. Interestingly MSC can enhance functional changes on microglia as depicted by the increase of intracellular calcium concentration and phagocytic activity. This last event is associated with an increased expression of TREM2, an innate immune receptor involved in phagocytosis in the absence of inflammation. The observed effects on CX3CR1-expressing microglia are due to the release of CX3CL1 by MSC, driven by inflammatory signals, as demonstrated by the reversal of the observed results when CX3CL1 expression was silenced in MSC or its release was blocked. Last, we showed that exogenous CX3CL1 induce phenotypic and functional changes of microglia similar to those induced by MSC.

Conclusion: These findings demonstrate that MSC instruct, through the release of CX3CL1, microglia responsiveness to pro-inflammatory signals by modulating constitutive "calming" receptors, typically expressed by "steady-state microglia" thus switching microglia from a detrimental phenotype to a neuroprotective one.

Keywords: Mesenchymal Stem Cells, Microglia, Chemokines, Neuroprotection, Immunomodulation.

WINNERS
NATIONAL WINNER

Embryology

Omega-3 Fatty Acids Accompanied with α-tocopherol Improved Fresh and Post-thaw Sperm Quality in Ruminants

Objective: The plasma membrane is a highly dynamic structure that regulates extracellular exchange and mediates fertilization. Lipid composition of the sperm plasma membrane is a major determinant of mobility characteristics, cold sensitivity, and overall viability. Species differences in lipid composition of the sperm plasma membrane is a key factor for freezability of the sperm. In several mammalian species, especially ruminants up to 60 % of phospholipid bound the total fatty acids of cells are long-chain polyunsaturated fatty acids (LCPUFAs) especially, DHA. Presence of these LCPUFAs is assumed to impart greater fluidity (less order) within the plasma membrane due in large measure to the presence of many double bonds. These specific physical characteristics may give membranes greater resistance to damage arising from the formation of ice crystals. DHA may contribute to the membrane fluidity required for the bending sperm tails. Mammalian spermatozoa are sensitive to lipid peroxidation, due to the phospholipid content of sperm membranes with their high PUFA sidechains. Seminal plasma provided some protection against peroxidation via its constituent antioxidants. However, dilution of semen reduces antioxidant availability for sperm. On the other hand, supplementing semen extender with PUFAs during cryopreservation increases ROS production. Therefore, including an antioxidant when adding PUFAs to semen extender is beneficial. The objective of our studies were to investigate combined effects of omega-3 fatty acids (FA) and a-tocopherol (vitamin E, VE) on fresh and post-thaw sperm quality in most important ruminant species including cattle, sheep and goat.

Results: The results of in vivo trials indicated that combined feeding omega-3 FA and VE improved fresh semen quality in each 3 animal species. Use of VE promoted the results in goat. Feeding FA also increased post-thaw sperm motion characteristics in bulls. The results of in vitro trials showed that using FA or/and VE increased motility and viability of frozen-thawed sperm. The best results were observed in groups that received combination of FA and VE. The DHA content and the ratio of omega-3: omega-6 FA of sperm lipid was increased in treated-groups in both trials.

Conclusion: It was concluded that feeding omega-3 FA in ruminants could enhance fresh semen quality, and α-tocopherol promoted this effect. Moreover, supplementation omega-3 FA accompanied with α-tocopherol during cryopreservation improved post-thaw quality of bovine, ovine and caprine sperm. These effects were apparently mediated by alteration of sperm lipid composition.

Keywords: Semen, Omega-3 Fatty Acids, Vitamin E, Cryopreservation, Ruminants

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Dr Armin Towhidi earned his BSc degree in Animal Science from University of Tehran in 1994. He completed an MSc and PhD degree in animal reproductive physiology at the University of Tarbiat Modares in 1997 and 2003, respectively. He was working in Animal Science Research Institute of Iran, as a research assistant in 1997-2003. In May 2003, He started his work in Department of Animal Science, College of Agriculture and Natural Resources, University of Tehran as an assistant professor. He has promoted to associate professor in January 2010. He was a visiting professor in department of animal science, Cornell University, USA, in 2012. Dr Towhidi has been working on production and cryopreservation of sperm in domestic ruminants since 10 years ago. He won 2 research awards in 2010 and 2011 from University of Tehran. He is also secretary of Holstein association of Iran. He established extension system of science and technology in University of Tehran for first time in Iran, 2013.

WINNERS

NATIONAL WINNER

Female Infertility

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Dr Ashraf Moini obtained her medical degree from Iran University of medical sciences, in 1983, and completed her specialty in Obstetrics & Gynecology from Tehran University of medical sciences, in 1989. She joined as a member of scientific board to Tehran University of medical sciences from 1990. Her current position is full professor in Obstetrics & Gynecology of Tehran University of medical sciences & head of Arash Woman's Hospital, Tehran. Since 1990, she is also a scientific member of Endocrinology and Female Infertility Department at Reproductive Medicine Research center, Royan Institute. Dr Moini is especially interested in infertility treatment and assisted reproductive technology (Endometriosis and PCOD). She has several international & national published articles, scientific books, oral and poster presentations, and has supervised several scientific projects and theses.

Risk Factors Associated with Endometriosis Among Iranian Infertile Women

Objective: Endometriosis is defined as overgrowth of endometrial tissue (glandular epithelium and stroma) outside the uterine cavity. It has been estimated to affect 2.5-3.3% of women in reproductive age. Endometriosis may be asymptomatic or associated with dysmenorrheal symptoms, dyspareunia, pelvic pain, abnormal uterine bleeding and infertility. The objective of present study was to explore the risk factors related to endometriosis among Iranian infertile women.

Results: Logistic regression showed that age, duration of infertility, BMI, duration of menstrual cycle, abortion history, dyspareunia, pelvic pain and family history of endometriosis are the independent predictive factors for any type of endometriosis while age, education, duration of infertility, BMI, amount and duration of menstrual bleeding, menstrual pattern, dyspareunia, pelvic pain and family history of endometriosis are the independent predictive factors of severe endometriosis. The AUC for these models were 0.781 (0.735-0.827) and 0.855 (0.810-0.901) for any type and severe endometriosis, respectively.

Conclusion: It seems that any type of endometriosis and severe ones could be predicted according to demographic, menstrual and reproductive characteristics of infertile women.

Keywords: Endometriosis, Infertility, Risk factors, Laparoscopy, Severe Endometriosis

WINNERS
NATIONAL WINNER

Reproductive Genetics

Genome Instability and DNA Damage in Male Somatic and Germ Cells Expressed as Chromosomal Microdeletion and Aneuploidy Is a Major Cause of Male Infertility

Objective: Sperm chromatin insufficiencies leading to low sperm count and quality, infertility and transmission of chromosomal microdeletion and aneuploidies to next generations can be due to exposure to environmental pollutions, chemicals and natural or manmade ionizing radiation. In this project which has continued for more than 10 years and is unique in many technical aspects in Iran and in the region, genome instability induced by exogenous DNA damaging agents in sperm or spermatogenic cycle, the correlation of DNA damage with chromosomal microdeletion and aneuploidy, sperm chromatin alterations in failed fertilized oocyte's, chromosomal alterations in preimplantation embryos and localization of DAZ microdeletion on sperm nuclei were studied. Correlation of DNA damage induced during spermatogenesis leading to chromosomal aneuploidy and micronuclei in mouse preimplantation embryo is shown.

Results: Results indicate that sperm DNA damage in fertile and subfertile patients increased with increasing severity of male infertility and is well correlated with chromosomal aneuploidy especially sex chromosomes. Copy number variations of studied markers in AZFc region (microdeletion and duplication) after exposure to radiation increased with a dose dependent fashion ($p<0.001$). Correlation of DNA damage and chromosomal aneuploidy with in vitro fertilization and pregnancy outcome is also shown. Using FISH-PRINS technique showed that DAZ microdeletion on sperm nuclei can be easily evaluated and shown that situation of DAZ microdeletion in somatic and germ cells might not be always similar.

Conclusion: A direct correlation between protamine deficiency and sperm DNA damage was found for all subfertile patients studied and also sperm DNA damage is well correlated with chromosomal aneuploidy especially sex chromosomes. DNA damage might be involved in the process of malsegregation of chromosomes. This study indicates that genomic instability in infertile men could probably contribute to the development of an impaired reproductive capacity. Irradiation of gonads during spermatogenesis may lead to unstable chromosomal aberrations and probably stable chromosomal abnormalities affecting pairing and disjunction of chromosomes in successive preimplantation embryos expressed as MN. Increased frequency of induced microdeletion and duplication in infertile men compared with normal might be attributed to the deficiency in repair systems and the genetic factors involved in incomplete spermatogenesis of infertile men. Therefore, evaluation of DAZ microdeletion on sperms of male candidates for ICSI is necessary instead of simply using somatic cells for DAZ evaluation.

Keywords: Male infertility, Genome instability, DAZ microdeletion, DNA damage, Aneuploidy, Sperm, Leukocytes, Exogenous DNA damaging agents

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Professor Hossein Mozdarani studied at St Andrews University, UK, where he obtained PhD in Medical Cytogenetics in 1989. He currently holds the position of Professor of the Medical Genetics Department of Tarbiat Modares University, where he has been teaching at post-graduate level and supervising more than 20 PhD and 70 MSc students since 1989. He is the author or co-author of some 180 papers in national and international journals, and the author/translator of several books (15 items) in the field of cytogenetics and radiobiology. He is also a pioneer in studying cytogenetics of gametes and introducing preimplantation genetic diagnosis in Iran. In recognition of his outstanding research in the field of Medical Sciences, awarded International Khwarizmi Prize in 2011, and elected as National distinguished Professor in 2000. He has been selected as Tarbiat Modares University outstanding professor for three times (1993, 1999, 2003) and distinguished researcher for five times (2000-2004). He was awarded the second and third class medal for Basic Medical Sciences in Razi Medical Science National Festival in 1999 and 2006 respectively. He also has been selected as national winner of Royan international award (2009).

WINNERS

NATIONAL WINNER

Stem Cell Biology and Technology

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Malek Hossein Asadi, PhD of Molcular Genetics, Assistance Professor at the Graduate University of Advanced Technology. He did his BSc degree in Biology Department of Ferdowsi Univeristy, and both his master and PhD programs in Molecular Genetics Department of Tarbiat Modares University in Tehran. Working in Dr Mowla's lab in TMU, he was deeply involved in deciphering the role of iPS genes, specially Oct4 variants, in tumorigenesis of gastric adenocarcinoma. He was a member of research team in Dr Mowla's lab who discovered a novel variant of OCT4, designated as OCT4B1, which is highly expressed in stem cells as well as some tumor cell lines. Based on their latest findings published in International Journal of Cancer and Urology Journal, OCT4B1 acts as an anti-apoptotic factor in gastric and bladder cancers. Currently, he is involved in proceeding his research on Cancer Stem Cell concept in Biotechnology Department at Graduate University of Advanced Technology in Kerman.

OCT4B1, a Novel Spliced Variant of OCT4, Is Highly Expressed in Gastric Cancer and Acts as an Antiapoptotic Factor

Objective: The octamer-binding transcription factor 4 (OCT4) is involved in regulating pluripotency and self-renewal maintenance of embryonic stem cells. Recently, misexpression of OCT4 has been also reported in some adult stem as well as cancer cells; a finding which is still controversial. In addition to the previously described spliced variants of the gene (e.g. OCT4A and OCT4B), we have recently identified a novel variant of the gene, designated as OCT4-B1.

Results: We have detected the expression of OCT4B1 in tumors with no or much lower expression in marginal samples of the same patients ($p < 0.002$). Our data revealed that interfering with the expression of OCT4B1 caused profound changes in the morphology and cell cycle distribution of the cells. Furthermore, down-regulation of OCT4B1 significantly elevated the relative activity of caspase-3/caspase-7 and the rate of apoptosis in the cells (more than 30%).

Conclusion: All together, our findings suggest that OCT4B1 has a potential role in tumorigenesis of gastric cancer and candidates the variant as a new tumor marker with potential value in diagnosis and treatment of gastric cancer.

Keywords: OCT4B1, Cancer Stem Cells, Gastric Denocarcinoma, Apoptosis

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JURIES

Last Name, First Name, Degree	Country
Aboutorabi, Roshanak, PhD	Iran
Abroun, Saeid, PhD	Iran
Aflatoonian, Reza, MD, PhD	Iran
Aflatoonian, Abbas, MD	Iran
Afsharian, Parvaneh, PhD	Iran
Aghdami, Nasser, MD, PhD	Iran
Agramoorthy, Govindasamy, PhD	Taiwan
Ahmadi, Firoozeh, MD	Iran
Ajonuma, Louis Chukwuemeka, MD, PhD	Hong Kong
Akhlaghpoor, Shahram, MD	Iran
Akhondi, Mehdi, PhD	Iran
Akhoond, Mohamad Reza, PhD	Iran
Aleyasin, Ashraf, MD	Iran
Al-Hasani, Safaa, DVM, PhD	Germany
Aliabadi, Elham, PhD	Iran
Alipour, Hiva, DVM, PhD Stud.	Denmark
Almadani, Seyed Navid, MD	Iran
Almstrup, Kristian, PhD	Denmark
Altmae, Signe, PhD	Spain
Ansari Pour, Naser, PhD	Iran
Ao, Asangla, PhD	Canada
Arefi, Soheila, MD	Iran
Ashrafi, Mahnaz, MD	Iran
Azadbakht, Mehri, PhD	Iran
Azin, Seyed Ali, MD, PhD	Iran
Bahadori, Mohammad Hadi, PhD	Iran
Baharvand, Hossein, PhD	Iran
Bakhtiari, Mitra, PhD	Iran
Baron-Van Evercooren, Anne, PhD	France
Behboodi, Esmail, DVM, PhD	Canada
Benagiano, Giuseppe, MD, PhD	Switzerland
Bulte, Jeff, PhD	USA

Last Name, First Name, Degree	Country
Cantz, Tobias, MD	Germany
Chian, Ri-Cheng, PhD	Canada
Chieffi, Paolo, MD, PhD	Italy
Crosignani, Pier Giorgio, MD, PhD	Italy
Dadkhah, Farid, MD	Iran
De Geyter, Christian, MD	Switzerland
De Rooij, Dirk G, PhD	Netherlands
Duggavathi, Raj, DVM, PhD	Canada
Ebrahimi, Bita, PhD	Iran
Eftekhari-Yazdi, Poopak, PhD	Iran
Evans, John, PhD	New Zealand
Evers, Johannes, MD, PhD	Netherlands
Farrahi, Faramarz, MD	Iran
Farzadi, La'ya, MD	Iran
Ferrara, James L.M., MD, DSc	USA
Fleming, Steven, MSc, PhD	Australia
Fulka, Jr., Josef, PhD, DSc	Czech Republic
Geraedts, Joep, PhD	Netherlands
Ghaderian, Sayyed Mohammad Hossein, MD, PhD	Iran
Ghaedi, Kamran, PhD	Iran
Ghaffari Novin, Marefat, MD, PhD	Iran
Ghafoori, Mahyar, MD	Iran
Ghazizadeh, Shirin, MD, PhD	Iran
Giojalas, Laura, PhD	Argentina
Gourabi, Hamid, PhD	Iran
Hamidieh, Amir Ali, MD	Iran
Hammarberg, Karin, PhD	Australia
Heimberg, Harry, PhD	Belgium
Henkel, Ralf, PhD	South Africa
Hescheler, Jurgen, MD	Germany
Hoseini far, Hani, MSc	Iran
Hosseini, Jalil, MD	Iran

Last Name, First Name, Degree	Country
Hosseinkhani, Hossein, PhD	Taiwan
Jalal Shokouhi, Jalal, MD	Iran
Jalali, Mohsen, PhD	Iran
Kabir-Salmani, Maryam, PhD	Iran
Kalantar, Seyed Mehdi, PhD	Iran
Kallen, Bengt, MD, PhD	Sweden
Kamali, Koorosh, MD, MPH, PhD	Iran
Kamali, Mohammad, PhD	Iran
Karimzadeh Meybodi, Mohammad Ali, PhD	Iran
Kazemeyni, Seyed Mohammad, MD	Iran
Khalili, Mohammad Ali, PhD	Iran
Küpker, Wolfgang, MD, PhD	Germany
Larijani, Tahereh, MD	Iran
Maccarrone, Mauro, PhD	Italy
Ma'dani, Tahereh, MD	Iran
Mathur, Premendu, PhD	India
Minami, Naojiro, PhD	Japan
Moein, Mohammad Reza, MD	Iran
Moghaddam Matin, Maryam, PhD	Iran
Mohammadi Roushandeh, Amaneh, PhD	Iran
Mohseni Meybodi, Anahita, PhD	Iran
Monsees, T.K., PhD	South Africa
Movahedin, Mansoureh, PhD	Iran
Mowla, Seyed Javad, PhD	Iran
Mukhopadhyay, Asok, PhD	India
Nakatsuji, Norio, PhD	Japan
Nasr-Esfahani, Mohammad Hossein, PhD	Iran
Nasu, Kaei, MD, PhD	Japan
Nematollahi-Mahani, Seyed Noureddin, PhD	Iran
Ng, Ernest, MD	Hong Kong
Nielsen, Hans Ingolf, PhD	Denmark
Nieto Toledano, Maria Angela, PhD	Spain
Niknejadi, Maryam, MD	Iran
Noruzinia, Mehrdad, MD, PhD	Iran
Nussler, Andreas, PhD	Germany
Oback, Björn, PhD	New Zealand
Ory, Steven, MD	USA
Ott, Michael, MD	Germany
Parsanezhad, Mohammad Ebrahim, MD	Iran
Passier, Robert, PhD	Netherlands
Piemonti, Lorenzo, MD	Italy
Piryaei, Abbas, PhD	Iran
Pluchino, Stefano, MD, PhD	UK

Last Name, First Name, Degree	Country
Pourmand, Gholamreza, MD	Iran
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Shahhoseini, Maryam, PhD	Iran
Shahverdi, Abdolhossein, PhD	Iran
Shahzadeh Fazeli, Seyed Abolhassan, MD, PhD	Iran
Shamsi Pour, Mansur, PhD Stud.	Iran
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Suh, Kahp-Yang, PhD	Korea
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Tehraninejad, Ensieh, MD	Iran
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Ghaffari, Firoozeh, MD	Iran
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Khalili, Gholamreza, MD, PhD	Iran
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Tahamtani, Yaser, PhD	Iran
Taheri Panah, Robabeh, MD	Iran
Tehraninejad, Ensieh, MD	Iran
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Zarei Moradi, Shabnam, MSc
Zarrabi, Morteza, MD

ROYAN INSTITUTE
ANNUAL REPORT

www.royaninstitute.org

ANNUAL REPORT

Contents:

Compilers:

Bagheri Lankarani, Narges, **PhD**
Fouladgar, Maryam, **BSc**
Haghighi, Hadieh, **BSc**
Kheymeh, Abolfazl, **MSc**
Kouhkan, Azam, **MD**
Molla Ahmadi, Fahimeh, **BSc**
Nickhah, Zeinab, **BSc**
Rahmani, Fatemeh, **BSc**
Shajareh Pour, Laleh, **BSc**
Soleimani Omid, Fariba, **BA**
Tahamtani, Yaser, **PhD**
Vahabbi, Zeinab, **BSc**

ANNUAL REPORT

ROYAN INSTITUTE

Royan Institute is a world-renowned center committed to multidisciplinary, campus-wide, integration and collaboration of scientific, academic, and medical personnel for understanding male/ female infertility, embryo development, stem cell biology, and biotechnology. Royan Institute provides comprehensive services for the treatment of infertility, regenerative medicine/ cell therapy and production of recombinant proteins.
Royan Institute was established in 1991 by the late Dr Saeid Kazemi Ashtiani (May he rest in peace) in Tehran, Iran. The center supports innovation, excellence and the highest ethical standards focusing on increasing the success rate of infertility treatment alongside embryo health. Furthermore, this center supports the placement of stem cell research findings into operation in cell therapy and disease treatment with the purpose of increasing the level of health.

Mission

The mission of Royan Institute, which is aligned with the country's comprehensive scientific roadmap and the Iranian Academic Center for Education, Culture and Research (ACECR) development plan, can be categorized in the following aspects:

- Research and development of science and technology in the fields of reproductive biomedicine, stem cells and biotechnology
- Education and promotion of scientific findings at national and international levels
- Commercialization of research findings to offer services and biological products for the purpose of resolving the country's specialized needs
- Treatment of infertile patients and difficult-to-treat diseases by the efficient use of research findings

Vision

Royan Institute is a center of excellence in research and technology at an international level, a pioneer in development of science, technology and innovation of biological sciences, and an internationally renowned authority on stem cells science, reproduction, biotechnology, and regenerative medicine alongside its effective role in improving the society's health.

Royan Consists of Three Research Institutes and a Core Facility

1. Royan Institute for Reproductive Biomedicine (RI-RB)
2. Royan Institute for Stem Cell Biology and Technology (RI-SCBT)
3. Royan Institute for Biotechnology (RI-B)
4. Laboratory Animal Core Facility

Royan Institute for Reproductive Biomedicine (RI-RB)

Royan Institute for Reproductive Biomedicine, founded in 1991, consists of six departments and one infertility clinic actively working on different aspects of infertility and the development of new methods for infertility treatment.
Its vision is to improve the population's health through infertility treatments and giving infertile families the hope of having children.
In this regard, RI-RB's mission is to research on different aspects of infertility and its treatment in order to increase the success rate alongside improving embryo health.

RI-RB Departments

- Endocrinology and Female Infertility
- Andrology
- Embryology
- Reproductive Genetics
- Epidemiology and Reproductive Health
- Reproductive Imaging
- Infertility Clinic

Royan Institute for Stem Cell Biology and Technology (RI-SCBT)

Royan Institute for Stem Cell Biology and Technology (RISCBT) was established in 2002 to promote research on general stem cell biology in Iran. Since early 2010, it has continued its activities in:

- Stem Cells and Developmental Biology — 16 Research Programs, 10 Core Facilities
- Regenerative Medicine — 5 Research Programs, 1 Core Facility

RI-SCBT's vision is to efficiently put stem cell research findings into operation in disease treatment with the aim of improving health. RI-SCBT's mission is to generate insights into the biology of stem cells through basic research and to provide the foundation needed for novel therapies from regenerative medicine.

Royan Institute for Biotechnology (RI-B)

Royan Institute for Biotechnology was initially established in 2004 as the first research branch of Royan Institute. It is located in Isfahan Province, which is famous for its architecture, rivers and handcrafts, and is known as the city of "blue tiles".
Royan Institute for Biotechnology was established with the purpose of advancing research in reproduction, development, cell and molecular biology, in addition to the fields of bioengineering and reproductive technology. In this regard, this Institute has focused on somatic cell nuclear technology (SCNT), interspecies-SCNT, transgenesis, the establishment of novel sperm selection methods for assisted reproductive technology, cell differentiation, production of recombinant proteins and the cell biology of peroxisomes. The endeavors of Royan Institute for Biotechnology have made us the pioneer of animal cloning in Iran and the Middle East. Therefore, this Institute is well known for its cloned animals, Royana and Hanna, the first cloned sheep and goat in Iran, and Bovana; the first calf born with IVF. Areas of interest at this Institute are: gene reprogramming during SCNT, transgenesis, sperm cell biology, the role of sub-cellular organelles in differentiation and recombinant protein technology. In addition, the Institute is providing a comprehensive and coordinated "bench to production" approach in recombinant protein technology, animal farming and the establishment of methods to increase the efficiency of assisted reproductive techniques.

RI-B Projects and Facilities

- Embryology
- Andrology
- Stem Cell
- Genetics
- Ricombinant Protein

The institute's vision is to attain new heights in biotechnology research, shaping biotechnology into a premier precision tool of the future for creation of wealth, ensuring social justice and efficiently bridging science with daily life.

Overview of the Institute

- The first IVF child born in Tehran (1993)
- The first ICSI child born in Tehran (1995)
- Iran's second success in open testicular biopsy to treat severe male infertility (1996)
- The first frozen embryo child born in Iran (1996)
- The first ICSI birth by frozen sperm of a gonadectomized man in Iran (1999)
- The first human embryonic stem cell line established in Iran and the region (2003)
- The first PGD child born in Iran (2004)
- First time use of adult stem cells in the treatment of MI during CABG in Iran (2004)
- Production of insulin producing cells from human embryonic stem cells (2004)
- Culture of human limbal stem cells on chorionic membrane (2004)
- Establishment of the first Private Cord Blood Bank in Iran (2005)
- The first IVM-IVF sheep born in Iran (2006)
- The first cloned sheep born in Iran (2006)
- Establishment of mouse and human induced pluripotent stem cells (iPS) (2008)
- The first cloned goat born in Iran (2009)
- A new method for treatment of Vitiligo by cell transplantation (2009)
- The first transgenic goats born in Iran (2010)
- The first calves born from vitrified in vitro developed embryos in Iran (2011)
- Establishment of cell therapy pre-hospital (2011)
- Establishment of Stem Cell Bank (2011)
- The first healthy child birth after Molecular PGD for beta-thalassemia in Iran (2012)
- Birth of eight cloned goats through the simplified method of SCNT in Iran (2013)

ENDOCRINOLOGY AND FEMALE INFERTILITY DEPARTMENT OF RI-RB

Message from the Department Head

The goal of our department is to perform applied researches in order to achieve the best and easiest strategies for diagnosis and improvement of ART outcomes. Our department focuses on the treatment and research of PCOS, recurrent abortion, endometriosis, poor responders and recurrent implantation failure. In addition, we investigate various ovulation inductions, COH and ART/ ET methods.

Department Head:
Mahnaz Ashrafi, MD
(Obstetrics & Gynecology)

ashrafim@royaninstitute.org

Biography
Dr Mahnaz Ashrafi obtained her MD from Tehran University of Medical Science in 1984 and continued her education on Obstetrics & Gynecology from 1985 to 1989 in Iran University of Medical Science, Tehran, Iran. During 1989 to 2005 she was an Assistant Professor at Faculty of Medicine, Iran University of Medical Science. Since 2005 she has been an Associate Professor at Faculty of Medicine, Iran University of Medical Science. Dr Ashrafi has been the Head of Endocrinology and Female Infertility Department, Royan Institute from1989.

Department History and Introduction

This department was established in 1995, and began to research on new strategies and advanced methods for the diagnosis and treatment of female infertility and recurrent abortion with the intent of increasing implantation rates.

Goals of the Department

- Evaluation and treatment of infertile couples
- New guidelines for improving IVF outcomes
- Achieving new strategies for diagnosing infertility causes
- Ovulation induction and COH
- Improving methods for oocyte and embryo culture
- Endometrial preparation
- The promotion of prenatal care

Research Scientists

Ghaffari, Firouzeh, MD (Gynecologist)
Hafezi, Maryam, MD (Gynecologist)
Hemmat, Mandana, MD (Gynecologist)
Hosseini, Roya, MD (Endocrinologist)
Madani, Tahereh, MD (Gynecologist)
Mashayekhi, Mehri, MD (Gynecologist)
Moini, Ashraf, MD (Gynecologist)
Ramezanali, Fariba, MD (Gynecologist)
Shahrokh Tehrani Nejad, Ensieh, MD (Gynecologist)
Shiva, Marzieh, MD (Gynecologist)
Zanganeh, Mehrangiz, MD (Infectious Diseases Physician)

Research Assistants

Amirchaghmaghi, Elham, MD (PhD Candidate)
Arabipour, Arezoo, Msc
Kiani, Kiandokht, PhD Candidate
Jahangiri, Nadiya, MSc
Jahanian Sadat Mahaleh, Shahideh, PhD Candidate
Malekzadeh, Farideh, MSc

Staff

Jalali, Samaneh, BSc
Joudmardi, Masoumeh, BSc
Keshvarian, Maryam, AA
Sanati, Azam, BSc
Shajarehpour Salavati, Laleh, BSc
Zolfaghari, Zahra, BSc

Students

Amirchaghmaghi, Elham, MD (PhD Candidate)
Amjadi, Fatemeh, PhD
Azizolahi, Saeed, PhD
Chekini, Zahra, MSc
Elhami-Golzar, Maral, MSc
Hashemzadeh, Mohammadreza, MSc
Hosseini, Fatemeh Sadat, PhD
Hosseini, Elham, PhD
Lakpour, Mohammadreza, MSc
Mahdiyan, Soudeh, MSc
Mohebbi, Ali, MSc
Nouri, Elaheh, MSc
Pesaran-Hajabbas, Faezeh, DDS
Raghibi, Maryam, MSc
Taghavi, Seyd Abdolvahab, PhD
Yazdanpanah, Ayna, MSc
Zandi, Mitra, PhD
Zandiyeh, Zahra, PhD

News and Events

Journal Clubs

- **Hypothalamic Amenorrhea,** Dr F. Ghaffari, November 20, 2012
- **Recurrent Abortion,** Dr M. Mashayekhi, January 22, 2013
- **Recurrent Implantation Failure (RIF),** Dr M. Shiva, February 12, 2013

Workshops/Symposiums

- **Recurrent Abortion Symposium**

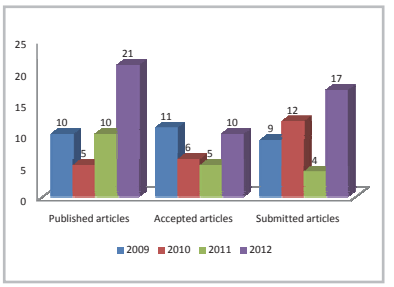
Assessment of Etiology & Treatment in Couples due to Recurrent Abortion. Scientific Manager: Dr Maryam Hafezi, Executive Manager: Samaneh Jalali and Fatemeh Sheikhan. November 16, 2012.

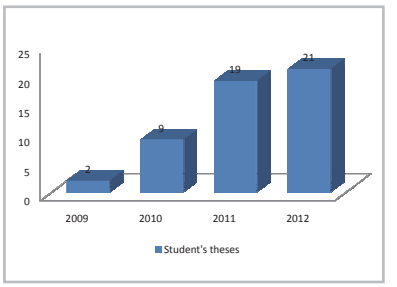
- **Pre-congress Workshop of Using Monopolar or Bipolar Cautery in Operative Hysteroscopy**

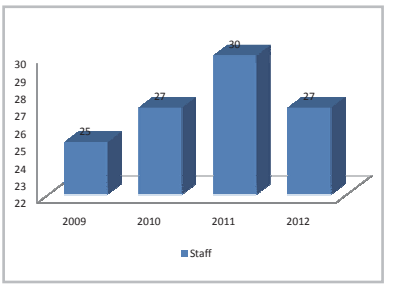
Introduction about using monopolar or bipolar cautery in operative hysteroscopy. Scientific Manager: Dr Ensieh Shahrokh Tehrani Nejad, Executive Manager:Dr Marzieh Shiva. September 3, 2012.

- **Pre-congress Workshop of Implantation**

Introduction to physiology, aspects of implantation, introduction to effects of COH on implantation, and uterine preparation protocols for ET, among others. Scientific Manager: Dr Mahnaz Ashrafi, Executive Manager: Dr Elham Amirchaghmaghi. September 4, 2012.







Published Book / Chapter Book

Increasing pregnancy by improving embryo transfer techniques. In Book: Embryo Transfer. ISBN 979-953-307-354-4. Dr Tahereh Madani, Nadia Jahangiri.

The role of low dose hCG in late follicular phase of controlled ovarian hyper stimulation (COH) protocols. In Book: In vitro Fertilization – Innovative Clinical and Laboratory aspects. ISBN 979-953-307-566- Dr Mahnaz Ashrafi, Kiandokht Kiani.

Advance treatment of infertility (Online). Dr Marzieh Shiva, Dr Souphia Abdollah, under observation of Dr Mahnaz Ashrafi.

RIF (Recurrent Implantation Failure) (Online). Dr Marzieh Shiva, Dr Souphia Abdollah, under observation of Dr Mahnaz Ashrafi.

Publications

Broer SL, Van Disseldorp J, Broeze KA, Dolleman M, Opmeer BC, Anderson RA, Ashrafi M, Bancsi L, Caroppo LE, Copperman A, Ebner T, Eldar Geva M, Erdem M, Greenblatt EM, Jayaprakasan K, Fenning R, Klinkert ER, Kwee J, Lambalk CB, La Marca A. **Added value of ovarian reserve testing on patient characteristics in the prediction of ovarian response and ongoing pregnancy: an individual patient data approach.** Human Reproduction Update. 2013; 19(1): 26-36.

Ranjzad F, Mahmoudi T, Irani Shemirani A, Mahban A, Nikzamir A, Vahedi M, Ashrafi M, Gourabi H. **A common variant in the adiponectin gene and polycystic ovary syndrome risk.** Molecular Biology Reports. 2012; 39(3): 2313-9.

Madani T, Mohammadi Yeganeh L, Khodabakhshi S, Akhoond MR, Hasani F. **Efficacy of low dose hCG on oocyte maturity for ovarian stimulation in poor responder women undergoing intracytoplasmic sperm injection cycles: a randomized controlled trial.** Journal of Assisted Reproduction and Genetics. 2012; 29(11): 1213-20.

Madani T, Mohammadi Yeganeh L, Ezabadi Z, Hasani F, Chehrazi. **Comparing the efficacy of urinary and recombinant hCG on oocyte/follicle ratio to trigger ovulation in women undergoing intracytoplasmic sperm injection cycles: a randomized controlled trial.** Journal of Assisted Reproduction and Genetics. 2012; 30(2): 239-45.

Moini A, Shiva M, Arabipoor A, Hosseini R, Chehrazi M, Sadeghi M. **Obstetric and neonatal outcomes of twin pregnancies conceived by assisted reproductive technology compared with twin pregnancies conceived.** European Journal of Obstetrics & Gynecology and Reproductive Biology. 2012; 165(1): 29-32.

Madani T, Ashrafi M, Yeganeh LM. **Comparison of different stimulation protocols efficacy in poor responders undergoing IVF: a retrospective study.** Gynecological Endocrinology. 2012; 28(2): 102-5.

Moini A, Tadayon S, Tehranian A, Yeganeh LM, Akhoond MR, Salman Yazdi R. **Association of thrombophilia and polycystic ovarian syndrome in women with history of recurrent pregnancy loss.** Gynecology Endocrinology. 2012; 28(8): 590-3.

Tehraninejad ES, Hafezi M, Arabipoor A, Aziminekoo E, Chehrazi M, Bahmanabadi A. **Comparison of cabergoline and intravenous**

albumin in the prevention of ovarian hyperstimulation syndrome: arandomized clinical trial. Journal of Assisted Reproduction and Genetics. 2012; 29(3): 259-64.
Koruji M, Shahverdi A, Janan A, Piryaei A, Lakpour MR, Gilani Sedighi MA. **Proliferation of small number of human spermatogonial stem cells obtained from azoospermic patients.** Journal of Assisted Reproduction and Genetics. 2012; 29(9): 957-67.

Karamzadeh B, Eslami nejad MB, Aflatoonian R. **Isolation characterization and comparative differentiation of human dental pulp stem cells derived from permanent teeth by using two different methods.** Journal of Visualized Experiments. 2012; (69).

Parvizy S, Kiani K, Ivbijaro G. **Women's health bridges and barriers: a qualitative study.** Health Care for Women International. 2013; 34(3-4): 193-208.

Moieni A, Bahgar L, Ashrafinia M, Eslami B, Ghaderi R, Ashrafinia N**. Fertility outcome after operative laparoscopy versus no treatment in infertile women with minimal or mild endometriosis.** International Journal of Fertility & Sterility. 2012; 5(4): 235-240.

Ghafari F, Kiani K, Bahmanabadi A, Akhoond MR. **Comparison of Easy and difficult embryo transfer outcomes in in vitro fertilization.** International Journal of Fertility & Sterility. 2013; 6(4): 232-237.

Moini A, Kiani K, Ghaffari F, Hoseini F. **Hysteroscopic findings in patients with a history of two implantation failures following in vitro fertilization.** International Journal of Fertility & Sterility. 2012; 6(1): 27-30.

Tehrani Nejad E, Pourmatroud E, Sadighi Gilani MA, Rakebi M, Azimi, Neko Z, Arabipoor A. **Comparison of the intractoplasmic sperm injection outcomes between oligospermic and obstructive azoospermia and non-obstructive.** International Journal of Fertility & Sterility. 2012; 6(1): 13-18.

Madani T, Irani Sh, Ashrafi M, Nabavi M. **The effect of flutamide on induction if ovulation in PCOS patients.** International Journal of Fertility & Sterility. 2012; 6(1): 65-70.

Moini A, Javanmard F, Eslami B, Aletaha A**. Prevalence of metabolic syndrome in polycystic ovarian syndrome women in a hospital of Tehran.** Iranian Journal of Reproductive Medicine. 2012; 2(10): 127-130.

Moini A, AhmadiF, Eslami B, Zafarani F. **Dizygotic twin pregnancy with a complete hydatidoform mole and a coexisting viable fetus.** Iranian Journal of Radiology. 2011; 8(4): 249-252.

Faridi Tazeh-Kand N, Moini A, Eslami B, Khajehdehi A. **Continuous infusion of remifentanil plus ketamine compared with continuous remifentanil for pain relief in labor.** Medical Journal of Islamic Republic of Iran. 2011; 4(25): 171-176.

Core Facility

Female Infertility Research Laboratory

Introduction

The Female Infertility Research Laboratory is a cellular and molecular research facility established in 2010 to undertake researches in the field of reproduction.

Staff

Aghajanpour, Samaneh, MSc
Janan, Arghavan, MSc

Core Facility Head:
Reza Aflatoonian, MD, PhD

rezaaflatoonian@royaninstitute.org

Boigraphy
Dr Reza Aflatoonian was born in 1970. He received his Medical Degree from Shahid Sadoughi University of Medical Sciences, Yazd, in 1998. He started his PhD degree in Reproductive Medicine at University of Sheffield and was graduated in 2008. He continued his education at post-doctoral level in Molecular Reproductive Medicine at the same university and graduated in 2009. He joined Endocrinology and Female Infertility Department of Royan Institute, and established Female Infertility Research Laboratory in 2010. He has supervised several reproductive projects in collaboration with Embryology, Andrology, Genetics and Stem cell departments.

ANDROLOGY DEPARTMENT OF RI-RB

Department Head:
Mohammad Ali Sadighi Gilani, MD
(Urology)

ali.sadighi@royaninstitute.org

Biography
Dr Sadighi Gilani was born in 1954 and studied geology at Shiraz University in 1970. He continued his studies and earned an MSc degree at the School of Mines & Technology, South Dakota, USA in 1977. Afterwards he began his study of medicine at Tehran University of Medical Science in 1980. Dr Sadighi Gilani completed his residency training at the Urology Department of Hashemi-Nejad Hospital-University of Tehran University of Medical Science in 1992. From 1992 to 1993 he was trained as an observer in the Institute of Urology and Nephrology in London, England. In 1995 he completed his master training for no Scalpel Vasectomy (WK) with Professor Li in Tehran, Iran by P.C.L and training for Vasectomy by Professor Li, Tehran-Iran by P.C.I.

Message from the Department Head

The department of Andrology provides the most scientific protocols in the diagnosis and treatment of male infertility. This new male infertility management depends on specialized proper evaluation of the male factor by clinical examination for testicular size and checking for the presence of varicocele, hormonal profile, scrotal Doppler sonography, and semen analysis, according to the standards of the World Health Organization. Different modalities are available in this unit to manage low sperm count, low sperm motility and increased sperm abnormality.
The mission of this department is to improve diagnostic and therapeutic methods by using and applying the results of investigative projects, in addition to using stem cells to treat patients with incomplete spermatogenesis. Providing quality health care for infertile males, educating the lay and professional communities on the latest treatments for male fertility and enhancing the understanding of male infertility issues by developing research projects are the vision of this department.

Department History and Introduction

This department was established in 1995 and started to research on male infertility factors. The first step in infertility management is to evaluate the couple. Male factor infertility accounts for approximately 50% of all infertility cases. Thus in order to study male factor infertility it is necessary to use appropriate diagnostic and therapeutic techniques. The intent of this research department is to develop new diagnostic methods and treatment for male factor infertility.

Goals of the Department

- Determining the etiology of spermatogenesis, sperm function and ejaculation disorders
- Determining the etiology of azoospermic, genetic, and maturation disorders
- Determining the etiology of dry and retrograde ejaculation

Main Activities of Andrology Department

- Improving diagnostic and therapeutic methods
- Determining the etiology of spermatogenesis, as well as functional and ejaculation disorders

Research Scientists

Azizi, Mohammad, MD
Dadkhah, Farid, MD (Urologist)
Farrahi, Faramarz, MD (Urologist)
Hosseini, Seyed Jalil, MD (Urologist)
Nour Mohammadi, Ahmad, MD
Salman Yazdi, Reza, MLD
Zarrabi, Morteza, MD (PhD Student)

News and Events

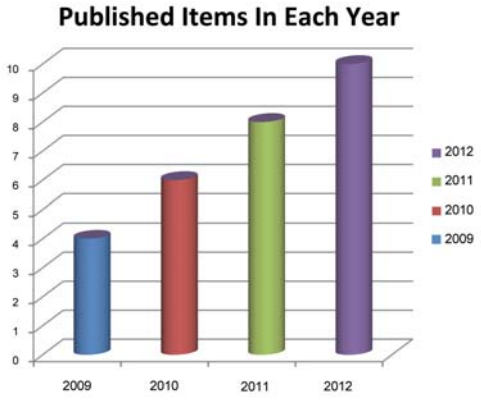
Journal Clubs

- **Assessment of DNA Fragmentation,** Dr Sabbaghian, July 26, 2012.
- **Survey of Infertile Men,** Dr Sadighi Gilani, February 14, 2013.
- **Sperm Extraction Methods; TESE, MD-TESE, PESA, TESA,** Dr Hosseini, February 14, 2013.
- **Surgical Treatment in Male Infertility: V.V, V.E.A, Varicocelectomy, Electroejaculation, EDO,** Dr Farrahi, February 14, 2013.
- **Diagnostic Tests: Sperm Analysis,** Dr Salman Yazdi, February 14, 2013.
- **Diagnostic Tests: Sperm DNA Fragmentation,** Dr Sabbaghian, February 14, 2013.
- **A Review of Drug Therapy in Male Infertility,** Dr Dadkhah, March 5, 2013.

Workshops

- **Assessment of Sperm DNA Fragmentation in Male Infertility**

Clinical aspects of DNA fragmentation assessment: Methods of chromatin damage assessment: AOT (Acridine Orange Test), SCSA (Sperm Chromatin Structure Assay), SCD (Sperm Chromatin Dispersion Test) and CMA3 (Chromomycin A3). Scientific Manager: Dr Marjan Sabbaghian; Executive Manager: Hani Hosseinifar and Tahereh Modarresi, September 3, 2012.



- **Semen Analysis**

The necessary steps to ensure an accurate sperm count; Illustrations and descriptions for normal and abnormal sperm morphology. Scientific Manager: Dr Reza Salman Yazdi; Executive Manager: Dr Marjan Sabbaghian, May 17, 2012.

Publications

Hosseinifar H, Gourabi H, Salekdeh GH, Alikhani M, Mirshahvaladi S, Sabbaghian M, Modarresi T, Gilani MA. **Study of sperm protein profile in men with and without varicocele using two-dimensional gel electrophoresis.** Urology. 2013 Feb; 81(2):293-300.

Farrahi F, **Ejaculatory Duct Obstruction.** IJFS. Summer 2012; 6(1): 9.

Salman Yazdi R. External Quality Assessment - A Necessity in the Andrology Laboratory. IJFS. Summer 2012; 6(1):10.

Yazdanikhah S, Sabbaghian M, Hosseinifar H, Modarresi T, Sadighi Gilani MA. **Evaluation of DNA Fragmentation in Patients with Total Globozoospermia.** IJFS. Summer 2012; 6(1):76-77.

Sabbaghian M, Shafipour M, Shahhoseini M, Sadighi Gilani M, Hosseinifar H, Modarresi T. **Expression levels of Septins 14 in testes of patients with normal spermatogenesis and spermatogenic failure.** IJRM. April 2012; 10(1): 25-26.

Hosseinifar H, Sadighi Gilani M, Gourabi H, Hosseini Salekdeh G, Daliri Hampa A, Sabbaghian M. **Study of HSPA5, ATP5D and SOD1 proteins expression in men with and without varicocele.** IJRM. April 2012; 10(1): 28-29.

Modarresi T, Sabbaghian M, Sadighi Gilani M, Shahverdi A, Hosseinifar H, Akhlaghi A. **Enzymatic digestion improves testicular sperm retrieval in non-obstructive azoospermic patients.** IJRM. April 2012; 10(1): 29

Sabbaghian M, Hosseini SJ, Farrahi F, Modarresi T, Khalili Ma, Sadighi Gilani MA. **Outcome of microdisection testicular sperm extraction in patients with nonmusaic Klinefelter syndrome.** Abstract book of 15th Congress of Iranian Urological Association. May 2012: 92-93.

Daliri Hampa A, Hosseinifar H, Sabbaghian M, Modarresi T, R. Nakjavani, Salman Yazdi R, Sadighi Gilani MA. **Reduction of Sperm DNA Fragmentation by Oral Ginger (Zingiber officinale) Extract Treatment.** Abstract book of 15th Congress of Iranian Urological Association. May 2012: 24.

Dadkhah A, Amini E, Soleimani M, Lashay A, Riazi N**. Optimal number of biopsies and impact of testicular histology on the outcome of testicular sperm extraction: a study of 741 infertile men with non- obstructive azoospermia.** Abstract book of 15th Congress of Iranian Urological Association. May 2012: 22-23.

Education & Research

Introduction

This group is interested in the biology of human sperm function in relation to male fertility and infertility. Current projects include the development of new diagnostic methods for the analysis of sperm function, assessment of sperm DNA fragmentation and its relationship to the ART outcome and abortion and also investigation of the genetic cause of abnormal morphology of the sperm.
The mission of this group is to improve diagnostic and therapeutic methods by focusing on the characterization of the molecular mechanisms underlying spermatogenesis and male infertility and using the results of investigative projects to treat the patient.

Research Assistants

Hosseinifar, Hani, MSc
Modarresi, Tahereh, MSc
Nickhah, Zeynab, BSc

Students

Abedini Marghzari, Maryam, MSc
Ahmadi Panah, Mona, MSc
Ahmadian, Zahra, MSc
Borjian, Parnaz, MSc
Dehghankhalili, Faezeh, MSc
Firouzi, Vida, MSc
Faghihi Zamani, Fatemeh, MSc
Hassani, Mahdiyeh, MSc
Habib Zade Shojaei, Hanieh, MSc
Jangkhah, Meysam, MSc
Lakpour, Mohammad Reza, MSc
Rostami Chayjan, Maral, MSc
Rasouli, Fereshteh, MSc
Yazdanikhah, Samaneh, MSc
Zargar, Haleh, MSc
Zamani Kebria, Zahra, MSc

Group Leader:
Marjan Sabbaghian, PhD

m.sabbaghian@royaninstitute.org

Biography
Marjan Sabbaghian obtained an MSc in Biochemistry in 2002 and a PhD in Biochemistry in 2009 from the institute of Biochemistry and Biophysics, University of Tehran. She joined Royan Institute in May 2009 and is the head of the Andrology Laboratory at Royan Institute. Her research interests focus on characterization of the molecular mechanisms underlying spermatogenesis and male infertility.

EMBRYOLOGY DEPARTMENT OF RI-RB

Department Head:
Mojtaba Rezazadeh Valojerdi, PhD
(Anatomy and Embryology)

m.rezazadeh@royaninstitute.org

Biography
Mojtaba Rezazadeh Valojerdi obtained his PhD degree (1990) in Anatomy from the University of Glasgow, UK. Currently, he is a full Professor in the Anatomy and Embryology at the University of Tarbiat Modares and the Head of the Department of Embryology at Royan Institute in Tehran. He is a member of the Research and Ethics Committees at the University of Tarbiat Modarres and has more than 200 publications in national and international journals. He serves as an ad-hoc reviewer of the editorial boards of different national journals concerned with Cell Biology and Human Reproduction. His current research interests include assisted reproduction, embryo and ovarian tissue cryopreservation, and differentiation of stem cells.

Department History and Introduction

The Department of Embryology, founded in 1995, is a part of Royan Institute's Reproductive Biomedicine. During the preceding decade, a fundamental description of human and animal experimental studies has emerged in the field of embryology.
The main focuses of this Department are:

- Increasing the quality of gametes and embryos
- Studying molecular aspects of gamete maturation and embryo development
- Performing embryo co-culture with various types of somatic cells
- Studying molecular aspects of gamete and embryo freezing
- In vitro maturation of animal and human gametes
- Evaluating molecular and cellular events of embryo implantation
- Three-dimensional culture of cells to design an endometrial biomodel
- Three-dimensional culture of follicles in order to acquire good quality oocytes
- Performing nuclear transfers
- Performing animal cloning and transgenesis
- Finding the best method for preserving gametes, ovarian, and testicular tissues

Goals of the Department

- Increasing the number of high quality human embryos
- Producing transgenic animals with selected genes
- Establishing in vitro human follicle culture following ovarian tissue cryopreservation

The mission of the RI-RB Embryology Department is the performance of multiple research regarding different aspects of fertility preservation and different treatments of infertility in order to improve embryo health and increase the pregnancy success rate.
Its aim is to make the wish of having children for infertile couples come true, and to give a promising future to them.

Main Researches of Embryology Department

- Molecular pathways involved in reproductive system development
- DNA methylation pattern in embryos following vitrification
- Human ovarian and testicular tissue cryopreservation
- In vitro three-dimensional culture of human follicles
- Production of human factor IX in a transgenic goat by nuclear transfer
- Molecular mechanisms involving in follicle in vitro culture, in vitro oocyte maturation, implantation, endometrium receptivity, etc.
- Stem cell differentiation in correlation with reproductive system development

News and Events

Workshop

Evaluation of Intracellular Parameter Tests Related to Reactive Oxygen Species (ROS) in Spermatozoa

Scientific Managers: Dr Abdolhossein Shahverdi and Dr Bita Ebrahimi, Executive Manager: Mina Sharbatoghli. December 5, 2012.

Course

Gamete and Embryo Reprogramming Course

Introduction to epigenetic reprogramming in mammalian PGC and embryo, and epigenetic programming in oogenesis and spermatogenesis. Covering all of the essential points for reprogramming of mammalian PGC and preimplantation embryo. Elaboration of the mechanisms of epigenetic reprogramming in fundamental understanding of biological progresses and in substantial therapeutic advances. The topics discussed in this course include: Epigenetics of reprogramming, PGC reprogramming, Epigenetic programming of oocytes, Epigenome of the male germ cells during spermatogenesis, Epigenetic reprogramming in early embryo, Extrinsic and intrinsic factors regulating pluripotency state and cellular reprogramming. Scientific Managers: Dr Poopak Eftekhari-Yazdi, Azam Dalman, Executive Manager: Masoumeh Rajabpour Niknam. September 2, 2012.

The Groups of Embryology Department

- Implantation Biology
- Oocyte Biology
- Ovarian Tissue Banking
- Sperm Biology
- Embryo Biotechnology
- Clinical Research

Implantation Biology

Introduction

The main interests of Implantation Biology group focus on molecules and pathways that affect implantation. Endometrium receptivity, its ultrastructural and molecular changes during ovarian stimulation are the fields of work in Implantation Biology group. Some inflammatory and growth factors in blastocysts that are effective in implantation are investigated in this group as well. The researchers intend to study epigenetical changes in blastocysts and also some organs of post implantation embryo obtained from hormone stimulated mice and human. Expression of adhesion, attachment and invasion genes in eutopic and ectopic endometrium of endometriosis patients in the near future will be investigated. Some research on embryo freezing and the epigenetical effects of vitrification on some genes involved in growth of embryo and placenta have been also performed in this group. It has been shown that these genes were downregulated after embryo vitrification and also embryo culture. The epigenetic changes played an important role in this process.

Research Assistant

Jahangiri, Maryam, MSc

Publication

Movaghar B, Askarian S. **Expression of e-cadherin, leukemia inhibitory factor and progesterone receptor in mouse blastocysts after ovarian stimulation.** Cell Journal (Yakhteh). 2012; 14(3):225-230.

Group Leader:
Bahar Movaghar, PhD

b.rmovaghar@royaninstituite.org

Biography

Bahar Movaghar received her BSc from Tehran Medical University in physiotherapy in 1997. She continued her education at Tarbiat Modares University in Tehran and joined Royan Institute for her graduate courses under the supervision of Professor Rezazadeh and obtained her MSc in 2001. She began her PhD at Tarbiat Modares University; her thesis was entitled "Regeneration of Transected Rat Sciatic Nerve, using in vitro Transdifferentiated BMSCs", under the supervision of Professor Taki Tiraihi, and was graduated in 2007. She currently works as an academic staff member in Embryology Department at Royan Institute. Her major research interests are the molecular mechanisms involved in implantation.

Oocyte Biology

Introduction

The oocyte Biology group is interested in ovarian biology and the regulation of mammalian oocyte development, the development of oocyte maturation techniques, and particularly cryopreservation of oocytes and ovarian tissue in experimental models. It is also active on the transgene chicken production with capable of antibodies expression. The research program of this group spans basic discovery research to applied research and clinical trials. A key objective of the discovery research program is to obtain the ability of having a bank for cryopreservation of oocyte and ovarian tissue. The group works primarily in animal models but is also actively engaged in pre-clinical trials of research to develop new treatment for female infertility.

Laboratory Head

Tahaei, Leila Sadat, MSc

Research Assistants

Fathi, Rouhollah, PhD Student
Golkar Narenji, Afsaneh, MSc

Students

Abedi, Reyhaneh, MSc
Jafarian, Zahra, MSc
Mokhber Maleki, Elham, MSc
Pazoki, Hassan, MSc
Rajabzadeh, Ali Reza, MSc
Shahi Sadrabadi, Fatemeh, PhD

Publications

Behbahanian A , Eimani H , Zeinali B , Rezazade Valoujerdi M, Eftekhari P, Shahverdi A, Gourabi H, Golkar-Narenji A**. In vitro maturation, fertilization and embryo culture of oocytes obtained from vitrified-autotransplanted mouse ovary.** International Journal of Fertility & Sterility (IJFS). 2013; 4 (16): 278-285.

Jafarian Z , Eimani H, Azarnia M , Shahverdi AH, Eftekhari-Yazdi P, Kamalinejad M. **The effect of intra-peritoneal administration of Papaver bracteatum Lindl. extract on development of NMRI mice oocytes treated with Doxorubicin.** Reproductive Medicine and Biology (RMB .(2013; 12(2): 57-63.

Golkar-Narenji A, Samadi F, Eimani H, Hasani S, Shahverdi A, Eftekhari-Yazi P, Kamalinejad M. **Effects of intraperitoneal administration of Papaver rhoeas L. extract on mouse ovaries.** Animal Cells and Systems. 2013; 17 (2): 113-120.

Group Leader:
Hossein Eimani, PhD

h.eimani@royaninstitute.org

Biography

Hossein Eimani received his PhD from Tarbiat Modares University, Tehran, Iran. His research area focused on folliculogenesis and oocyte in vitro maturation and vitrification. Further training and specialization in infertility and assisted reproductive technology was undertaken at Royan Institute, Iran. He is now a full professor in Embryology with research focus on the maturation of immature oocytes, animal cloning and ovarian tissue transplantation and has led to numerous publications in national and international journals.

Ovarian Tissue Banking

Group Leader:
Bita Ebrahimi, PhD

b.ebrahimi@royaninstitute.org

Biography
Bita Ebrahimi was born in 1975. She received her BSc in Physiotherapy from Tehran Medical University in 1997 and continued her MSc and PhD in the field of Anatomical Sciences at Tarbiat Modares University. She graduated in 2010 as the 1st rank student. Her PhD thesis entitled "Evaluation of in-vitro maturation and ultrastructure of sheep cumulus-oocyte complexes follow vitrification by conventional, cryotop, and solid surface methods" was under the supervision of Prof Rezazadeh. Her collaboration with Royan Institute started in 2010. She currently works as an academic staff in the Embryology Department of Royan Institute. Her major research subject is molecular mechanism involving in folliculogenesis and ovarian tissue vitrification.

Introduction

As a result of developments in current treatment modalities, remarkable improvements have been made in the numbers of survivals from childhood malignancies. Increased awareness of the various cytotoxic treatments impact on gonadal function has now resulted in a surge in the number of patients seeking help to preserve their fertility. Cryopreservation of embryos is a standard technique for fertility preservation when there is adequate time for ovarian stimulation. If patients have no partner or are unwilling to use donor sperm, oocytes can be frozen instead. The current experience in ovary cryopreservation and transplantation is limited. Nevertheless, at present, it is the only fertility preservation procedure that can be offered to prepubertal girls and can be implemented without any delay in treatment. The main goal of this group is to preserve ovarian tissue by using the best cryopreservation protocol and to establish in vitro cultures of human follicles and investigate the different molecular mechanisms involved in these procedures.

Laboratory Head

Abtahi, Naeemeh Sadat, MSc

Research Assistants

Farahani Deheshkar, Nafiseh, MSc
Fatehi, Rouya, MSc
Tavana, Somayeh, MSc

Students

Eivazkhani, Farideh, MSc
Sadr, Zeinab, MSc

Publications

Fathi R, Rezazadeh M, Salehnia M. **Sucrose effect on follicular survival rate and apoptosis incidence in rat ovarian tissue after vitrification.** Modares Journal of Medical Sciences: Pathobiology. 2013; 15(4): 49-61.

Sperm Biology Group

Group Leader:
Abdolhossein Shahverdi, PhD

shahverdi@royaninstitute.org

Biography
Abdolhossein Shahverdi was born in 1963 in Iran. He received his BSc in Audiology from Iran University in 1986. He studied his MSc and PhD degrees in Anatomical Science at Tarbiat Modares University, and received his PhD degree in 2007. His PhD thesis was entitled "Developmental and Ultrastructural Studies of Zygotes Derived from Reconstructed Oocytes Using Nuclear Transfer and Activated Sperms". Currently, he works as an associate professor and has been an academic member of Royan Institute since 1990. In addition, Dr Shahverdi is a member of the Iranian Society for Anatomy, Iranian Society of Fertility Sterility, Editorial Board of the Iranian Journal of Fertility Sterility, and Executive Board of the Cell Journal (Yakhteh). He published 52 ISI articles and presented 45 abstracts in International & National Congresses. His main research interests are germ cells and sperm biology.

Introduction

In this group, we focus on different factors affecting sperm biology, such as environmental, nutritional and free radicals, to name a few. In addition, we investigate the correlation of these factors with fertility. The group staffs are interested in researching molecular mechanisms involved in sperm maturation and morphogenesis in different cases of infertility. Additionally, sperm and testis cryopreservation have been successfully performed in this laboratory. Effects of cryopreservation techniques and different protocols of sperm processing on DNA fragmentation, membrane integrity and mitochondrial membrane potential were assessed in this group. The next goal of this group is to plan research regarding germ cell characteristics and its differentiation to spermatozoa.
The Sperm Biology group has held four workshops on "Sperm Functional Tests" and "Sperm Class Analyzer System" in the past two years.

Goals of the Group

- Designing new tests for sperm evaluation
- Optimizing cryopreservation of testicular tissue and sperm from humans and animals In vitro differentiation of spermatogonial stem cells
- Assessing the effects of environmental factors and nutrition on sperm and relative genetic expression

Research Scientists

Alizadeh Moghadam Masouleh, Ali Reza, PhD
Ebrahimi, Bita, PhD

Laboratory Head

Sharbatoghli, Mina, MSc

Research Assistants

Abbasi Hormozi, Shima, MSc
Esmaeili Borzabadi, Vahid, MSc
Rashki, Leila, MSc
Rezaei, Topraggaleh Tohid, DVM
Sharafi, Mohsen, PhD

Students

Hajiaghalou, Samira, MSc
Safiri, Mehran, MSc
Taleb, Zeynab, MSc

Publications

Alipour H, Sharbatoghli M, Eftekhari P, Shahverdi H, Valojerdi M. **Pregnancy in the Caspian Miniature Horse Using Frozen Semen Cryopreserved with the EquiPRO CryoGuard Freeze Medium and Customized Freezing Protocols.** Journal of Equine Veterinary Science. 2013; 33 : 266-271.

Abbasihormozi S, Shahverdi A, Kouhkan A, Cheraghi J, Akhlaghi A, Kheimeh A. **Relationship of leptin administration with production of reactive oxygen species, sperm DNA fragmentation, sperm parameters and hormone profile in the adult rat.** Arch Gynecol Obstet. 2013; 287(6):1241-9.

Rastegarnia AR, Shahverdi AH, Rezaei Topraggaleh T, Ebrahimi B, Shafipour V. **Effect of different thawing rates on post-thaw viability, kinematic parameters and chromatin structure of buffalo (bubalus bubalis) spermatozoa.** Cell J. 2013; 14(4): 306-313.

Sharbatoghli M, Valojerdi M, Amanlou M. **Relationship of sperm DNA fragmentation, apoptosis and dysfunction of mitochondrial membrane potential with semen parameters and ART outcome after intracytoplasmic sperm injection.** Arch Gynecol Obstet. 2012; 286:1315–1322.

Embryo Biotechnology

Introduction

This team is engaged in the development of new embryo-oriented biotechnologies. The aim of this group is to develop new techniques leading to a better quality embryo production and more efficiently cloned embryo. The production of a transgenic goat with human coagulation factor IX gene in its milk is one of the priorities in this group. The researchers are also interested in the production of all types of transgenic animals that contain useful proteins which can later be used in the research laboratory or pharmaceutical industry. Above all, the role of epigenetics on the growth and development of gametes and embryos is being investigated in Embryo Biotechnology group. One of the newest issues under research is the study of proteome and secretome in embryos, and the selection of embryos with high quality development based on these two items. This group has had the honor of determining the best way to synchronize necessary cells for nuclear transfer into an enucleated oocyte in order to increase the number of cloned embryos. One of the most significant activities of this group during the last four years has been the production of two transgenic goats (Shangool and Mangool) and their offspring with milk that contained human coagulation factor IX. Additionally, another significant activity of this group is the production of cloned mice embryos with the use of an electric Piezo technique. The approaches are developed in several model species (sheep, goat, and mouse).
Methods used: Micromanipulations of oocytes and embryos, epigenetic characterization of cloned embryos, in vitro maturation, fertilization, and assessment of special protein concentration in embryo secretome.

Chief Researcher

Dalman, Azam, PhD Candidate

Biography
Azam Dalman (MSc 2005) is a chief researcher at Royan institute, Embryology department, Embryo Biotechnology. She has three main research interests: use of micromanipulation techniques on oocytes, production of cloned and transgenic animals and analysis of epigenetic modification and gene expression during development. She received her BSc in Animal Biology from the faculty of science, Arak university in 2001 and MSc in Animal Physiology (2005) under the supervision of Dr Eimani at Royan Institute and Dr Sepehri at the University of Tehran. In 2012, she began a PhD position in Cell and Molecular Biology in a joint program between Royan institute and the University of Shiraz. Her major research focus is on 'reprogramming' of nuclear potency in somatic cell-derived clones of the mouse.

Group Leader:
Poopak Eftekhari-Yazdi, PhD

eftekhari@royaninstitute.org

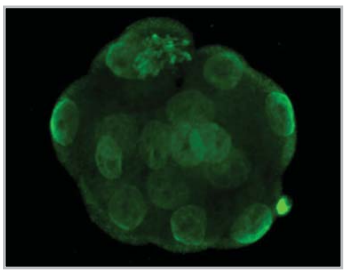
Biography
Poopak Eftekhari-Yazdi obtained her MSc in the subject of Histology and Embryology in Tarbiat Modaress University in 1997. She began her PhD in the field of Anatomy at Tarbiat Modares University in 1997 and at the same time she joined the Embryology Laboratory at Royan Institute. Her PhD thesis was on human embryo fragmentation and the effect of fragment removal on embryo development, supervised by Prof Valojerdi. She is currently working as the Director of the Biotechnology Laboratory at Royan Institute and her major research interests are epigenetics, proteomics, and secretome of embryos as well as the production of cloning and transgenic embryos.

Research Assistants

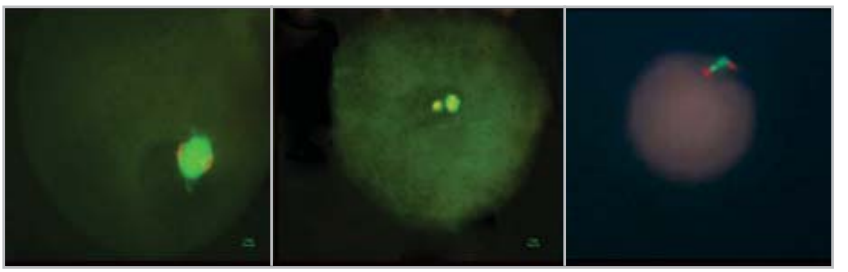
Hadi, Mahdi, BSc
Rajabpour Niknam, Masoumeh, MSc
Vahabi, Zeinab, BSc

Students

Shamaghdari, Boshra, MSc
Zarei, Maryam, MSc



Mouse cloned embryo and Global methylation indirect immunofluorescence staining of DNA, Zarei M, 2013.



Distribution of α-tubulin around the chromosomes in ovine oocytes cultured in biphasic maturation medium. Red and green represent chromosomes and distribution of α-tubulin, respectively: (A) anaphase B; (B) telophase I; (C) metaphase II stages, Vahabi Z, 2013.

Publications

Amiri Yekta A, Dalman A, Eftekhari-Yazdi P, Sanati MH, Shahverdi AH, Fakheri R, Vazirinasab H, Daneshzadeh MT, Vojgani M, Zomorodipour A, Fatemi N, Vahabi Z, Mirshahvaladi S, Ataei F, Bahraminejad E, Masoudi N, Rezazadeh Valojerdi M, Gourabi H. **Production of transgenic goats expressing Human Coagulation Factor IX in the mammary gland after Nuclear Transfer using transfected fetal fibroblast cells.** Transgenic Research, 2013 Feb; 22(1):131-42.

Dalman A, Eftekhari-Yzdi P, Shahverdi A. **Animal transgenesis and applications.** Journal of Biosafety. 2012; 40(1): 73-86.

Rastegarnia AR, Afshani M, Eftekhar-Yazd P. **Separation of X and Y-bearing buffalo frozen spermatozoa using gradient medium and evaluation by fluorescence in-situ hybridization.** J Vet Res. 2012; 67(1): 35-42.

Clinical Research

Group Leader:
Poopak Eftekhari-Yazdi, PhD

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Introduction

The clinical part of the Embryology Department of RI-RB offers extensive training in routine and advanced laboratory tests in assisted reproduction techniques (IUI, IVF/ICSI), gamete cryopreservation, and PGD. Through one-on-one training in laboratory procedures, candidates develop technical expertise in all of the essential techniques, including comprehensive semen analysis, sperm preparation procedures, assisted reproduction (IVF/ICSI) techniques, and cryopreservation protocols for semen, testicular, and oocytes/embryos. At the end of the program, candidates receive a Certificate of Training recognizing their achievements.

Besides patient treatment, this group focuses on researches about some aspects of the embryos pre-Implantation such as:

- IVM
- IMSI and the best approaches for sperm selection
- Cryopreservation of gametes, reproductive tissues and embryos
- Culture media and pre-implantation embryo development
- Low fertilization
- Methods of embryo transfer
- Effect of pre-implantation developmental stage on pregnancy rate
- Effect of oxidative stress on sperm and oocytes

Research Scientists

Karimian, Leila, MSc
Movaghar, Bahar, PhD
Rezazadeh Valojerdi, Mojtaba, PhD

Research Assistants

Behbahanian, Arash, MSc
Fazel Tabar-Malekshah, Mohammad, MSc
Hasani, Fatemeh, MSc
Nasiri, Nahid, MSc

Publications

Nasiri N, VosoughTaqi Dizaj A, Eftekhari-Yazdi P, Akhond MR. **Reproductive performance of mouse oocyte after in vivo exposure of ovary to continuous wave ultrasound.** Int J Fertil Steril. 2012; 6(3): 195-200.

Hassani F, Eftekhari Yazdi P, Karimian L, Valojerdi MR, Movaghar B, Fazel M, Fouladi H, Shabani F, Johansson L. **The Effects of ISM1 Medium on Embryo Quality and Outcomes of IVF/ICSI Cycles.** IJFS. 2013; 7(2):108-116.

REPRODUCTIVE GENETICS DEPARTMENT OF RI-RB

Message from the Department Head

Recently, there is more and more attention towards genetic sciences, especially among biology and medicine researchers. Genetic background of many diseases with unknown origin is well understood now and many other genetic backgrounds are under research process. Successful treatment of infertility with assisted reproduction techniques (ART) has many unknown points that discovery of each can help using these treatments more efficiently. Reproductive genetic aids discovering these unclear points and finding new treatment strategies.
We have organized specialized groups to follow the department programs. Assigning more specialized staffs and providing suitable infrastructures can make fruitful future. My colleagues have planned to continue their programs for recognizing the genetic factors related to recurrent abortions, fail ART, poor responding to ovarian stimulation medication, epigenetic factors related to infertility and embryo development, genetic manipulation of cells to produce recombinant proteins and transgenic animals.
I would like to express my thanks to my valuable colleagues for their efforts during last year, and extend invitation to all genetic scientists for collaboration in our research programs.

Department Head:
Hamid Gourabi, PhD
(Medical Physics)
gourabi@royaninstitute.org

Biography
Dr Hamid Gourabi obtained his PhD degree in 1997 from Tarbiat Modarres University. He was a faculty member of Iran Medical Sciences University until 2001. Dr Gourabi has been a member of Royan Institute board of directors since its establishment, and joined as a faculty member in 2003. Since 2004, he has been the Head of Genetics Department at Royan Institute. His main research interests are reproductive genetics and radiobiology of stem cells. Dr Gourabi has more than 60 published papers in international scientific journals.
Academic Staff of:
ACECR since 1993
Iran Medical University, 1997-2001
Royan Institute since 2001
Director of PGD Lab since 2002

Department History and Introduction

Department of Genetics was established in 2001. Some routine activities of this department include: genetic counseling, lymphocyte karyotyping, preimplantation genetic diagnosis (PGD), as well as molecular diagnostic tests which involve the diagnosis of Y chromosomal micro deletions and certain mutations in candidate genes that may be related to the causes of abortions or failed ART.
The major research interests in this department are genetic causes of male and female infertility, recurrent spontaneous abortion (RSA), genetic factors leading to azoospermia, mutations leading to congenital agenesis of the vas deferens, preimplantation genetic diagnosis, pharmacogenetics plus epigenetic and gene expression profiles of early embryogenesis.
The production of recombinant proteins by genetic manipulation in different host cells in addition to the joint production of transgenic animals in a mutual project with Embryology Group is another main activity of this department.
Activities carried out in collaboration with Royan Institute for Stem Cell Research are karyotyping of stem cell lines following various manipulations, epigenetic and genetic studies of stem cells and iPS cells, in addition to other common research interests.

Goals of the Department

- To improve implantation rates along with health of embryos by preimplantation genetic screening and diagnosis
- To assist physicians with prescribing medicine for controlled ovarian stimulation via pharmacogenetics
- Genetic follow up of newborns conceived by ART
- Evaluation of candidate genes related to recurrent abortion in the Iranian population
- Epigenetic studies of oocytes, sperm and embryos

The mission of the Genetic Department is basic research on genetic and epigenetic factors that may influence fertility, embryo development, and implantation, bringing these research results to the clinical setting with the purpose of improving the health of patients and newborns, as well as the production of pharmaceutical proteins through transgenic animals.

The vision of this department is to perfect diagnosis and treatment of infertility based on reproductive genetic knowledge, which will lead to healthy newborns in a short period of time.

Overview of the Department in 2012

In 2012, 13 research projects were carried out in reproductive genetics department and 39 projects were undertaken in collaboration with other departments. 35 MSc and 2 PhD theses were ongoing. 18 Masters Students have completed their theses during the past year. Nineteen oral presentations and 38 posters were presented in different national and international congresses. The department published 26 papers that have been listed separately under each group. Additionally, 8 hands-on workshops were held during the past year.

News and Events

Journal Clubs

- **Genetic Aspects of Premature Ovarian Failure,** Zeynab Ghezelayagh, August 22, 2012.
- **The Role of Immune System Proteins in Male Infertility,** Maedeh Moazzenchi, September 30, 2012.
- **MicroRNAs in Premature Ovarian Failure Patient,** Ummolbanin Asadpour, October 15, 2012..
- **Does the Loss of Ovarian Reserve Lead to POF?** Ali Eslami, October 29, 2012.

Workshops

- **Genetic Engineering & Molecular Cloning**
  Theory & Practical: 1. Genetic engineering, 2. Cloning of PCR product into T/A vector, 3. Transformation of recombinant vector into bacterial host, 4. Colony pick up & Colony PCR, 5. Plasmid extraction, 6. Digestion, 7. Gel electrophoresis & Analysis. Scientific Manager: Amir Amiri Yekta; Executive Manager: Amir Amiri Yekta. June 7-8, 2012

- **Genetic Counseling in Infertility**
  Theory & Practical: 1. Principles & Indications of clinical genetic counseling, 2. Pedigree drawing milestones (theoretical & practical), 3. Genetic inheritance patterns, 4. Chromosomal abnormalities, 5. Genetic aspects of recurrent miscarriage, 6. Genetic screening in obstetric clinic, 7. Prenatal & Neonatal screening, 8. Principles & Indications of PGD & PGS, 9. Genetic approach in infertility center. Scientific Manager: Navid Almadani; Executive Manager: Shabnam Zari Moradi. September 5-6, 2012.

- **Introductory Workshops on Molecular Techniques**
  Scientific Manager: Amir Amiri Yekta; Executive Managers: Amir Amiri Yekta & Hamed Vaziri. May 23-24, December 13-14, 2012, January 17-18, and February 28-March 1, 2013.

- **Epigenetic Methods**
  Scientific Manager: Maryam Shahhoseini; Executive Manager: Raha Favaedi. January 23-24, 2013.

- **Genetic Engineering & Molecular Cloning**
  Theory & Practical: 1. Genetic engineering, 2. Cloning of PCR product into T/A vector, 3. Transformation of recombinant vector into bacterial host, 4. Colony pick up & Colony PCR, 5. Plasmid extraction, 6. Digestion, 7. Gel electrophoresis & analysis. Scientific Manager: Amir Amiri Yekta; Executive Manager: Amir Amiri Yekta, Nayer Sadat Fatemi. January 31-February 1, 2013.

The Groups of Reproductive Genetics Department

- Epigenetics
- Genetic Engineering
- Medical Genetics
- Pharmacogenetics
- PGD

Epigenetics

Introduction

Epigenetics refers to DNA and chromatin modifications that persist from one cell division to the next, without any changes in the underlying DNA sequence. Some epigenetic changes show transgenerational inheritance meaning that these changes can be passed from one generation to the next. Epigenetics plays an important role in cellular differentiation, allowing distinct cell types to have specific characteristics despite sharing the same DNA sequence. Some examples of epigenetic processes include imprinting, gene silencing, paramutation, X chromosome inactivation, reprogramming, position effect, maternal effects, heterochromatinization and some carcinogenesis. The mechanisms of epigenetic inheritance systems can be categorized to at least 4 routes by which epigenetic changes persist over time. These routes include DNA methylation, chromatin modifications/variations, non-coding RNAs and ATP-dependent chromatin remodeling.

Because of the critical importance of epigenetics in regulation of development and cellular function/fate, the main interest of this research group is to study the molecular mechanisms of the cellular memory and function, with the special focus on chromatin modifications on the marker genes of different cellular processes. The epigenetics group has held 3 workshops in "Epigenetic Methods" in the past three years, observing different methods of epigenetic analyses at the single gene as well as whole genome levels.

Current Fields of Research

- **Epigenetics of Stem Cell/Differentiation**
  - in EC, ES and MS cells
- **Epigenetics of Male/Female Infertility**
  - Epigenetic analysis of marker genes such as Prm, Tnp, Fmr1, Cyp19, CDH1
  - Differential expression of histone variants such as H2A.Z, H2BFWT
- **Epigenetics of Embryogenesis**
  - Epigenetic effects of cryopreservation (early embryo, oocyte, ovary)
  - Epigenetic effects of in vitro fertilization (IVF) methods

Research Assistants

Favaedi, Raha, MSc
Mahdian, Soudeh, MSc

Students

Ashrafi Kakhki, Sara, MSc
Eilami-Nejad, Zahra, MSc
Eslami, Hossein, MSc
Faghihi Zamani, Fatemeh, MSc
Fallah Zadeh, Khadijeh, MSc
Heydarian, Neda, MSc
Mirzaee Nasab, Fazlollah, MSc
Moein-Vaziri, Farideh, MSc
Oftadeh, Shirin, MSc
Rastegari, Elham, MSc
Shokraee, Fatemeh, MSc
Ziadloo, Reihaneh, MSc

Awards

Maryam Shahhoseini, Selective Researcher of the Iranian Academic Center for Education Culture and Research (ACECR) 2012.

Publications

Saeed S, Logie C, Francoijs KJ, Frigè G, Romanenghi M, Nielsen FG, Raats L, Shahhoseini M, Huynen M, Altucci L, Minucci S, Martens JH, Stunnenberg HG. **Chromatin accessibility, p300, and histone acetylation define PML-RARα and AML1-ETO binding sites in acute myeloid leukemia.** Blood. 2012; 120(15): 3058-68.

Favaedi R, Shahhoseini M, Akhoond M.R. **Comparative epigenetic analysis of Oct4 regulatory region in RA-induced differentiated NT2 cells under adherent and non-adherent culture conditions.** Mol. Cell. Biochem. 2012; 363: 129-34.

Shahhoseini M, Taghizadeh Z, Hatami M, Baharvand H. **Retinoic acid dependent histone 3 demethylation of the clustered HOX genes during neural differentiation of human embryonic stem cells.** Biochem Cell Biol. 2013; 91(2): 116-22.

Group Leader:
Maryam Shahhoseini, PhD

m.shahhoseini@royaninstitute.org

Biography

Maryam Shahhoseini received her BSc degree in Microbiology at 1998 from Department of Biology, University of Tehran. In a straight line, she started her MSc degree in Biochemistry at the Institute of Biochemistry & Biophysics (IBB), University of Tehran, and was graduated at 2001 as the 1st rank student. She continued her education at PhD level in Biochemistry at the same department (IBB) and was graduated at 2007 as the 1st rank student. Immediately after dissertation, she joined to Stem Cell Department in Royan Institute to establish epigenetic techniques to investigate molecular mechanisms of stem cells through differentiation. Two years later she moved to Genetics Department, having been still in collaboration with the previous department. She has managed several epigenetic and genetic projects in collaboration with Embryology, Gynecology and Andrology departments in Royan Institute. Since 2007, Dr Shahhoseini has also been the invited academic lecturer of Biotechnology Department , Faculty of Sciences, University of Tehran; teaching Molecular Biology, Molecular Genetics, Molecular Biotechnology, and Gene Expression Regulation courses. Her major research interests are Epigenetic Aspects of Development and Reproductive Medicine.

Kakhki SA, Shahhoseini M, Salekdeh GH. **Comparative SRY incorporation on the regulatory regions of pluripotency/differentiation genes in human embryonic carcinoma cells after retinoic acid induction.** Mol Cell Biochem. 2013; 376(1-2): 145-50.

Baghaban Eslaminejad M, Fani N, Shahhoseini M. **Epigenetic Regulation of Osteogenic and Chondrogenic Differentiation of Mesenchymal Stem Cells in Culture.** Cell Journal (Yakhteh), 2013; 15(1): 1-10.

Jangravi Z, Alikhani M, Arefnezhad B, Sharifi Tabar M, Taleahmad S, Karamzadeh R, Jadaliha M, Mousavi SA, Ahmadi Rastegar D, Parsamatin P, Vakilian H, Mirshahvaladi S, Sabbaghian M, Mohseni Meybodi A, Mirzaei M, Shahhoseini M, Ebrahimi M, Piryaei A, Moosavi-Movahedi AA, Haynes PA, Goodchild AK, Nasr-Esfahani MH, Jabbari E, Baharvand H, Sedighi Gilani MA, Gourabi H, Salekdeh GH. **A fresh look at the male-specific region of the human Y chromosome.** J Proteome Res. 2013; 12(1): 6-22.

Rajabpour-Niknam M, Totonchi M, Shahhoseini M, Farrokhi A, Alipour H, Eftekhari-Yazdi P. **Quantitative Expression of Developmental Genes, Pou5f1 (Oct4) and Mest (Peg1), in Vitrified Mouse Embryos.** IJRM. May 2013.

Genetic Engineering

Group Leader:
Mohammad Hossein Sanati, PhD

mh.sanati@royaninstitute.org

Biography
Educational Qualifications: 1991-1996: PhD (Biotechnology) At Biotechnology Research Group, School of Biological and Environmental Sciences, Murdoch University, Western Australia. 1985-1988: MSc (Biochemistry), Biochemistry Department, School of Medical Sciences, Tarbiat Modarres University, Tehran, Iran. 1977-1984: BSc (Chemistry), Chemistry Department, School of Sciences, Ferdowsi University, Mashhad, Iran. Work Experiences: 2006- Current: Researcher at the Medical Genetics Department, National Institute for Genetic Engineering and Biotechnology, Tehran, Iran. 1997-2005: President of the National Institute for Genetic Engineering and Biotechnology, Tehran, Iran. 1996: Full-time researcher in Murdoch University, production of recombinant monoclonal antibody against the Rizhoctomi Saloon antigens in "Phage Display System". 1995: Part-time research assistant (work on multiple sclerosis diseases), Murdoch University, Western Australia. 1994: Demonstrator (practical molecular biology for undergraduate students), Murdoch University, Western Australia.

Introduction

Biotechnology is a field of applied biology that involves the use of living organisms and bioprocesses in engineering, technology, medicine and other fields requiring bioproducts. Biotechnology also utilizes these products for manufacturing purposes. Modern use of similar terms includes genetic engineering as well as cell- and tissue culture technologies. The concept encompasses a wide range of procedures (and history) for modifying living organisms according to human purposes; going back to domestication of animals and cultivation of plants through breeding programs that employ artificial selection and hybridization. By comparison to biotechnology, bioengineering is generally thought of as a related field with its emphasis more on higher systems approaches (not necessarily directly altering or using biological materials) for interfacing with and utilizing living things.
Biotechnology draws on the pure biological sciences (genetics, microbiology, animal cell culture, molecular biology, biochemistry, embryology, cell biology) and in many instances is also dependent on knowledge and methods from outside the sphere of biology (chemical engineering, bioprocess engineering, information technology, biorobotics). Conversely, modern biological sciences (including concepts such as molecular ecology) are intimately entwined and dependent on the methods developed through biotechnology and what is commonly thought of as the life sciences industry. Modern biotechnology is often associated with the use of genetically altered microorganisms such as E. coli or yeast for the production of substances such as synthetic insulin or antibiotics. It can also refer to transgenic animals or transgenic plants, such as Bt corn. Genetically altered mammalian cells, such as Chinese hamster ovary cells (CHO), are also used to manufacture certain pharmaceuticals. Another promising new biotechnology application is the development of plant-made pharmaceuticals.

Ongoing Projects

- Production of recombinant human and animal fertility hormones from 2011
- Production of transgenic chicken with Anti-CD34 Antibody Gene expression in oviduct from 2011
- Human factor IX production in transgenic goat by nuclear transfer from 2007

This group has held two workshops on elementary techniques in molecular biology and gene cloning last year.

Research Assistants

Amiri Yekta, Amir, PhD Student
Bahraminejad, Elmira, MSc
Fatemi, Neyreh Sadat, MSc

Students

Ghanbari, Meysam, MSc
Hadi, Fatemeh, MSc
Jazayeri, Hoda, PhD
Khoshbakht, Mona, MSc

Publications

Amiri Yekta A, Dalman A, Sanati MH, Fatemi N, Vazirinasab H, Zomorodipour A, Chehrazi M, Gourabi H. **Optimization of the electroporation conditions for transfection of human factor IX into the goat fetal fibroblasts.** Cell J. 2013; 14(4): 270-275.

Amiri Yekta A, Dalman A, Eftekhari-Yazdi P, Sanati MH, Shahverdi AH, Fakheri R, Vazirinasab H, Daneshzadeh MT, Vojgani M, Zomorodipour A, Fatemi N, Vahabi Z, Mirshahvaladi S, Ataei F, Bahraminejad E, Masoudi N, Rezazadeh Valojerdi M, Gourabi H. **Production of Transgenic Goats Expressing Human Coagulation Factor IX In The Mammary Glands after nuclear transfer using transfected fetal fibroblast cells.** Transgenic Res (2013) 22:131–142.

Fazeli AS, Nasrabadi D, Sanati MH, Pouya A, Ibrahim SM, Baharvand H, Salekdeh GH. **Proteome analysis of brain in murine experimental autoimmune encephalomyelitis.** Proteomics 2010 Aug; 10(15): 2822-32.

Hajian M, Hosseini S.M, Forouzanfar P, Abedi P, ... , Moulavi F, Gourabi H, Shahverdi H, Vosough A, Amiri-Yekta A, Nasr Esfahani M.H. **Conservation cloning of vulnerable Esfahan mouflon (Ovis orientalis isphahanica): in vitro and in vivo studies.** European Journal of Wildlife Research. 2011 Jan.

Nasr Esfahani ,M.H, Hosseini S.M, Hajian M, Gourabi H, Shahverdi H, Vosough A, Vojgani M. **Development of an optimized zona-free method of somatic cell nuclear transfer in the goat.** Cell Reprogram. 2011 Apr; 13(2):157-70

Jafarpour F, Hajian M,..., Ghaedi K, Gourabi H, Shahverdi H, Vosough A, Nasr -Esfahani M.H .**Somatic Cell-Induced Hyperacetylation, But Not Hypomethylation Positively and Reversibly Affects the Efficiency of In Vitro Cloned Blastocyst Production in Cattle.** Cell Reprogram. 2011 Dec; 13(6):483-93.

Medical Genetics

Introduction

The original goals of medical genetics and reproductive medicine are to maximize fertility, access appropriate genetic testing, and provide prenatal genetic testing and counseling. There are well-described associations between genetic and reproductive abnormalities, for which genetic testing is now being explored.

With recent advances in genetic screening and a better understanding of the genetic background of certain diseases, genetic evaluation is playing an important role in the work-up of various medical problems, including reproductive failure. Reproductive failure refers to both the inability to conceive (infertility) and the inability to carry a pregnancy successfully to term (spontaneous abortion or recurrent abortion). Embryos that do not carry a full chromosomal component are likely to be lost soon after implantation or do not implant at all. Genetic abnormalities (numerical or structural aberrations) play a role in at least 50% of early pregnancy losses. Karyotyping of the parents is now a routine procedure during the work-up of recurrent abortions. Infertility is another form of reproductive failure, and genetic screening plays an increasingly important role in its evaluation. In vitro fertilization (IVF) provides us with a unique situation in which not only the parents but also the embryo can be screened.

Pregnancy rates are between 35% and 50% following IVF treatment among women younger than 40 years. If pregnancy is not achieved during the first 2 or 3 cycles, genetic testing, when available, should be offered to the couples. This could be useful in those selected cases in which preimplantation genetic diagnosis could identify healthy embryos, possibly improving outcome. In other cases, early genetic testing of couples could identify those for whom the use of donor gametes would be indicated. Now through the assistance of reproductive and genetic medicine, medical miracles allow the detection of genetic disorders through prenatal diagnosis and the ability of infertile individuals to become genetic parents. Referred to as the new parenthood, these technologies allow for the conception of genetically exceptional babies by eliminating genetic defects and enhancing desirable qualities as well as the ability of individuals with a genetic disorder to reproduce without transmitting a given disorder. Such technological advances have influenced consumer (and often caregiver) expectations of reproductive medicine and medical genetics that result in unrealistic or misguided anticipations of feasibility, success and applicability of these medical interventions. Furthermore, the ability of reproductive medicine and medical genetics to facilitate the conception of a healthy infant has become fraught with moral dilemmas and technological complications.

Group Leader:
Anahita Mohseni Meybodi, PhD

anahitamohseni@royaninstitute.org

Biography

Anahita Mohseni Meybodi was born in 1976. She began working at Royan Institute from 2000 when she started her MSc thesis. She worked on "Human sperm various genetic abnormalities and male infertility" and graduated in 2003 from Islamic Azad university, Science & Research branch. In a straight line, she started her PhD and was graduated in 2008 in the field of Medical Genetics from Tarbiat Modarres University, Tehran, Iran. Her PhD project was a research on Fanconi anemia patients and the mechanisms of how they repair DNA damages induced by different agents. She currently works as an academic staff and director of the Medical Genetics Laboratory at Royan institute. She supervises a couple of research projects. Her major research interest is gene polymorphisms and their role in male and female infertility.

Projects

- Investigation for an association of CGG triples repeat alleles of Fragile X gene (FMR1) with ovarian stimulation rates and premature ovarian failure
- Association of MICA gene polymorphism with Clamydia Trachomatis infection in male infertility in Royan Institute patients

- Investigation of FMR1 gene expression rate in blood and ovary granulosa cells in patients with Diminished Ovarian Reserve
- Investigation for an association between CAG and GGN triple repeat alleles of the Androgen Receptor gene with different situations of infertility in men
- Epigenetic patterns and gene expression of FMR1 gene in blood and granulose cells in women with Diminished Ovarian Reserve
- Investigation of genetic variation and gene expression of the FSH receptor gene in blood and granulose cells of patients with OHSS, Premature Ovarian Failure and Diminished Ovarian Reserve, referred to Royan Institute
- Genetic and protein analysis of β-defensin126 and male infertility
- Genetic variation analysis of H2BFWT gene in the peripheral blood of infertile men with azoospermia and severe oligospermia referred to Royan Institute
- Infertility treatments chromosomal status of infants living in the Royan Institute in Tehran
- Investigate the causes of autosomal dominant non-syndromic sensorineural deafness in Iranian families
- Chromosomal abnormalities and common genetic variations and gene polymorphisms of MTHFR, Factor V and prothrombin genes in patients with recurrent miscarriage referred to Royan Institute
- HLA-G gene polymorphism in human embryonic implantation failure
- The pattern of X chromosome inactivation in women with recurrent spontaneous abortion referred to Royan Institute
- Analysis of Expression Level of tex11, tex12, tex14, tex15, movl01 Genes in Obstructive and Non-Obstructive Azoospermic Men Referred to Royan Institute
- Comparison of genetic changes in prolactin receptor gene in infertile patients with idiopathic normal Haypeprolaktinemay

Reserch Scientists

Almadani, Seyd Navid, MD
Bazrgar, Masoud, PhD Student
Totonchi, Mehdi, PhD Student
Zamanian, Mohammadreza, MD
Zar'i Moradi, Shabnam, MSc

Research Assistants

Asadpour, Omolbanin, PhD Student
Borjian, Parnaz, MSc
Fakhri, Mostafa, Msc
Habibi, Roghayeh, MSc
Hosseinifar, Hani, Msc
Kalantari, Hamid, MSc
Mansouri, Zahra, MSc
Masoodi, Najmeh Sadat, MSc
Mokhtari, Pegah, MSc Student

Students

Abedini, Maryam, MSc
Ahmadipanah, Mona, MSc
Dehghan Khalili, Faezeh, MSc
Eslami, Ali, MSc
Eslami, Hossein, MSc
Farahmand, Kameliya, MSc
Firouzi, Vida, MSc
Ghezelayagh, Zeynab, MSc
Hasani, Mahdiyeh, MSc
Moazenchi, Maedeh, MSc
Rostami, Maral, MSc
Zargar, Haleh, MSc

CORE FACILITY

DNA Bank

A DNA bank is a repository of DNA, usually used for research. Royan DNA Bank, for example, collects the DNA of male and female infertile patients and couples with repeated miscarriages, for scientific research. Most DNAs provided by DNA banks are used for studies that attempt to determine the reason behind idiopathic infertility and abortion, as well as to investigate genetic diseases related to infertility and abortion.
Couples: 647(ART Fail: 192, Abortion: 376, Fertile control: 79)
Male: 2245, Female: 741
Total: 4280

Publications

Kalantari H, Madani T, Zari Moradi S, Mansouri Z, Almadani N, Gourabi H, Mohseni Meybodi A. **Cytogenetic analysis of 179 Iranian women with premature ovarian failure.** Gynecol Endocrinol. 2013; 29(6): 588-91.

Mohammadreza Zamanian, Abhi Veerakumarasivam, Syahril Abdullah, Rozita Rosli. **Calreticulin and Cancer.** Pathology & Oncology Research. 2013; 19(2): 149-154.

Hosseinifar H, Gourabi H, Salekdeh GH, Alikhani M, Mirshahvaladi S, Sabbaghian M, Modarresi T, Gilani MA. **Study of sperm protein profile in men with and without varicocele using two-dimensional gel electrophoresis.** Urology. 2013; 81(2): 293-300.

Zarei Moradi S, Mohseni Meybodi A, Gourabi H, Mozdarani H, Mansouri Z. **Chromosome abnormalities and viability of vitrified eight-cell mouse embryos at presence of two different cryoprotectants at different storage durations.** Cell J. 2013; 14(4): 254-63.

Jangravi Z, Alikhani M, Arefnezhad B, Sharifi Tabar M, Taleahmad S, Karamzadeh R, Jadaliha M, Mousavi SA, Ahmadi Rastegar D, Parsamatin P, Vakilian H, Mirshahvaladi S, Sabbaghian M, Mohseni Meybodi A, Mirzaei M, Shahhoseini M, Ebrahimi M, Piryaei A, Moosavi-Movahedi AA, Haynes PA, Goodchild AK, Nasr-Esfahani MH, Jabbari E, Baharvand H, Sedighi Gilani MA, Gourabi H, Salekdeh GH. **A fresh look at the male-specific region of the human Y chromosome.** J Proteome Res. 2013; 12(1): 6-22.

Bazrgar M, Karimi M. **Is the apolipoprotein E4 allele always hazardous? Serum uric acid level as a conflict. Genet Test Mol Biomarkers.** 2012; 16(8): 920-3.
Fattahi Z, Shearer AE, Babanejad M, Bazazzadegan N, Almadani SN, Nikzat N, Jalalvand K, Arzhangi S, Esteghamat F, Abtahi R, Azadeh B, Smith RJ, Kahrizi K, Najmabadi H. **Screening for MYO15A gene mutations in autosomal recessive nonsyndromic, GJB2 negative Iranian deaf population.** Am J Med Genet A. 2012; 158A(8): 1857-64.

Pharmacogenetics

Introduction

Each individual can respond to the same doses of a drug in a different way, regarding to their own genetic variation patterns. Pharmacogenetics (PG) is considered as the study or clinical testing of these genetic variations that gives rise to differing response to drugs. PG also refers to genetic differences in metabolic pathways which can affect individual responses to drugs, both in terms of therapeutic effect as well as adverse effects. Thus, PG studies are committed to select the best therapy for every patient with a minimum risk of complications. Furthermore, these studies allow the development of clinical tests based on the presence of profiles of biomolecules and other biological markers to be useful for routine diagnosis.
Since genetic variations play an important role in reproductive medicine, pharmacogenetics studies open a new field to modify and develop the treatments of infertile couples. For instance, the application of PG to assisted reproductive techniques (ART) will help clinicians to improve the efficacy of hormone treatments that are being routinely applied during ART protocols. As an example, FSH- and estrogen-receptors are genetic markers involving controlled ovarian hyperstimulation as clinical studies have demonstrated that the p.N680S polymorphism of the FSH-receptor gene determines the less ovarian response to FSH stimulation in patients undergoing IVF. In women with homozygous Ser/Ser in their FSH-receptor, the FSH receptor appears to be more resistant to treatment. Therefore, genotyping of patients scheduled for ovarian stimulation could be an attractive tool to individualize FSH dosing according to genetic differences in ovarian sensitivity. Consequently, pharmacogenetics can assist physicians with prescribing medicine to achieve the controlled ovarian stimulation.
The research outlines of this group focus on genes which are involved in male/female infertility, particularly in ART-protocols response.

Projects

- Genetic and Pharmacogenetic aspects of ovulation induction in anovulatory women
- The study of genetic variants and expression of the follicular stimulating hormone receptor (FSHR) gene in patients with Polycystic Ovary Syndrome (PCOS)
- Gene expression and gene polymorphism study of the Estrogen receptor (ER) and Aromatase (CYP19) in infertile men referred to Royan Institute
- Genetic variation analysis of MIF in endometriosis patients referred to Royan Institute

Research Scientist

Zari Moradi, Shabnam, MSc

Research Assistant

Khosravi Far, Mona, MSc

Students

Chekini, Zahra, MSc
Ghezelayagh, Zahra, MSc
Keshmiripour, Shirin, MSc
Modaresi, Monir, MSc
Nazouri, Azadeh, MSc
Tarahomi, Nafiseh, MSc

Group Leader:
Parvaneh Afsharian, PhD

pafshar@royaninstitute.org

Biography
Parvaneh Afsharian received her first BSc in Chemistry. One year later, she was graduated in Biology (in BSc level) from Biology department at Ferdowsi University of Mashhad. Her MSc subject was Genetics in Azad University, Tehran. Her project (Chromosomal abnormalities in patients with the pubertal and reproductive failures) was done in Clinical Genetics Department, Iranian Blood Transfusion Organization in collaboration with Royan Institute. Next year in 2000, she has started her research in Genetics Department in Royan Institute as an academic staff of ACECR and 3 years later she moved to Department of Medicine in Karolinska Institute (KI), Stockholm, Sweden to start her PhD research in Pharmacogenetics of Bone Marrow Transplantation Chemotherapy. Immediately after PhD program in 2007, she started her first postdoc in Experimental Cancer Medicine group under supervision of Professor M. Hassan in Lab Medicine Department, KI and in 2008 she joined professor Inge Olsson group in Lund University to investigate "The Localization of Target Therapy in Hematopoietic Stem Cells". Since 2011, she works as an academic member and director of Pharmacogenetics group in Royan Institute. Her major research interest has been Pharmacogenetics aspects of Reproductive Medicine and Infertility.

EPIDEMIOLOGY AND REPRODUCTIVE HEALTH DEPARTMENT OF RI-RB

Department Head:
Reza Omani Samani, MD, PhD Student
(Bioethics)

samani@royaninstitute.org

Biography
Dr Samani achieved his MD from Iran University of Medical Science in 1996. Since 2001 he has been working in this department and has been involved mostly in ethical issues of infertility. Subsequently he applied for PhD of Bioethics in Tehran University of Medical Science and was accepted in early 2011. He currently works as Head of the department of Epidemiology and Reproductive Health in Royan Institute.

Message from the Department Head

The main purpose of establishing this department was doing extensive researches on epidemiological aspects of infertility and reproduction in addition to reproductive and sexual health. After establishment of Ethical committee in Royan Institute, ethics was added to the duties of this department. Later this department was divided to three groups: Biostatistics, Epidemiology and Bioethics. Then in 2008 Bioethics group was changed to "Bioethics and law" because of so many researches and legal issues in infertility treatment and reproduction. Afterwards in 2010, the groups changed to: Biostatistics and methodological group, Reproductive health, Epidemiological, social group, Bioethical, legal and Ethics and psychological group. Finally In 2012 reproductive epidemiology research center was established in Royan Institute and was approved by the ministry of Health.

Department History and Introduction

The Epidemiology and Reproductive Health Department was established in 1999 with the aim of doing extensive researches on epidemiological aspects of infertility and reproduction in addition to reproductive and sexual health. This department is responsible to check all research proposals in Royan three research institutes and gives both methodological and statistical consultation.
This department undertakes multicentre research between Iran and other countries in the following areas:

- Frequency, incidence and influencing factors for all subfertility and infertility types
- Environmental and occupational factors affecting fertility and reproduction
- Psychosocial issues affecting infertile couples, their treatment and coping mechanisms
- Experiences, quality of life, marital and sexual satisfaction of infertile couples, even after IVF failure
- Ethical issues, legislation and guidelines in assisted reproduction
- Statistical models and methods for research in reproduction, genetics and the cellular and molecular fields
- Animal ethics

The mission of this department is the promotion of reproductive health in Iran. Reproductive health is an important aspect of general health and involves people of all ages within the society, from an embryo to the elderly. Focusing on sexual and reproductive health guarantees the future health of society by ensuring healthy children and healthy adults. Finally, its job involves research into all reproduction related areas including social, medical, psychological and ethical issues, and therefore its vision is to ensure the health of the society.

The Department Focused Areas

- Social and occupational factors influencing reproduction and fertility
- Attitudes, knowledge and practice of the society regarding reproductive issues
- Quality of life, marital and sexual satisfaction and influential factors among infertile couples
- Psychological issues of infertility and interventions to improve them
- Statistical methods with intention to increase the accuracy of statistical analysis
- Ethical, legal and religious aspects of reproduction
- Designing Clinical trials
- Sexual health education
- Interpretation of statistical results in medical research
- Evaluation of diagnostic test accuracy
- Scientific writing
- Teaching the necessary items via virtual education

Main Activities and Researches of Department

- Giving information about ART results: (What and When)
- Ethical challenges of cell therapy and possible solutions
- The role of stem cells in burn healing
- Patient Bill of Rights
- Views in favor of commercial surrogacy
- Mutual obligations of the contract in Surrogacy
- Relationship between Surrogacy and Adoption
- Review the draft of guideline for adding some points to the Act of Embryo Donation
- Psychological and cultural problems of Surrogacy
- Medical hegemony in the definition of ethics body in Iran
- Nature of the relationship between physician and patient from Imamieh point of view
- Doctor and patient relationship
- Establishment of Biosafety committee and pursuit of related guidelines

- Therapeutic abortion and fetal reduction from ethical and legal perspective
- Moral status of human embryo
- Ethical aspects of fertility preservation by medical and non-medical reasons
- Sex selection: ethical, legal and religious aspects
- Attitude towards the child and the parent specially in HIV positives
- Survey of sexual function in infertile women
- Development and standardization of data collection tools to study knowledge and attitude towards methods of gamete donation
- Experience of infertility among embryo recipients
- Using ART for addicted couples from legal and moral points of view
- Review the necessity of obtaining permission of spouse for using the medical treatment for wife
- Review of reproductive rights in local and international legal systems
- The relationship between chemical pregnancy, risk factors, clinical and cellular factors in infertile people using structural equation model
- Using correction methods of sensitivity and specificity in diagnostic tests to estimate the accuracy of transvaginal ultrasonography in diagnostic endometrial polyps when verification bias is present
- Ethical challenges of human transplantation using transgenic animals organ
- The results of infertility treatment in older women
- Vaginismus treatment after 20 years: Case report
- Writing a book about assisted reproductive treatment history in Iran
- Collecting ART patient records
- Designing forecast models using decision trees to identify infertile women with endometriosis
- Review of assisted reproductive therapy in postmenopausal women with advanced age from medical and ethical perspectives
- Professionals' attitudes towards the welfare of children born after assisted reproductive techniques

Overview of the Department in 2012

- Establishment of reproductive epidemiology research center
- Initiation of numerous researches in 2012 in continuation to previously started projects
- Holding the second annual congress of reproductive ethics and rights
- Holding the 7th symposium of nursing role in infertility
- Supervising 22 projects, 78 joint projects, 4 graduated students, 191 consultation for research methodology, 51 statistical analyses, 104 article reviews and teaching 1 MSc and 3 PhD students

News and Events

Journal Clubs

- **Affective relationship in sex partners,** Shokoufeh Sabeti, September 29, 2012.
- **Informed consent,** Reza Omani Samani, October 29, 2012.
- **Sex selection,** Sadegh Shariat-Nasab, December 11, 2012.
- **Importance and status of child from social and cultural view,** Morteza Karimi, May 7, 2013.
- **Infertile stigma and adjustment mechanism,** Morteza Karimi, June 18, 2013.

Workshops/Congress

- **Introduction to ENDNOTE**

Helping researchers write their articles. Scientific Manager: Dr Narges Lankarani, Executive Manager: Dr Narges Lankarani. June 14, 2011.

- **Designing a Clinical Trial**

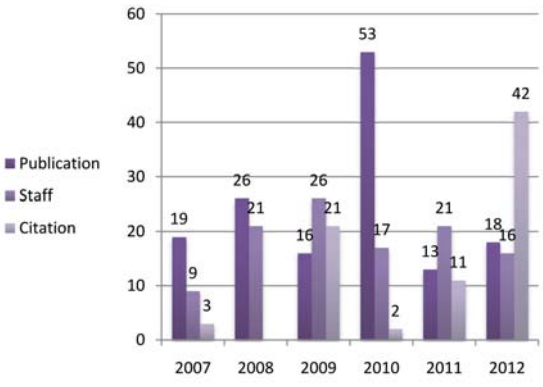
Helping researchers have a better understanding of interventional studies in which the research subjects are assigned by the investigator to a treatment or other intervention and their outcomes are measured. Scientific Manager: Dr AliAsghar Akhlaghi, Executive Manager: Dr Mansour Shamsipour. July 13-14, 2011.

- **Sexual Health**

Detailed instructions on issues relating to human sexuality, including: human sexual anatomy, sexual reproduction, sexual intercourse, reproductive health, emotional relations, reproductive rights and responsibilities, abstinence, birth control, and other aspects of human sexual behavior. Scientific Manager: Dr Ali Azin, Executive Manager: Leila Alizadeh. November 9-11, 2011.

- **The First Annual Congress of Reproductive Ethics and Law**

Gathering the religious controversies about assisted reproductive techniques procedures, especially surrogacy, considering the legal and ethical aspects, and making some of legal obstacles clear in order to pave the way for future laws. Scientific Manager: Dr Saeed Nazari Tavakoli, Executive Manager: Shima Behnam manesh. January 4-6, 2012.



Ethics and Legal Aspects of ART

Group Leader:
Mohammad Reza Rezaniya Moalem, MA

rezaniyamoalem@royaninstitute.org

Biography
Mohammad Reza Rezaniya Moalem achieved his BA in law from Tehran University in 1996. He continued his education in Qom University and graduated with MA of Private law in 1999. He has been working in this department since 2005 andhas been involved mostly in ethical and jurisprudential issues of infertility. Subsequently he applied for PhD and graduated from Shahid Motahari University in 2009.

Introduction

Assisted reproductive technologies are widely practiced around the world for the treatment of all forms of infertility. Currently, the application of this technology is common in the Islamic world. This group discusses derivation of Islamic rulings and its impact on the ethics of contemporary issues, including family formation and assisted reproduction. It is important for the Muslims from all around the world to know the current situation of Islamic decrees about assisted reproduction, especially Shī'ah Muslims, because in Shī'ah Islam, third party assisted reproduction is accepted. As the law in Iran and many other Islamic countries are based on Islam, legal researches and pursuing guidelines and legislations are the main aims of this group.

Research Assistants

Azin, Mohammad, PhD Student
Behnammanesh, Shima, MA
Merghati, Taha, PhD
Nemati, Zahra, BSc
Omani Samani, Reza, MD
Shariati-Nasab, Sadegh, PhD Student

Publications

Behnam Manesh Sh. **Ethical challenges regarding Xenotransplantation of transgenic animals to human beings.** Hakim Research Journal. 2012; 15(1): 13- 21.

Kamranpour SB, Oudi M, Omani Samani R. **Medical and ethical issues regarding assisted reproductive techniques in women of advanced age**. Iranian Journal of Medical Ethics and History of Medicine. 2012; 5(6); Mona Oudi, Reza Omani Samani, Leila Alizadeh. **Medical and ethical issues regarding egg sharing and egg donation.,** Iranian Journal of Medical Ethics & History. 5(30) (19 2012)

Leila Alizadeh, Reza Omani Samani. **Posthumous assisted reproduction: patients' rights and Islamic view.,** Iranian Journal of Medical Ethics & History. 5(4) (1 2012)

Behnammanesh Shima, Omani Samani Reza. **Animal status in the history of philosophy and ethics.** Journal of Medical Ethics and History of Medicine. March 2012; 5(2); 22-28

Shima Behnammanesh, Reza Omani Samani. **Ethical critics on foods from cloned animals,** Iranian Journal of Medical Ethics & History.2012; 5(1): 29-38.

Epidemiology and Biostatistics in ART

Group leader:
Gholamreza Khalili, MD, PhD Student

rkhalilie@royaninstitute.org

Biography
Dr Khalili has been involved with Epidemiology and Reproductive health for past four years as a research fellow. He achieved his MD from Tehran University in 1999. He continued his education in Tehran University and since 2001 he has been a PhD student in Epidemiology field.

Introduction

Infertility is a major public health problem worldwide that has been encountered more during recent years. Clinically a couple is considered to be infertile after at least one year without contraception and without pregnancy (Weinberg and Wilcox 1998; Savitz et al. 2002). Factors affecting fertility can be varied in different parts of the world. The epidemiological knowledge about infertility in Iran is sparse; as regards fertility treatment had developed substantially during the 1980's, and Royan institute is one of the largest centers in Iran to which many infertile men and women with different geographical areas and different ethnic groups refer. It is tried to study the important variables such as psychosocial, demographic, social, geographical factors which affect fertility. Also, the associations between those variables among women and men in ART through epidemiological methodology such as case-control, retrospective cohort or interventional study are included. The main goal of this group is to be effective in providing some important data about the epidemiologic and etiologic factors of infertility and to show the priority of future plan for complementary assessment and preventive programs in general population.

Research Assistants

Akhlaghi, Ali Asghar, PhD Student
Chehrazi, Mohammad, PhD Student
Cheraghi, Rezvan, MSc
Ghaheri, Azadeh, PhD Student
Hesam, Saeed, PhD Student
Sazvar, Saeedeh, BSc
Shabani, Fatemeh, MSc Student
Shamsipour, Mansour, PhD Student

Publications

Abbasihormozi S, Shahverdi A, Kouhkan A, Cheraghi J, Akhlaghi AA, Kheimeh A. **Relationship of leptin administration with production of reactive oxygen species, sperm DNA fragmentation, sperm parameters and hormone profile in the adult rat.** Arch Gynecol Obstet. 2013 Jun;287(6):1241-9.

Golkar-Narenji, A., H. Gourabi, H. Eimani, Z. Barekati, A. Akhlaghi. **Superovulation, in vitro fertilization (IVF) and in vitro development (IVD) protocols for inbred BALB/cJ mice in comparison with outbred NMRI mice.** Reproductive Medicine and Biology. 2012; 11(4): 185-192.

Tehraninejad, E. S., M. Hafezi, A. Arabipoor, E. Aziminekoo, M. Chehrazi and A. Bahmanabadi (2012). **Comparison of cabergoline and intravenous albumin in the prevention of ovarian hyperstimulation syndrome: a randomized clinical trial.** Journal of Assisted Reproduction and Genetics 29(3): 259-264.

Madani T, Yeganeh LM, Ezabadi Z, Hasani F, Chehrazi M. **Comparing the efficacy of urinary and recombinant hCG on oocyte/follicle ratio to trigger ovulation in women undergoing intracytoplasmic sperm injection cycles: a randomized controlled trial.** Journal of Assisted Reproduction and Genetics. 2012; 1-7.

Karimi R, Shabani F, Nayeri ND, Zareii K, Khalili G, Chehrazi M. 2012**. Effect of Music Therapy on Physiological Pain Responses of Blood Sampling in Premature Infants.** HAYAT. 18(2).

Niknejadi M, Haghighi H, Ahmadi F, Niknejad F, Chehrazi M, Vosough A, Moenian D**. Diagnostic Accuracy of Transvaginal Sonography in the Detection of Uterine Abnormalities in Infertile Women.** Iranian Journal of Radiology. 2012; 9(3): 139.

AmiriYekta A, Dalman A, Sanati MH, Fatemi NS, Vazirinasab H, Zomorodipour A, Chehrazi M, Gourabi H. **Optimization of the Electroporation Conditions for Transfection of Human Factor IX into the Goat Fetal Fibroblasts.** Cell Journal. 2013; 14(4): 270-275.

Reproductive Health

Introduction

Human being is one side of every innovation in the field of medicine and high-technology which has something to do with medicine. This kind of creature, similar to others, has necessary and basic needs for survival. But the main difference between human and other kind of animals is having culture and an economical system in order to live with each other and improve the qualities of life.
ART is a sort of innovations coming from this system in order to help to maintain and improve itself. Therefore, not only it is supposed to be studied the process of constructing ART, but also it is intended to do research on how it works, by which local socio-economic system it would be accepted, how it can be changed and internalized, and what intended or unintended consequences are.

Research Assistants

Ahmadi, Zahra, BSc
Ezabadi, Zahra, MSc
Izadyar, Nasrin, MSc
Kashfi, Fahimeh, MSc
Karimi, Morteza, PhD Student
Malekzadeh, Farideh, MSc
Sabeti, Shokoufeh, MD

Publications

Madani T, Yeganeh LM, Ezabadi E, Hasani F, Chehrazi M. **Comparing the efficacy of urinary and recombinant hCG on oocyte/follicle ratio to trigger ovulation in women undergoing intracytoplasmic sperm injection cycles: a randomized controlled trial.** Journal of Assisted Reproduction and Genetics. 2012; 1-7.

Larti A, Hosein Rashidi B, Azimi Nekoo E, Shahrokh Tehrani Nejad E, Jahangiri N, Ezabadi E. **The outcome of in vitro fertilization/intracytoplasmic sperm injection in endometriosis–associated and tubal factor infertility.** Iranian Journal of Reproductive Medicine.2012; 1-2.

Samiei N, Kashfi F, Khamoushi A, Hosseini S, Ghavidel AA, Taheripanah R, Mirmesdagh Y. **Pregnancy Outcome after Mechanical Mitral Valve Replacement: A Prospective Study.** The Journal of Tehran University Heart Center. 2012; 7(3): 117.

Group Leader:
Narges Bagheri Lanakarani, PhD

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Biography
Dr Lanakarani received her PhD from the University of Wollongong in Australia in 2008 and has been involved with Epidemiology and Reproductive health group for the past three years as a research fellow.

REPRODUCTIVE IMAGING DEPARTMENT OF RI-RB

Department Head:
Firouzeh Ahmadi, MD
(Radiology)

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Biography
Dr Firoozeh Ahmadi received her medical degree in1993 from Iran University of Medical Science, and completed her radiology specialty training at Iran University of Medical Science in 1997. She started residency program in computed tomograph (CT) scan and Doppler ultrasound in 1998.
Since 2003 she has been working as an assistant professor of radiology, and the head of imaging department at Royan Institute. Her research interest focuses on female and obstetric imaging.

Department History and Introduction

Reproductive Imaging Department was established in 2008 to focus on infertility assessment as well as evaluation of pregnancies in both clinic and research fields. During the last two decades, dynamic advances have been made in the evaluation and treatment of infertility. Imaging technique has been a significant breakthrough in the diagnosis and management of infertility. A broad range of imaging techniques, from the old and proven - such as hysterosalpingography- to the latest and cutting edge - such as three-dimensional hysonosterography, has been employed.
After applying these advanced techniques in this department, we are able to upgrade the management of infertility and obstetric care, and thereby, positively provide better services for infertile couples.
The main goal of imaging department is to provide comprehensive evaluation of infertility using the latest knowledge and innovative research in order to provide the highest quality of infertility management and to monitor emergency obstetric care.
The mission of this research department is to expand clinical and fundamental research in reproductive imaging in order to provide modern strategies and improve clinical services for infertile couples. The main aim of these projects classified as:

- Diagnostic accuracy investigation of imaging modalities (hysterosalpingography, hysterosonography and three-dimensional ultrasound)
- Role of imaging in (male & female) infertility management
- Fetal screening
- Measurement standards/ultrasound measurement charts appropriate for Iranian fetuses

The vision of this department is performing national and international multicentral researches and having collaboration with universities and other infertility centers to provide educational courses in diagnostic ultrasound including transvaginal, color Doppler, power Doppler, 3D/4D imaging and radiology for radiologist, gynecologist and fellowships.

Overview of Reproductive Imaging Research Center

Reproductive Imaging Department has an essential role in training in reproductive imaging field. More than seven radiologists, gynecologists and fellowships have taken these courses during last year. Courses are conducted as short term (2-4 weeks) and middle term (2-6 month).

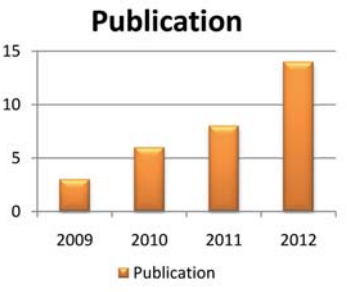
The research and training program is conducted in close collaboration with international universities and organizations in Iraq and Turkey. A large network of internal, national and international partners is invited to take part in these projects.

Research Scientists

Ahmadi, Firoozeh, MD
Irani, Shohreh, PhD
Niknejadi, Maryam,MD
Vousogh, Ahmad, MD
Zaferani, Fatemeh, MSc

Research Assistants

Akhbari, Farnaz, BSc
Ghaderi, Farahnaz, ASc
Haghighi, Hadieh, BSc
Javam, Maryam, BSc
Niknejad, Fatemeh, BSc
Poyan, Akram, ASc
Rashidi, Zohreh, BSc
Tehrani, Fataneh, BSc



News & Event

Achieving Standard ISO 9001: 2008 certification from Italy IMQ Company after months of hard work.

Workshop

- **Anomaly Scan of Fetus in Second Trimester**

An overview of the anomaly scan of fetus in second trimester. Scientific Manager: Dr Kourosh Shahsavan, Executive Manager: Fatemeh Niknejad. September 6, 2012.

Publication

Ahmadi F, Haghighi H. **Detection of Congenital Mullerian Anomalies by Real-time 3D Soonography.** J of Reproduction & Infertility. 2012; 13(1): 65-66.

Jafarpour F, Hosseini SM, Hajian M, Forouzanfar M, Ostadhosseini S, Abedi P, Gholami S, Ghaedi K, Gourabi H, Shahverdi A, Vosough A, Nasr-Esfahani M. **Somatic Cell-Induced Hyperacetylation, But Not Hypomethylation, Positively and Reversibly Affects the**

Efficiency of In Vitro Cloned Blastocyst Production in Cattle. Cellular Reprogramming. 2011; 13(6): 483-493.

Karimabad HM, Shabestari M, Baharvand H, Vosough A, Gourabi H, Shahverdi A, Shamsian A, Abdolhoseini S, Moazzami K, Marjanimehr MM, Emami F, Bidkhori HR, Hamedanchi A, Talebi s, Farrokhi F, Jabbari-Azad F, Fadavi M, Garivani U, Mahmoodi M, Aghdami N. **Lack of beneficial effects of granulocyte colony-stimulating factor in patients with subacute myocardial infarction undergoing late revascularization: a double-blind, randomized, placebo-controlled clinical trial.** Acta Cardiol. 2011; 66(2): 219-224.

Vaziri M, Sadighi M, Kavousi A, Firoozeh M, Khani R, Vosough A, Mohseni H, Bageri N, Azizi M, SalmanYazdi R. **The Relationship between Occupation and Semen Quality.** Int J Fertil Steril. 2011; 5(2): 66-71.

Nasiri N, Vosough A, Eftekhari-Yazi P, Akhond M. **Reproductivee Performance of Mouse Oocyte after In Vivo Exposure of the Ovary to Continuous Wave Ulltrasound.** Int J Fertil Steril. 2012; 6(3): 195-200.

Madani T, Irani Sh, Ashrafi M, Nabavi M. **The Effect of Flutamide on Ovulation Induction in PCOS Patients.** Int J Fertil Steril. 2012; 6(1): 65-69.

Ahmadi F, Akhbari F. **Incomplete cesarean scar Rupture.** J Reprod Infertil. 2013; 14(1): 41-45.

Ahmadi F, Irani Sh. **Cervical Ectopic Pregnancy following Assisted Reproductive Technology: A Case Report.** Int J Fertil Steril. 2012; 6(3): 201-204.

Niknejadi M, Haghighi H, Ahmadi F, Niknejad F, Chehrazi M, Vosough A, Moenian D. **Diagnostic Accuracy of Transvaginal Sonography in the Detection of Uterine Abnormalities in Infertile Woman.** IJR. 2012; 9 (3): 139-144.

Ahmadi F, Haghighi H. **Cervical Septal Remnants.** Int J Fertil Steril, 2012; 6(3): 205-207.

Ahmadi F, Keramat N, Haghighi H. **Conjoined Twin.** Int J Fertil Steril. 2012; 6(2): 135-136.

Ahmadi F, Haghighi H, AkhbariF. **Hysterosalpingography.** Middle East Fertility Society Journal. 2012; 17: 210-214.

Ahmadi F, Haghighi H. **True unicornuate uterus-Pseudounicornuate uterus.** Iran J Reprod Med. 2012; 4(10): 391.

Moini A, Ahmadi F, Eslami B, Zafarani F. **Dizygotic Twin Pregnancy With a Complete Hydatidiform Mole and a Coexisting Viable Fetus.** IJR, 2012; 8 (32): 249-252.

ROYAN INFERTILITY CLINIC OF RI-RB

Message from Clinic Manager

Royan Infertility Clinic is proud of hosting over ten thousand infertile couples annually. Current year, over a hundred and thirty thousand infertile couples are under treatment in this infertility clinic center. Besides embracing the significant number of Iranian infertile couples, Royan Infertility Clinic assumes a considerable number of infertile couples from neighboring countries and even continents of Europe, America, Africa and the Pacific.
The number of Royan infertility clinic patients faces a continuous growth due to the standard infertility treatment services and high rate of treatment success by efforts of expert specialists using modern technology in female infertility, male infertility, embryology, genetics, and imaging fields.
All my colleagues endeavor to achieve patients' satisfaction and higher success rate in infertility treatment via carrying out healthy children.
The next pages are an introduction to various Royan Infertility Clinic departments and colleagues plus last year efficiency statistics.

Clinic Manager:
Ahmad Vosough Taghi Dizaj, MD
(Radiology)

vosough@royaninstitute.org

Biography
Dr Ahmad Vosough received his medical degree in1993 from Iran University of Medical Science, and completed his Radiology specialty in 2000. He is an associate professor of Radiology at Royan Institute, chairman manager of IJFS, a member of IJFS editorial board, and the head of male infertility imaging department since 1995. His research interest focuses on male infertility imaging.

Endocrinology and Female Infertility Clinic of RI-RB

Clinic Head:
Tahereh Ma'dani, MD
(Obstetrics & Gynecology)

tmadani@royaninstitute.org

Biography
Dr Tahereh Ma'dani obtained her medical degree in 1984 from Shiraz University of Medical Sciences, Iran, and completed her obstetrics and gynecology specialty in 1989 at Iran University of Medical Sciences. She then became an associate professor at Iran University of Medical Sciences. Currently she is the head of Royan Endocrinology and Female Infertility Clinic. She is especially interested in assisted reproductive technology (OHSS, IVM) and reproductive immunology. She has managed several research projects and has a range of national and international publications and presentations.

Introduction

Infertility is a major health problem worldwide that has been encountered more during recent years. Clinically a couple is considered to be infertile after at least one year without contraception and without pregnancy .The average of 10 percent of Iranian couples suffers from infertility, while this rate varies from 10 to 20 around the world. Thanks to many options existing today such as advanced reproductive technologies and adoption, most infertile couples are able to experience the joy of parenthood.
Royan Infertility Clinic is the second infertility clinic in Iran and the first in Tehran. Although there are more than 50 infertility clinics throughout Iran, after 21 years of experience in this field and due to the high rate of success many patients prefer to have their treatments in this clinic. Every year we have numerous foreign patients who come to Iran for infertility treatment.
This clinic includes other special sub-clinics to provide a full service for patients; after the initial fertility evaluation by asking some questions and reviewing any records, the infertility specialists undergo a series of tests which may require a significant amount of time and energy to identify potential causes for difficulty in conceiving. Besides all kinds of diagnostic tests which contain karyotyping, molecular genetic tests such as Factor V Leiden, Factor II and MTHFR gene, the modern treatments in this field including diagnostic and operative laparoscopy, diagnostic and operative laparahysteroscopy, IUI, ovulation induction, IVF, ICSI, ZIFT, IVM blastocyst, assisted hatching, PGD, and gamete and embryo cryopreservation are also available in this clinic. The specialists offer an integrated approach to diagnosis and treatment, which may include evaluation by doctors in other specialties and extensive diagnostic testing and counseling. A collaborative approach includes the woman and her partner as part of the health care team.
There is an Endocrinology and Metabolism sub-clinic along with Nutrition sub-clinic in which endocrinologists cope with complex problems related to infertility such as PCOS, Diabetes, Thyroid problems. There are some other sub-clinics to conduct fertility preservation, recurrent pregnancy loss, amenorrhea, premature ovarian failure, congenital uterine anomalies and risk of genetic disorders in offspring, and endometriosis which can be found in about fifty percent of infertile women. The minimally invasive and open approaches to treat uterine fibroids, endometriosis, uterine polyps, adhesions and abnormalities of the uterus or fallopian tubes are available at:

- Endoscopy sub-clinic
- Endometriosis sub-clinic
- Recurrent Abortion sub-clinic
- Genetic Counseling sub-clinic
- Imaging modalities such as rectal and vaginal ultrasonography sub-clinic

IVF Failure sub-clinic provides couples consultation, to review their treatment and their status in order to decide the best treatment methods to increase their chance of having a healthy child.
The psychologists discuss the emotional stress of infertility, as a subject which is often difficult to share with family and friends. They also go into the third-party reproduction concerning the use of eggs, or embryos that have been donated by a third person (donor) to enable an infertile couple to become parents. It is a complex process requiring consideration of social, ethical, and legal issues by the third party consular.
Prenatology sub-clinic manages special pregnancy care such as DIPI, CVS, Amniocentesis, Doppler sonography for embryo assessment.

Goals of Endocrinology and Female Infertility Clinic

- Increasing the ongoing pregnancy rate
- Increasing the number of healthy babies
- Supporting couples in psychosocial problems
- Diagnosing and treatment of endocrinology problems before ART initiation
- Selecting patent friendly stimulation for the patients
- Providing different facilities for healthy mothers

The Groups of Infertility Specialists

- Obstetricians & Gynecologists (OB-Gyn)
- Prenatologists
- Endocrinologists
- Infection specialists
- Hematologists & oncologists
- Psychiatrists
- Nutrition specialists
- Genetic specialists

Obstetrics & Gynecology Group

Ashrafi, Mahnaz, MD (Gynecologist)
Ghaffari, Firouzeh, MD (Gynecologist)
Hafezi, Maryam, MD (Gynecologist)
Hemat, Mandana, MD (Gynecologist)
Mashayekhy, Mehri, MD (Gynecologist)
Moini, Ashraf, MD (Gynecologist)
Ramezanali, Fariba, MD (Gynecologist)
Saeidi, Leila, MD (Gynecologist)
Shahrokh Tehrani Nejad, Ensieh, MD (Gynecologist)
Shiva, Marzieh, MD (Gynecologist)

Endocrinology Group

Feiz, Firouzeh, MD (Endocrinologist)
Hoseyni, Roya, MD (Endocrinologist)
Jalali, Raheleh MD (Endocrinologist)

Other Specialties Group

Moininia, Fatemeh MD (Hematologist & oncologist)
Zangene, Mehrangiz MD (Infection specialist)

Andrology Clinic of RI-RB

Introduction

The first step in infertility management is to evaluate the couple. Male factor infertility accounts for approximately 50% of all infertility cases. Thus in order to study male factor infertility it is necessary to use appropriate diagnostic and therapeutic techniques. The intent of this clinic is to develop new diagnostic methods and treatment for male factor infertility.
Andrology Clinic of Royan Institute is the major referral center for male infertility problems in Iran. A part of the activities in this center for diagnosis of male factor infertility includes patients' history and clinical examinations such as scrotal sonography, hormone and semen analysis, and DNA damage analysis. This Clinic is set up for the evaluation and treatment of male infertility, male sexual problems, varicocele and vasectomy reversal.
Vasoepidiymostomy, Vasovasostomy, TUR of Ejaculatory Duct, and MD-TESE are the surgical procedures provided for male infertility in Andrology clinic which is divided to a clinic and an operating room.

Clinic Head:
Mohammad Ali SadighiGilani, MD
(Urology)

ali.sadighi@royaninstitute.org

Main Activities of Andrology Clinic

- Recording patient's history and clinical examination such as scrotal sonography, hormone and semen analysis and DNA damage analysis
- Determining the etiology of spermatogenesis, as well as functional and ejaculation disorders
- Trying to extract sperm from the testicle in patients with azoospermia

Urologists

Dadkhah, Farid, MD
Farrahi, Faramarz, MD
Hosseini, Seyed Jalil, MD
SadighiGilani, Mohammad Ali, MD

Head Chief for Routine Laboratory

Salman Yazdi, Reza, MLD

General Physicians

Azizi, Mohammad, MD
NourMohammadi, Ahmad, MD

Men Operation Room

Amiratashani, Elyas, ASc
Mohamadi, Samad, ASc
Pak, Hamid, Bsc
Rezayat, Mostafa, ASc
Shahroodi, Kianoush, ASc
Sobooti, Taher, BSc

Embryology Clinic of RI-RB

Clinic Head:
Poopak Eftekhari-Yazdi, PhD

Laboratory Head
Leila Karimian, MSc

l.karimian@royaninstitute.org

Introduction

Assisted Reproductive Technology (ART) refers to a range of laboratory techniques that combine sperm and egg for fertilization. Since the birth of the first in vitro fertilization (IVF) or 'test tube' baby in 1978, the field of IVF has been transformed with several technological discoveries that have led to a remarkable expansion of the treatable conditions as well as an outstanding increase in making possible the dreams of many couples to conceive. The embryology laboratory, where embryos are produced, grown and nourished during an IVF cycle, is one of the key components of a fertility center. While patients don't necessarily know what happens behind the scenes during an IVF cycle or how their embryos are produced, having a state-of-the-art embryology laboratory is what separates an average center from an excellent fertility one.

The embryology clinic of RI-RB gives the patients access to some of the most accomplished and national renowned fertility specialists in the field. A wide range of advanced ART services are also available, including:

- Intra uterine insemination (IUI)
- In vitro fertilization (IVF)
- Intracytoplasmic sperm injection (ICSI)
- Assisted hatching
- In vitro maturation (IVM)
- Blastocyst culturing
- Embryo cryopreservation
- Preimplantation genetic diagnosis (PGD)
- Donor oocyte (egg) services
- Oocyte cryopreservation (egg freezing) services

After fertilization, embryos are cultured in the embryology laboratory. This is done under very strict conditions in specialized media in an incubator. Embryos are typically transferred back into the uterus at either the cleavage stage (on day 3 after retrieval) or the blastocyst stage (on day 5 after the retrieval).

The embryology clinic of RI-RB offers extensive training in routine and advanced laboratory tests in assisted reproduction techniques (IUI, IVF/ ICSI), gamete cryopreservation and PGD. Through one-on-one training in laboratory procedures, candidates develop technical expertise in all of the essential techniques, including comprehensive semen analysis, sperm preparation procedures, assisted reproduction (IVF/ICSI) techniques and cryopreservation protocols for semen, testicular and oocytes/ embryos. At the completion of the program, candidates receive a certificate of Training recognizing their achievements.

In addition to patient treatment we also focus on research about the following aspects of preimplantation embryo:

- IVM
- IMSI and best approaches to sperm selection
- Cryopreservation of gamete and embryo
- Low fertilization
- Effect of oxidative stress on sperm and oocyte

The mission of the Clinical part of RI-RB Embryology Department is the performance of multiple approach regarding different treatments of infertility in order to improve embryo health and increase the pregnancy success rate. Its aim is to make the wish of having children for infertile couples come true, and to give a promising future to them.

Embryologists

Akhondi, Mohammad Mahdi, PhD
Movaghar, Bahar, PhD
Rezazadeh Valojerdi, Mojtaba, PhD

Technical Staff

Badrkhani, Mojgan, BSc
Behbahanian, Arash, MSc
Fazel Tabar-Malekshah, Mohammad, MSc
Fouladi, Hamid Reza, BSc
Hasani, Fatemeh, MSc
Mamivand, Maryam
Mohajer-Soltani, Neda, BSc
Mohamadi, Simin, PhD
Nargesi, Hamed, BSc
Reihani, Elham, BSc
Soleimani, Mahdi, BSc
Zeinolabedini, Behnoush, BSc

Nursing and Midwifery Group of RI-RB

Introduction

Some of the main roles of nursing and midwifery group include giving assurance to couples, effective communication, consultation and delivering information to patients, management of different stages of treatment, cooperation with specialists in treatment, researching and case collection for researches in different ART centers. Direct connection with patient to explain instructions and provide complete information in screening period, during treatment and afterward, highlights the role of nursing and midwifery group.
The Endocrinology and Female Infertility Clinic of Royan Institute includes different sections for assessment of different aspects of infertility and developing the best treatment methods, in each a special midwife collaborates with one gynecologist.

Group Manager:
Zahra Ezabadi, MSc

z_ezabadi@royaninstitute.org

Biography
Zahra Ezabadi received her BSc from Iran University of Medical Science in 1996. She continued her education in Human Science at Culture and Social Studies Research center and in 2006obtained her MSc in research management. Since 1990 she has been the manager of Nursing and -Midwifery group in Royan Institute. She also has collaborated with the Epidemiology and Reproductive Health and Endocrinology and Female Infertility departments from 1989.

Main Activities of Nursing and Midwifery Group

- Taking the first visit history of the patient
- Vaginal Examination and Pap smear
- Provide comments and advice to patients about infertility causes, treatment and duration of treatment
- Management of patients in whole treatment cycle
- Collaboration during ultrasound monitoring and pharmaceutical and medical explanations of patients
- Statistical following of the ART outcome and pregnancy status of patients
- Psychological support and counseling patients after getting the results
- Collaboration in prenatal care during pregnancy
- Providing consultations and comments about donation
- Telephone answering of patients questions
- Cooperation and collaboration with physicians during diagnosis and treatment process
- Collaboration in research projects
- Cooperation in providing educational books and pamphlets

Nursing and Midwifery Seminar

To increase the knowledge and scientific level of nurses and midwives in ART clinics, we decided to hold the symposium of "Nursing and Midwifery in Reproductive Medicine" in Farsi language. This Symposium was held for the first time in 2006 along with the Royan International Congress on Reproductive Biomedicine and Stem Cells Biotechnology. Later, by improving the scientific level of articles and research presentation, this symposium changed to a Seminar. This annual seminar is organized by nursing and midwifery manager of Royan Institute, and supports of ART specialists and assistants of Royan Institute.

Clinic Staff

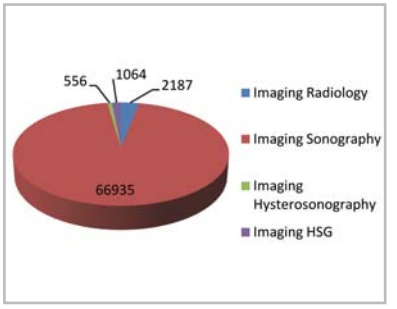
Ahmadi, Jila, BSc
Ahmadi, Laleh, BSc
Ahmadi, Maryam, BSc
Ahmadieh, Maliheh, BSc
Bahmanabadi, Akram, BSc
Etminan, Jaleh, BSc
Farshad, Beheshteh, ASc
Ghasemkhani, Zahra, BSc
Hajihasan, Fatemeh, MSc
Hasani, Zahra, BSc
Hoseini, Maryam, BSc
Khodabakhshi, SHShabnam, BSc
Kohestani, Swolmaz, BSc
Mirghavamedin, Naeemeh, BSc
Mirzaagha, Elaheh, BSc
Mollaahmadi, Fahimeh, BSc
Omrizadeh, Maryam, BSc
Rashidi, Mahnaz, BSc
Rastegar, Fatemeh, ASc
Shahbakhti, Nafiseh, BSc
Shahbazi, Fatemeh, BSc
Shahdoost, Tannaz, BSc
Shamsipour, Narges, BSc
Taghvaie, Saeedeh, BSc
Vahedi, Akram, BSc

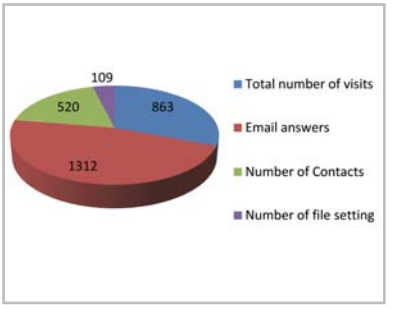
IVF Room Nurses and Midwives

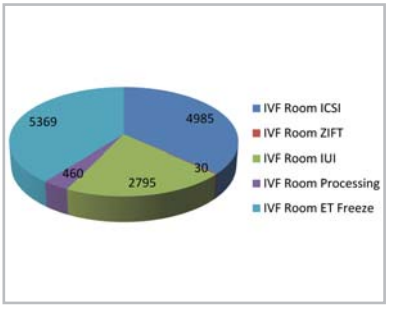
Rafiei, Najmeh, BSc
Sadeghi, Maria, BSc
Sadeghkhah, Adeleh, BSc
Saidie, Akram, ASc
Saie, Maryam, BSc
Tavakoli, Azadeh, BSc

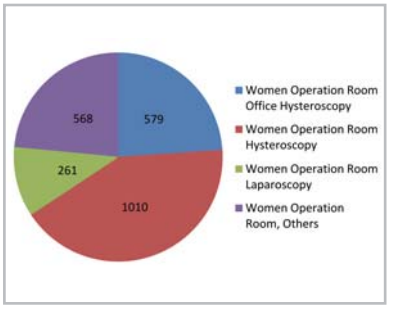
Women Operation Room Nurses and Midwives

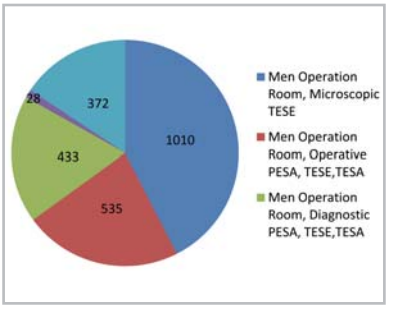
Aghaie, Zahra, ASc
Banaie, Hamid, BSc, BSc
Hoseini, Fatemeh, BSc
Khani, Zahra, BSc
Oroomiehchi, Mansoureh, BSc
Talebi, Mehrak, BSc

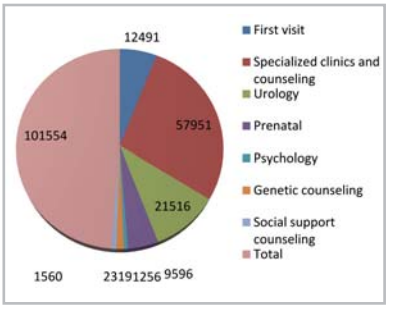












PARACLINICAL SERVICES

Royan Medical Genetic Laboratory of RI-RB

Laboratory Head:
Hamid Gourabi, PhD

gourabi@royaninstitute.org

Introduction

Genetics as a branch of biological science, studies the correlation between genes and heredity. Chromosomal and/or molecular analysis is considered an essential component of the important work-up for individuals with congenital malformations, mental retardation, multiple spontaneous miscarriages, ART failures, or infertile couples.

The Genetic Laboratory of Royan Institute was established in 2001 to provide general molecular and cytogenetic services for the Iranian couples. This center offered both molecular and Cytogenetics services to more than 7200 patients during last year.

Some of the individuals who referred to Genetic Laboratory may be recommended to attend genetic counseling or undergo prenatal diagnosis for the following reasons:

- Male infertility (Azoespermia or Severe Oligospermia)
- Family history of a genetic condition or chromosome abnormality
- Parents of a child with mental retardation, autism
- Previous unexplained stillbirth or repeated (3 or more) first trimester miscarriages
- Individual history with recurrent ART failure

- Molecular test for single gene disorders
- Primary or secondary amenorrhea
- Abnormal maternal serum screening results, ultrasound findings or increased nuchal translucency measurements in fetus

Cytogenetics refers to the microscopic analysis of chromosomes and/or genetic materials in individual cells. These studies can be performed on various samples, e.g., fresh blood, amniotic, and 8-cells embryo specimens. Information about genetic abnormalities in infertile patients can be particularly useful for disease classification and monitoring, as well as diagnosis and treatment strategy decision.

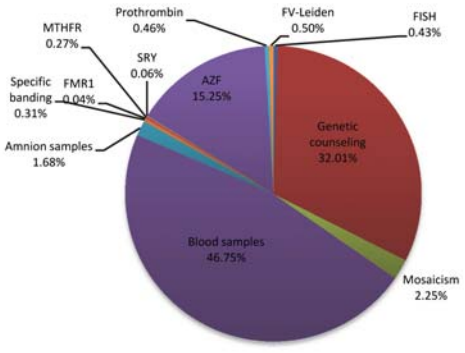
Genomics refers to the detailed molecular analysis of the entire genome. Peripheral blood is the main type of tissue using for abnormality analysis in the molecular laboratory. A number of the PCR based molecular tests that carried out in this center are screening of mutations in Factor-V (Leiden), MTHFR, Prothrombin, AZF, SRYand FMR1 genes. Besides fluorescence in situ hybridization (FISH) for micro deletion syndromes and other indications such as sex selection, identification of marker chromosomes and specific chromosome rearrangements are provided in Genetic Laboratory of Royan Institute. Clinically, more than 2248 genetic consultations, 3283 karyotypes, 1070 AZF-microdeletion tests, and 875 PGD tests were performed. The Cytogenetic Laboratory employs more than 19 full- and part-time employees, including one genetic consultant.

Cytogenetic Laboratory Director
Mohseni Meybodi, Anahita, PhD

Molecular Laboratory Director
Zamanian, Mohammad-Reza, MD, PhD

Genetic Consultant
Almadani, Navid, MD

Genetic Laboratory Staff
Asia, Saba, BSc
Beheshti, Zahra, BSc
Eshaghi Zadeh, Hanieh, BSc
Eshrati, Maryam, BSc
Fahimi, Peyman, BSc
Hedayatian, Narges, MSc
Jalilnezhad, Sayeh, BSc
Kalantari, Hamid, MSc
Mokhtari, Pegah, MSc
Pirasteh, Pouneh, BSc
Reyhani Sabet, Fakhr-al-din, MSc
Saffari, Zeinab, MSc
Shahsavan, Mahboubeh, BSc
Tavakol, Tayebeh, BSc
Tirandaz, Farhad, BSc
Zarei, Keshvar



Imaging Unit of RI-RB

Main Activities

- **Gynecology Ultrasound**
  - Transvaginal ultrasound
  - Transabdominal ultrasound
  - 3D-4D ultrasound
- **Obstetric Ultrasound**
  - Screening for fetal chromosomal and structural abnormalities
    - Screening in first trimester
    - Screening in second trimester
    - Screening in third trimester
  - Color Doppler ultrasound
- **Diagnostic Ultrasound in Male Infertility**
  - Transabdominal ultrasound
  - Transrectal ultrasound
  - Scrotul sonography
  - Color-doppler ultrasound
- **Hysterosonography**
  - Two-dimensional hysterosonography
  - Three-dimensional hysterosonography
- **Radiology**
  - Hysterosalpingography
  - Other graphy with constract (IVP, BE,..)
  - Routine Radiology

Unit Head:
Maryam Niknejadi, MD
(Radiology)

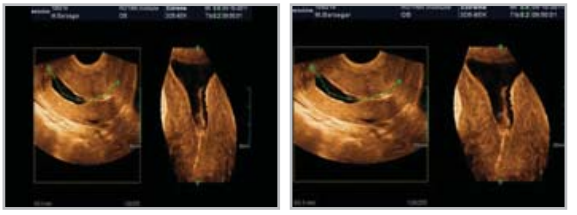
m.niknejadi@royaninstitute.org

Biography
Dr Maryam Niknejadi received her medical degree in1995 from Iran University of Medical Science, and completed her Radiology specialty in 1999. She completed residency training of MRI in 2012.
She has been an assistant professor in Reproductive Imaging Department at Royan Institute since 2006 and is the head of Imaging Unit. Her research interests focus on female and obstetric imaging.

The Groups of Imaging Unit

Gynecology & Obstetric Ultrasound

- **Abdominal and Transvaginal Ultrasound** has a high predictive value in both obstetrics and gynecology investigations. Gynecologic ultrasonography refers to the application of ultrasound to assess the female pelvic organs. It also forms a part of routine clinical investigations of women with history of gynecologic disorders, infertility, recurrent miscarriage and early preterm labor, before and during IVF/ICSI. Two-dimensional transvaginal ultrasound (2DUS) and Doppler ultrasound have a reliable diagnostic value in assessment of female pelvic organs.
- **3D/4D Ultrasonography:** Detection of uterine abnormalities has been the focus of research in gynecology recently. Structural pathology in the uterine cavity such as müllerian duct anomalies (MDAs) may have an important role in sub-infertility, implantation failure and outcome of pregnancy. 3DUS has recently become the mandatory step in the classifying MDAs since there is a high degree of concordance between 3DUS and MRI in the diagnosis of uterine malformation. In addition, lately 3D has become available for endometrial volume measurement. Ultrasonographic assessment of the endometrium is an important investigative tool in the assessment of endometrial receptivity. Endometrial volume is a useful criterion in predicting embryo implantation success and pregnancy rate in patients undergoing in-vitro-fertilization (IVF).
- **3D/4D Sonohysterography:** Sonohysterography consists of ultrasonographic imaging of the uterus, using real-time ultrasonography during injection of sterile saline into the uterine cavity. The goal of sonohysterography is to detect intrauterine lesions (polype, leiomyomas, hyperplasia, adhesions...) and congenital uterine abnormalities (septate, bicornuate, unicornuate...) by real -time ultrasonography.



Sonohysterography assosiated with three-dimensional ultrasonography is a non-invasive, cost _effective, outpatient diagnostic modality, which enables a detailed assessment of uterine morphology. The appearance of fluid surrounding the fimbria, turbulence in the periadnexae and accumulation of fluid in cul-de-sac were considered evidence of tubal patency.

- **Prenatal Ultrasonographic Screening of Fetal Anormalies:** Prenatal screening is testing for diseases in a fetus before it is born. The aim is to detect birth defects such as neural tube defects, Down syndrome, chromosome abnormalities and so on. An ultrasound screening in the first, second and third trimester can rule out potential for abnormalities. Nuchal translucency measurement is a common screening test at the first trimester scans.

Diagnostic Radiology

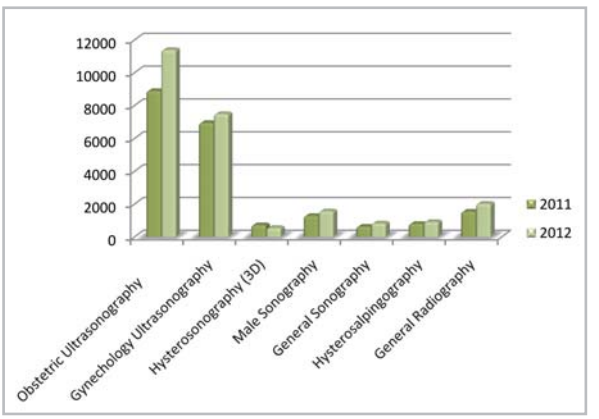
- **Hysterosalpingography (HSG)** is a radiologic procedure to investigate the shape of the uterine cavity and the shape and patency of the fallopian tubes. It entails the injection of a radio-opaque material into the cervical canal and usually under fluoroscopic control. A normal result shows the filling of the uterine cavity and the bilateral filling of the fallopian tube following the injection material.
  HSG is known as one of the first conventional diagnostic tool that provides valuable information about the uterine cavity and tubal patency. Hysterosalpingography is superior to other techniques to check the openness of the Fallopian tubes, and to monitor the effects of surgery on the Fallopian tubes.
- **Other Graphy with Contrast (IVP, BE, ...)**
- **Routine Radiology (Chest X-Ray,KUB, ...)**

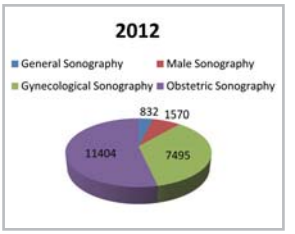
Diagnostic Imaging in Male Infertility

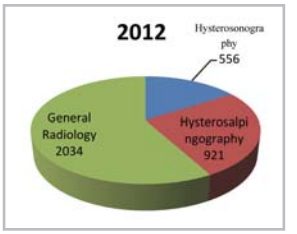
- **Gray Scale Sonography**
  - Trans Abdominal
  - Trans Rectal
  - Scrotul sonography: to assess prostate and seminal vesicles. Seminal vesicles abnormally which is caused by acquired diseases (seminal vesiculitis) and congenital abnormality (ectopic insertion of the ureter into the seminal vesicle, S.V. agenesis, seminal vesicles cysts) may causes infertility.
- **Color Doppler Sonography**
  - With injection: to evaluate impotence with injection of Papaverine
  - Without injection
    - Assessment and classification of varicocele
    - Assessment of blood supply of testis's mass
    - Assessment of possibility of testicular torsion
    - Confirmation of inflammatory lesions like epididymitis
- **Vasography** is a surgical test in which a radio- opaque dye is injected into the vas to determine if it is open or blocked and if it is blocked, to find out the exact site of the block. This test requires very delicate surgery and X-ray equipment.

Radiologists

Ahmadi, Firoozeh, MD (Radiologist)
Hodeshenas, Safa, MD (Radiologist)
Niknejadi, Maryam,MD (Radiologist)
Salamati, Masomeh,, MD (Radiologist)
Vousogh, Ahmad, MD (Radiologist)







Clinical Laboratory of RI-RB

Introduction

Royan clinical Laboratory consists of several sections including: Hematology, Biochemistry, Immunology, Serology, Coagulapathies & Thrombophilia, Hormone Analysis, Andrology, Parasitology, Urinalysis, Microbiology, Molecular diagnostic and Blood Banking. All kinds of general and specific tests are provided for patients and physicians by putting into operation modern instruments, experienced staffs educated in laboratory science, and reliable and validated materials and kits. In addition, laboratory has partnership in numerous research project and all required tests of research projects in different divisions of Royan Institute, as well as those ordered by the other research centers, are accomplished in this laboratory.
Having reduced all kinds of potential and actual Random & Systematic errors, internal quality control procedures continuously applied to all sections of laboratory in company with taking part in validated External Quality Assessment schemes.
Semen Analysis section is a unique part of this laboratory in which the procedures are done in agreement with the newest WHO instruction manual, and their activities are regularly watched under the international inspections. In addition, the workshops in Semen Analysis for all the applicants (useful for laboratory technicians, physicians, students and researchers of infertility centers) are held in this laboratory.
During the last year, there were 64800 admissions to the laboratory from which 24700 cases were for Semen Analysis.
To complete the spectrum of para-clinical services for patients who refer to Royan Institute, anatomical section of Royan Laboratory is newly established under the inspection of a pathologist to perform related tests of cytology and pathology on different tissue samples.
In 2012, Royan Clinical Laboratory was honored to achieve ISO-9001 certification from BRS, USA, on the field of performing clinical tests. For the near future, to obtain the "Quality Board" from the Health Reference Laboratory is planning now in this Laboratory.

Laboratory Head:
Reza Salman Yazdi, PhD
(Medical Laboratory Sciences)

r.salmanyazdi@royaninstitute.org

Biography
Having born in 1965 in Tehran, Iran, Dr Reza Salman Yazdi started his primary educations in Medical Laboratory Sciences in 1984 at Tabriz University in Iran. He was graduated with the first ranking as a DCLS from Iran University of Medical Sciences in 1997. His doctorate thesis was about production and purification of polyclonal and monoclonal antibodies, which achieved the highest grade of the jury board. His collaboration with Royan Institute was begun in 2001 as the head of clinical laboratory and faculty member of Andrology department, as well. He has contributed and managed in several research projects and has a multiple of international publications and presentations.

Laboratory Supervisor

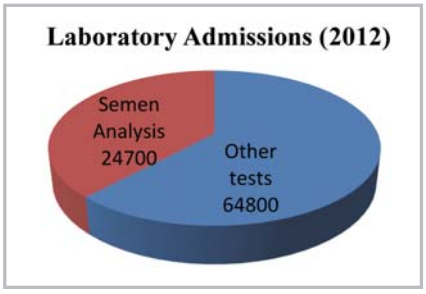
Lakpoor, Mohammad Reza, MSc

Technical Staff

Afraz, Kaveh, MSc
AhmadianShal, Zahra, MSc
Ansary, Abdol-Ali, ASc
Baghery, Mohsen, MSc
Gol-Mohammady, Zeynab, BSc
Karimian, Farahnaz, ASc
Khadem, Ruhollah, ASc
Khalily, Modjgan, Bsc
Maleky, Amir Naser, ASc
Mosaddeq, Ruh-angiz
RafieeAndabily, Yaser, ASc
Salmanieh, Puran, ASc
Tofighian, Mohsen, MSc

Office Staff

Ali Asgary Fard, Fatemeh
Amir Sardary, Sheeva, BSc
Farahany, Zohreh
Hoseyni, SayyedEbrahim
Keshavarz Afshar, Zahra
Kord, Fatemeh, BSc
Qolamy, Somayyeh
Sahraii, Elham, ASc



Pathology Laboratory of RI-RB

Laboratory Head:
Niloofar Sodeifi, MD, AP, CP
(Pathology)

niloofarsodeifi@royaninstitute.org

Biography
Dr Niloofar Sodeifi received her medical degree in1997 from Shahid Beheshti University of Medical Science, and completed her Pathology specialty at Tehran University of Medical Science in 2006. She is currently the technical officer and manager of laboratory of pathology at Royan Institute. Her research interest focuses on male infertility pathology.

Introduction

Royan laboratory of pathology focuses on the following areas:

- **Histopathologic evaluation of specimens of testis:** Incisional biopsy or excisional specimens of testis are sent by urologist to laboratory in the suitable fixative.
  Specimens are processed by special device and paraffin blocks are prepared from it. 0.6 mm cut sections are prepared and spread on glass slide for histologic evaluation by the pathologist.
  Testis biopsies are classified to six groups:
  1. Normal spermatogenesis
  2. Hypospermatogenesis
  3. Spermatogenic germ cell maturation arrest
  4. Sertoli cell only syndrome
  5. Complete seminiferous tubule hyalinization
  6. Hetrrogenous patterns

Specimens are also evaluated for tumors or intratubular germ cell neoplasia.

- **Cytologic evaluation of specimens prepared from uterine cervix (Pap smear test):**
  Brushing specimens from uterine cervix are sent to laboratory of pathology in the suitable liquid fixative.
  Specimens are processed by special device and smears are prepared on the glass slides. Slides are evaluated by the pathologist.

Laboratory Staff

Afraz, Kaveh, MSc
Haddadi, Effat, BSc
Kordestani Shargh, Elham, BSc

ROYAN INSTITUTE FOR STEM CELL BIOLOGY AND TECHNOLOGY (RI-SCBT)

Introduction

Royan Institute for Stem Cell Biology and Technology (RI-SCBT), formerly known as the Department of Stem Cells, was first established in 2002 to promote research on general stem cell biology in Iran. Thereafter, Department of Stem Cells expanded to sixteen main research groups that conduct studies on stem cells and developmental biology and molecular systems' biology. Moreover Department of Regenerative Medicine consists of five main research groups which conduct research focused on translational and clinical studies using cell therapy. Throughout, the vision of RI-SCBT has been to make stem cell research findings applicable in disease treatment to improve public health.
Therefore, today, RI-SCBT is providing a comprehensive and coordinated "bench to bedside" approach to regenerative medicine, as well as a greater understanding of fundamental biology of stem cells, developmental biology, development of translational research of stem cell therapeutics and administration of new cell-therapy approaches that can restore tissue function to patients.

Director:
Hossein Baharvand, PhD
(Cell and Developmental Biology)

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Biography
Born in 1972, Hossein Baharvand received his PhD degree from University for Teacher Training (Khwarizmi), Tehran in 2004 in the field of Cell and Developmental Biology. He joined Royan Institute when he was MSc student in 1995. He is currently professor and director of Royan Institute for Stem Cell Biology and Technology (2002-now) and head of Department of Developmental Biology at University of Science and Culture (2006-now). He established the first mouse and human embryonic stem cells in Iran (2003). Later his team has generated several mouse and human induced pluripotent stem cells (2008). This has enabled them to pursue many avenues of research into translational research and regenerative medicine. He has published 166 international and 98 national peer-reviewed papers, as well as five chapters in international books, six books in Persian. He also translated six English text books into Persian and was the editor of three international books (2009, 2012, Humana press, Springer, USA). He is editorial board member of eight international journals and was the invited speaker of several meetings. He has received 20 international and national prizes including 10th (2004), 12th (2006) and 17th (2012) annual Razi research festival on medical sciences, 27th annual book of the year of the Islamic republic of Iran (2010), Academy of Medical Sciences of Iran (Dr Hadavi's Award, 2010), Science and Technology Prize of the Islamic Educational, Scientific, and Cultural Organization (ISESCO) in the field of Biology (2010) and 26th Khwarizmi International Award (KIA) on basic science (2013).

Department of Stem Cells and Developmental Biology

Head: Dr Hossein Baharvand

Research Programs	Group Leaders
• Biology of Pluripotent Stem Cells • Epigenetic Reprogramming • Hepatocytes • Pancreatic Beta Cells • Germ Cells • Neural Cells- Developmental Biology • Eye Cells • Cell Engineering	Dr Hossein Baharvand
• Neural Cells-Traumatic Nerve Injury	Dr Sahar Kiani
• Neural Cells-Neurodegenerative diseases	Dr Mohammad Javan
• Bone and Cartilage/Mesenchymal Stem Cells	Dr Mohammadreza Baghban Eslaminejad
• Cardiomyocytes and Endothelial Cells • Skin Cells • Renal Cells	Dr Nasser Aghdami
• Molecular Systems Biology	Dr Ghasem Hosseini Salekdeh
• Cancer and Hematopoietic Stem Cells	Dr Marzieh Ebrahimi

Core Facilities

- Royan Stem Cell Bank (RSCB)
- Public Cord Blood Bank
- Molecular Biology Lab
- Electrophysiology Lab
- Cytometry and Imaging Lab
- Histology Lab
- Gene Targeting Lab
- Viral Transduction Lab
- Recombinant Proteins Quality Control Lab
- Stem Cell Lab for Everyone

Department of Regenerative Medicine

Head: Dr Nasser Aghdami

Research Programs	Group Leaders
• Skin Disorders	Dr Saeed Shafian
• Neuromuscular Disorders	Dr Masoud Nabavi
• Bone and Joint Disorders	Dr Mohsen Emadodin
• Cardiovascular Disorders	Dr Nasser Aghdami
• Kidney Disorders	

Core Facility

- Production Facility

Biology of Pluripotent Stem Cells

Group Leader:
Hossein Baharvand, PhD

Chief Researcher:
Seyedeh Nafiseh Hassani, PhD Student

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Biography
Seyedeh Nafiseh Hassani received her BSc in Cell and Molecular Biology from Tehran University in 2002. She continued her education in same field at Khatam University in Tehran. She passed her thesis by Dr Rafati at Pasteur Institute and graduated with MSc in 2005. In 2008, she began a PhD degree in Developmental Biology in a joint program between Royan Institute and the University of Science and Culture. Currently, she is working on her PhD thesis under the supervision of Dr Baharvand. Her major research interest is pluripotent signaling pathways in stem cells.

Introduction

The first priority of this group was the derivation and maintenance of embryonic and pluripotent stem cells from mice and human. Accordingly, we could derive 60 lines of human embryonic stem cells and more than 300 lines of mouse embryonic stem cells from 2002 until now. In recent years, we have focused on the generation of new embryonic stem cell lines for achievement of the following goals:

- Identification of signaling pathways in pluripotent stem cells
- Improvement of culture medium and extracellular matrix for pluripotent stem cells
- Scale-up culture of human pluripotent stem cells (hESCs and hiPSCs) in bioreactors
- Improvement of biological test for determining the accuracy of derived ES cell lines
- Study the cellular and molecular bases of planarian stem cell pluripotency and understand how conserved these mechanisms are

In this regard, different subgroups have been set up along with the other activities of this group including Mycoplasma Detection Test Laboratory, Royan Small Molecule Bank (RSMB), and Regenerative Biology Laboratory.

Mycoplasma Detection Test Laboratory

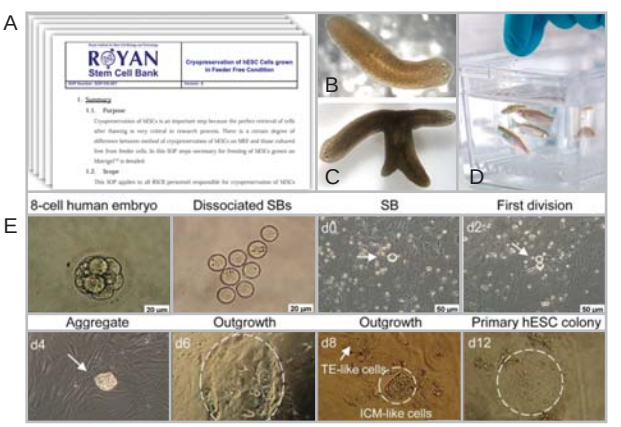
In this Lab the mycoplasma test is set up for 10 most common strains and multiplex PCR method is used for their observation. This method is fast and reliable and results can be obtained within one day.

Small Molecule Bank (RSCB)

Regarding the growing area of stem cell application in different research and therapeutic fields, implementation of any kind of biological tools with more efficiency and lesser costs is important. One of these tools is small molecules which can cover these two characteristics.
Small molecules can trigger different signaling pathways and mechanisms and manipulate stem cells for a specific purpose. These light weighted organic compounds are extremely important in tracking significant biological pathways for development of therapeutic strategies and stem cell researches. They can be applied in molecular biology, pharmacy and agriculture.
Considering the extensive application of these organic molecules, in 2012, Royan Institute decided to establish Royan Small Molecules Bank (RSMB) for covering researcher's requirements. Right now about 100 small molecules are available in RSMB which can affect different signaling pathways. Efficient storage of small molecules, handling Royan researcher's requests and ordering specific small molecules are the most important duties of RSMB staff.

Regenerative Biology Laboratory

The principal goal in Regeneration Biology Lab is to study the cellular and molecular bases of planarian stem cell pluripotency and to understand how conserved these mechanisms are. Furthermore, Zebra fish and Hydra are being used as the other Regeneration Biology models.



A) All procedures held in this group have specific Standard Operating Procedure (SOP) with related educational videos. B) Planaria, Schmidtea mediterranea. C) Induces the regeneration of two heads in Planaria, D) Zebrafish, Danio rerio, E) Morphological patterning of SBs transition to hESC lines. The first division of SBs was usually visualized 24-48 h after culturing on MEF. Aggregates that resulted from proliferating SBs were observable on day 4. Aggregates rescued from this stage produced outgrowths with ICM- and TE-like cells. ICM-like cells could proliferate and generate hESC colonies.

Technical Staff

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Gharaati, Mohammad Reza, PhD

Publications

Abbasalizadeh S, Larijani MR, Samadian A, Baharvand H. **Bioprocess development for mass production of size-controlled human pluripotent stem cell aggregates in stirred suspension bioreactor.** Tissue engineering Part C, Methods. 2012; 18(11):831-51.

Baharvand H, Larijani MR, Yousefi M. **Protocol for expansion of undifferentiated human embryonic and pluripotent stem cells in suspension.** Methods in molecular biology (Clifton, NJ). 2012;873:217-26.

Faradonbeh MZ, Gharechahi J, Mollamohammadi S, Pakzad M, Taei A, Rassouli H, et al. **An orthogonal comparison of the proteome of human embryonic stem cells with that of human induced pluripotent stem cells of different genetic background.** Molecular bioSystems. 2012;8(6):1833-40.

Jadaliha M, Lee HJ, Pakzad M, Fathi A, Jeong SK, Cho SY, et al. **Quantitative proteomic analysis of human embryonic stem cell differentiation by 8-plex iTRAQ labelling. PloS one.** 2012;7(6):e38532.

Moraveji SF, Attari F, Shahverdi A, Sepehri H, Farrokhi A, Hassani SN, et al. **Inhibition of glycogen synthase kinase-3 promotes efficient derivation of pluripotent stem cells from neonatal mouse testis.** Human reproduction (Oxford, England). 2012; 27(8):2312-24.

Baharvand H, Hassani SN. **A new chemical approach to the efficient generation of mouse embryonic stem cells.** Methods in molecular biology (Clifton, NJ). 2013;997:13-22.

Rassouli H, Tabe Bordbar MS, Rezaei Larijani M, Pakzad M, Baharvand H, Salekdeh GH. **Cloning, expression and functional characterization of in-house prepared human basic fibroblast growth factor.** Cell journal. 2013;14(4):282-91.

Schwartzkroin.P, **So You Want to be a Scientist,** Oxford University Press, 2009, Translation by Haghparast.N.

Epigenetic Reprogramming

Introduction

After the first successful somatic cell nuclear transfer in the cloning of the frog Xenopus laevis, in 2006 another big success was achieved with the generation of induced pluripotent stem cells (iPS) from somatic cells by a small set of defined factors. Regarding the diverse applications of iPS cells in basic research, disease modeling, drug development, and potential cell therapy, the group termed 'Epigenetic Reprogramming Group' at Royan Institute was succeeded in 2008 to generate the first iPS cell lines in Iran. Next, several research projects were designed on the basis of these cells, which their fruitful results can now be observed in many research groups at the Institute. Generation of different patient-specific iPS cell lines is among the important projects of this group. The researchers of this group then paid their attention to the production of safe iPS cells using, for example, miRNA-expressing mini-circles.
The weekly meetings on the Cutting-Edge Science and lab reports on the latest findings of the scientific community and colleagues in the field of epigenetic reprogramming, are some of the regular programs of the Epigenetic Reprogramming Group. At present, the research projects that are being conducted in this group include:

- Molecular tracing of embryonic stem (ES) cell derivation from mouse blastocysts using the R2i approach
- Analyzing of microRNAs during ES cell derivation from mouse blastocysts using the R2i approach
- Bioinformatics study of enhancer elements in relation to gene activity in ES and differentiated cells
- In silico modeling of the 'Waddington Epigenetic landscape' about the genetic/epigenetic interplay in pluripotent and differentiated cells
- Conversion of the primed human pluripotent stem cells into a naive-like state using the nuclear receptor agonists
- Safe induction of pluripotency in human somatic cells using the miRNA-expressing mini-circles

Group Leader:
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Chief Researcher:
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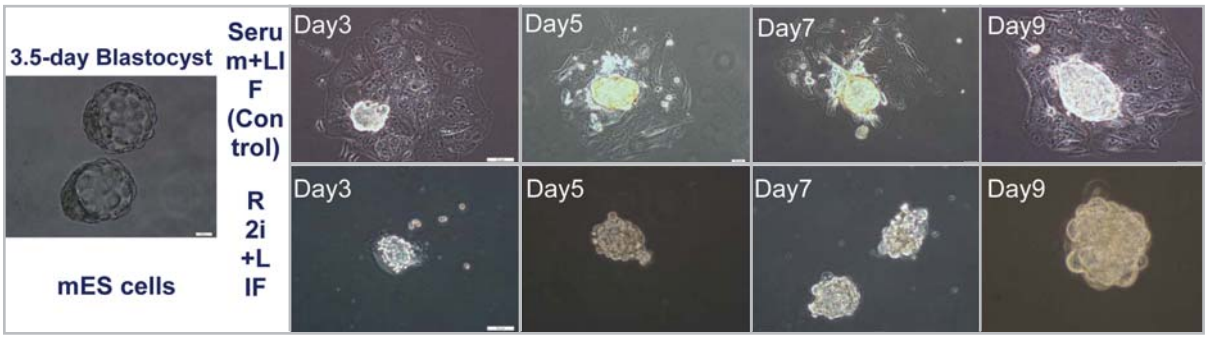
Biography
Mehdi Totonchi was born in 1979 and received his BSc in Biology at the University of Bu-Ali Sina in Hamedan from 1997-2002. In 2005, he got his MSc in the field of Molecular Genetics at Azad University of Research Sciences. For the next three years, he was a research assistant in the Department of Genetics and Stem Cells at Royan Institute. There, he was involved in the establishment of viral transduction lab and generation of the first induced pluripotent stem cell (iPSC) in Iran. In 2008, he began his PhD at a joint program between University of Science and Culture and Royan Institute in the field of Developmental Biology.



A: Procedure of mouse embryonic stem cell derivation in R2i and serum culture condition.

Technical Staff

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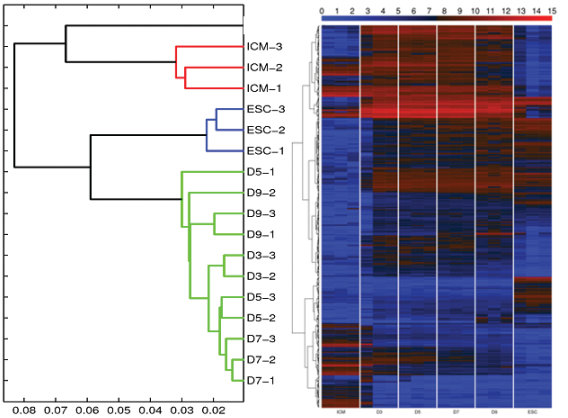

B: Gene clustering and heatmap of mES cell derivation

Publications

Fattahi F, Asgari S, Pournasr B, Seifinejad A, Totonchi M, Taei A, Aghdami N, Salekdeh GH, Baharvand H. **Disease-Corrected Hepatocyte-Like Cells from Familial Hypercholesterolemia-Induced Pluripotent Stem Cells.** Mol Biotechnol. 2012 Dec 18.

Tahamtani Y, Azarnia M, Farrokhi A, Sharifi-Zarchi A, Aghdami N, Baharvand H. **Treatment of Human Embryonic Stem Cells with Different Combinations of Priming and Inducing Factors Toward Definitive Endoderm.** Stem Cells Dev. 2013 Feb 1.

Zahabi A, Shahbazi E, Ahmadieh H, Hassani SN, Totonchi M, Taei A, Masoudi N, Ebrahimi M, Aghdami N, Seifinejad A, Mehrnejad F, Daftarian N, Salekdeh GH, Baharvand H. **A new efficient protocol for directed differentiation of retinal pigmented epithelial cells from normal and retinal disease induced pluripotent stem cells.** Stem Cells Dev. 2012 Aug 10; 21(12): 2262-72.

Hepatocytes

Group Leader:
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Chief Researcher:
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Biography
Behshad Pournasr received his BSc in Cell and Molecular Biology from the Faculty of Science, Tehran University in 2000. He continued his education at Isfahan University of Medical Sciences. He joined the Department of Immunology and worked under the supervision of Dr Pourazar, completing his study in 2003. He began working at Royan Institute from 2006 as a research assistant. In 2009, he could gain a PhD position in Developmental Biology in a joint program between Royan Institute and the University of Science and Culture. His major research interest is the biology of hepatocytes and hepatogenesis.

Introduction

Cell-based therapies such as cell transplantation, hepatic tissue engineering and bioartificial liver devices with the hope of replacement of organ transplantation, motivates scientists to produce large amounts of the cells ex-vivo. Having functional hepatocyte in the lab, one needs to have extensive knowledge regarding real, functional hepatocytes that can be obtained in a primary culture from the liver. It is also necessary to have the basic knowledge of mechanisms involving liver formation during embryogenesis, which can be simulated in the lab by using human pluripotent stem cells in addition to using a rodent model.
Therefore, the studies in this group focused on hepatocyte differentiation of pluripotent stem cells as well as direct conversion of accessible cells such as fibroblasts to hepatocytes; a new era called transdifferentiation.
The main goal of Hepatocytes group is improving the situation of patients suffering liver disease by bench to bed studies in addition to finding unknown basic phenomena during human hepatogenesis using pluripotent stem cells as a model.

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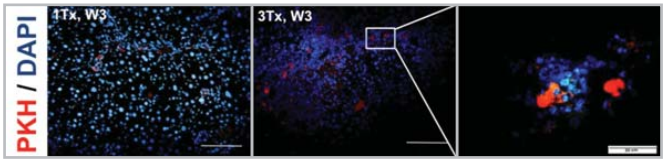

Figure 1: Homing of Red PKH-labeled human Bone Marrow mesenchymal stem cells after 3 times transplantation in comparison to 1 time transplantation.

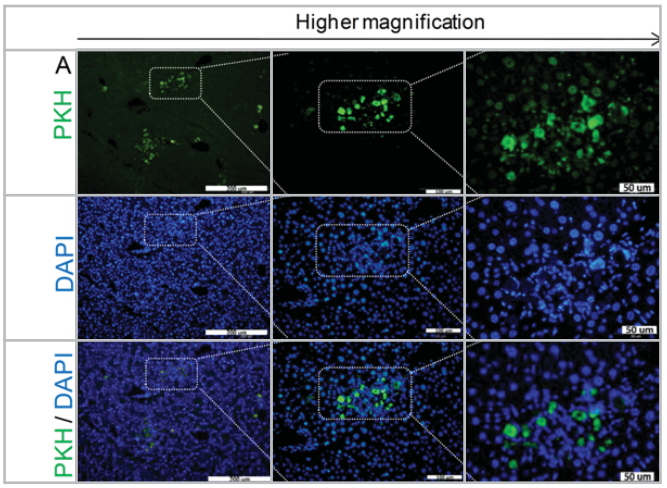

Figure 2: Homing of Red PKH-labeled human iPSc-derived mesenchymal stem cells after transplantation in a acute liver mouse model.

Publications

Moslem M, Valojerdi M, Pournasr B, Mohammadnejad A, Baharvand H. **Therapeutic Potential of Human-induced Pluripotent Stem Cell-derived Mesenchymal Stem Cells in Mice with Lethal Fulminant Hepatic Failure.** Cell Transplantation. 2013 Feb 5.

Miryounesi M, Piryaei A, Pournasr B, Aghdami N, Baharvand H. **Repeated versus single transplantation of mesenchymal stem cells in carbon tetrachloride-induced liver injury in mice.** Cell Biol Int. 2013 Jan 17.

Fattahi F, Asgari S, Pournasr B, Seifinejad A, Totonchi M, Taei A, Aghdami N, Salekdeh GH, Baharvand H. **Disease-Corrected Hepatocyte-Like Cells from Familial Hypercholesterolemia-Induced Pluripotent Stem Cells.** Mol Biotechnol. 2012 Dec 18.

Pancreatic Beta Cells

Introduction

Pancreatic beta cells are essential regulators of metabolism in human. The absence or the reduced functionality of these beta cells leads to diabetes mellitus; A sever disease which involves millions of people all over the world. There is a great hope to use renewable sources of cells that could replace pancreatic β-cells. Followings are some of the approaches to produce functional β-cells:

- Direct differentiation of pluripotent stem cells into the β-cell lineage
- Transdifferentiation of terminally differentiated cells to β-cells in vitro and in vivo
- Promote the replication of existing β-cells either in vivo or in vitro
- Promote the regeneration of beta cells in vivo

Main Areas of Focus

- Manipulating signaling pathways to enhance differentiation of human pluripotent stem cells to insulin producing cells by growth factors and small molecules in adherent and suspension culture systems
- Using engineering approaches (ex: growth factor immobilization) to promote differentiation of pluripotent cells into endodermal and pancreatic fates
- Transdifferentiation of terminally differentiated cells such as fibroblast to β-cells
- Gene manipulation of regulatory networks in pancreas development to enhance the differentiation of mouse embryonic stem cells to β-cells
- Producing transgenic embryonic stem cell reporter lines to use as a tool in differentiation studies

Group Leader:
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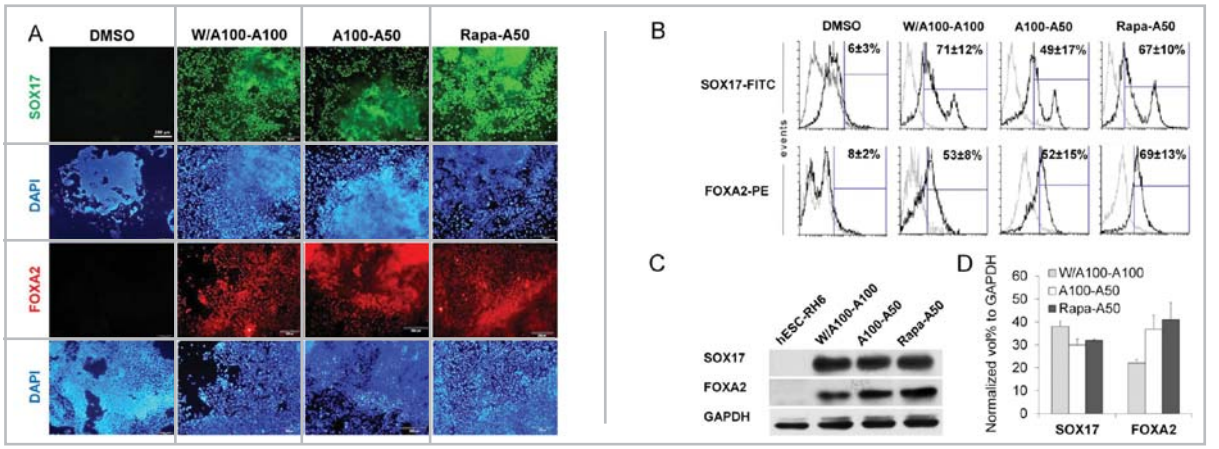
Biography
Yaser Tahamtani completed his BSc degree in General Biology from Shiraz University in 2004. He received his MSc and PhD in Developmental Biology (2007 and 2013). He joined Royan Institute since 2008 where he worked on his thesis in the field of endodermal differentiation of human embryonic stem cells. His major research interest is the developmental biology of endodermal and pancreatic cells.

The Pancreatic Beta Cells group also works on increasing the efficiency of islet transplantation in animal models. Islet transplantation as an approach to provide the missing β-cells faces some obstacles which affects the viability and functionality of the islets after transplantation. Considering these issues "beta cell program" works on the following projects:

- Co-transplantation of pancreatic islets and VEGF-expressing mesenchymal stem cells for angiogenesis promotion during transplantation
- Producing novel oxygen generator micro spheroids to accompany the islets during the islet transplantation studies

In this regard this group proceeded to set up a well-organized infrastructure for further islet related studies. This infrastructure includes:

- Setting up a mouse pancreatic islet isolation facility with optimum yield of islets per mouse
- Setting up different pancreas surgery techniques in normal and Nude mice
- Setting up different models of diabetes in normal and Nude mice



Introduction of new protocol for definitive endoderm differentiation of human embryonic stem cells. (A) Immunofluorescent staining of Rapa-A50-treated hESCs showed SOX17+ (green) and FOXA2+ (red) populations comparable to that of W/A100-A100- (positive control) and A100-A50-treated cells. Nuclei were counterstained with DAPI (blue color). (B) Flow cytometric analysis of SOX17 and FOXA2 showed the same efficiency of Rapa-A50 treatment in inducing definitive endoderm (DE) markers as compared with W/A100-A100 (positive control) and A100-A50 treatments. Percentage represents the mean±SD; n=3. (C) The western blot analysis of differentiated hESC RH6 cells at day four for expressions of SOX17 and FOXA2 at the protein level with the GAPDH protein as the internal control. (D) Quantification of band intensities from (C). These data indicated that there is not a significant difference in the level of expression of both proteins in different treatments groups. (Tahamtani, et al, Stem cells and development, 2013)

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Publication

Tahamtani Y, Azarnia M, Farrokhi A, Sharifi-Zarchi A, Aghdami N, Baharvand H. **Treatment of human embryonic stem cells with different combinations of priming and inducing factors toward definitive endoderm.** Stem Cells Dev. 2013 May 1;22(9):1419-32.

Tahamtani Y, Azarnia M, Farrokhi A, Moradmand A, Mirshahvaladi S, Aghdami N, Baharvand H. **Stauprimide priming of human embryonic stem cells toward definitive endoderm.** Cell Journal. 2013

Germ Cells

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Introduction

Germ cells represent unique cell type which transmits genetic material to next generation by gamete production. There is not much information about these cells, because limited access to biological material makes them difficult to study. An unlimited source of germ cells would allow for studying the basic principles underlying reproduction with the ultimate goal of healthy gametes production for infertile couples. So there have been many efforts to achieve germ cells from embryonic stem cells. In this regard, germ cell group is going to differentiate pluripotent stem cells to functional germ cells in the lab. The researchers of this group could create primordial germ cells (PGC) based on Hayashi protocol (Hayashi et al., Cell (2011)) but they have not test their functionality yet. They are also going to develop a system to improve it.

Gonads, same as other organs, contain a group of stem cells which are called germ line stem cells. Germ line stem cells are settled in the seminiferous tubules of testis in male and called spermatogonial stem cells (SSC). They are in the balance between proliferation and differentiation. There have been many efforts to isolate and culture the SSC in vitro,

because SSCs promised near application to cure male infertility. In this regard this group is focused on the isolation and culture of human spermatogoinal stem cells. In addition they are interested in promoting the differentiation of SSC toward perm in the lab. Despite the huge study on female ovary, there is challenge in the presence of female germ line stem cells. Some scientists believe the existence of these cells in the epithelium of ovary and called them oogonial stem cells (OSCs). However other researchers refused to accept these experiments. OSCs can produce oocytes in vitro, so access to OSCs means achievement to unlimited source of oocytes which not only facilitate the biological studies, it would be a new solution for female infertility as well. In this area, the researchers of this group are testing the existence of OSC in the ovary of mouse and human to answer this challenge.
An interesting point related to germ line is the expression of pluripotency genes in these cells; however it is at a lower level. In this regard isolation of PGCs and their in vitro culture cause reprogramming theminto a subset of pluriopotent stem cells called embryonic germ cells (EG). In addition, in vitro culture of SSCs leads to another class of pluriopotent stem cells called germ line-derived Pluripotent stem cells. We could reprogram both PGCs and SSCs by small molecule approach. In this regard we inhibited GSK3 using CHIR99021 to achieve pluripotent stem cells from SSCs and simultaneous inhibition of TGF β and Erk by applying SB and PD to achieve EGs.

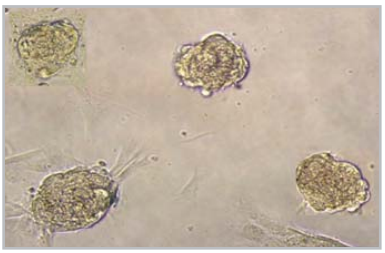

Fig1. Human SSC colonies

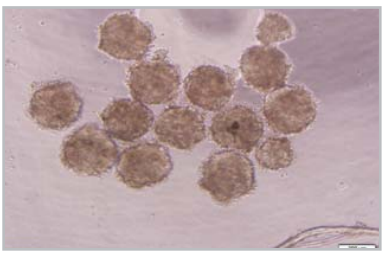

Fig2. Embryonic stem cell (ESC) derived primordial germ cells (PGCs). At first ESCs differentiated to a transient phase called epiblast like cell (EpiLC). Then EpiLCs were induced to PGCs using defined factors

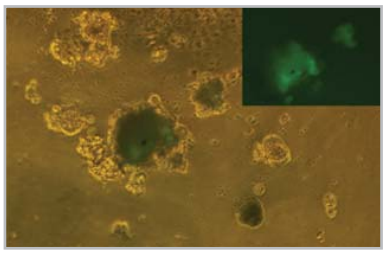

Fig3. Human ESC derived germ cells. Royan H6 cell line received the vector which has GFP downstream the promoter of VASA. So directed differentiation of them caused the expression of GFP.

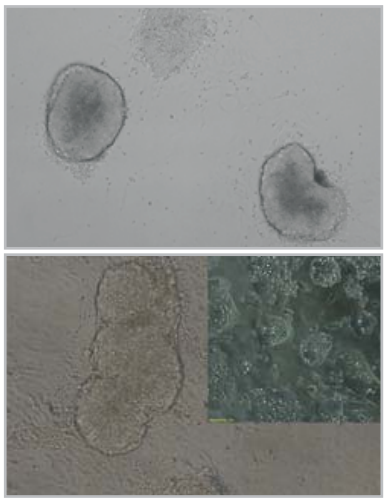

Fig4, 5. reprogramming of PGCs to embryonic germ cells (Egs). Inhibition of TGF β pathway in E8.5 PGCs leads to EG cell derivation.

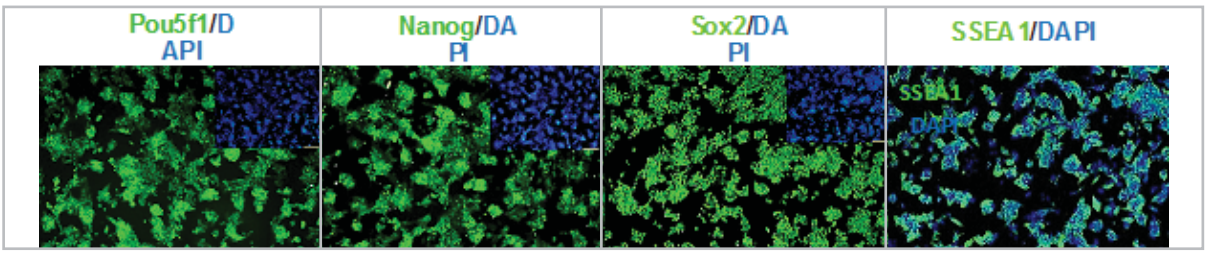

Fig 6. Expression of pluripotent markers in EG cells.

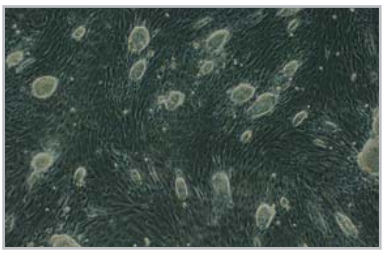

Fig7. Germ line derived pluripotent stem cells (gPSCs). Inhibition of GSK3 by small molecules lead to reprogramming of testicular cells to gPSCs.

Research Scientists

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Zargarzadeh, Moein, DVM

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Saber, Maryam, MSc

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Attari, Farnoosh, PhD
Mohamadi, Alireza, PhD

Publications

Moraveji et al., **Inhibition of glycogen synthase kinase-3 promotes efficient derivation of pluripotent stem cells from neonatal mouse testis.** Human Reproduction (2011).

Neural Cells- Developmental Biology

Group Leader:
Hossein Baharvand, PhD

Chief Researcher:
Ebrahim Shahbazi, MSc

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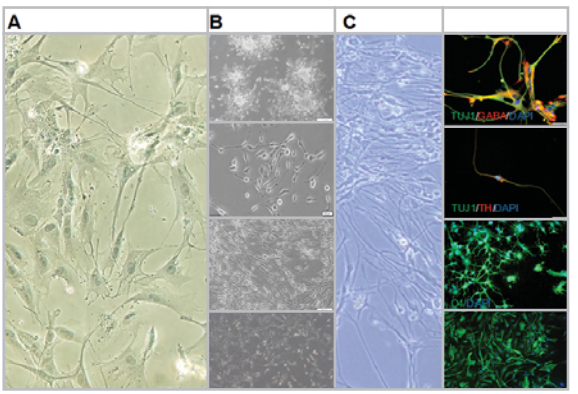
Biography
Ebrahim Shahbazi obtained his BSc degree from the department of biology at Mohaghegh Ardabili University of Ardabil in 2004. He received his MSc in Developmental biology in 2008; a joint program between Royan Institute and Science & Culture University. He began working at Royan institute from 2008 as a research assistant. His major research interest is the biology of neural cells and neurogenesis.

Introduction

Neural development comprises the processes that generate, shape and reshape the nervous system, from the earliest stages of embryogenesis to the final years of life. This field of study draws on both neuroscience and developmental biology to provide insight into the cellular and molecular mechanisms by which complex nervous system has been developed. Defects in neural development can lead to cognitive, motor and intellectual disability, as well as neurological disorders. The major focus of this group is to develop new efficient protocols generating neural cell types from either pluripotent or somatic cells (i.e. mouse/human fibroblasts). These approaches are based on programming, reprogramming and direct transdifferentiation. The availability of new functional self-renewing stem cells with more specific characteristics has provided new perspectives for the development of neuroregenerative therapies.



A) Phase-contrast image of HFFs after overnight treatment with G1 lentivirus in fibroblast medium. (B) G1-infected cells in NSC medium with growth factors generate NSC-like aggregates on gelatin-coated plates by 20-24 days after infection. C) Differentiation potential of iNSCs in vitro.

Research Assistants

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Students

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Neural Cells-Traumatic Nerve Injury

Group Leader:
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Biography
Sahar Kiani received her BSc from the Department of Biology at Azad University in 2001. She continued her education in the Medical University of Mashhad and joined the laboratory of Professor Boskabady and graduated with an MSc in Physiology in 2003. Then, she began her PhD at Tarbiat Modares University and Royan Institute, emphasizing the electrophysiology of human embryonic stem cells during neural differentiation in the laboratory of Professor Baharvand at Royan Institute in 2006, and graduated in 2010. She currently works as a member of the academic staff at Royan Institute. Her major research interest has been motor neurons, particularly spinal cord injuries.

Introduction

The aim of this group is to study about the cell transplantation for improvement of spinal cord injured animals. For the first step the researchers try to find suitable cells for transplantation. There are many reports about the mesenchymal stem cells and their trophic effects but glial scar is the main problem in spinal cord injury since the transplanted cells could not migrate from this scar. The researchers of this group hope to transplant the neural cells into spinal cord injured animal models (rodents and primates) and they also study about the scar glial formation and the condition through which the cells pass this scar. Another purpose of Neural Cells-Traumatic Nerve Injury group is to do experiments about brain trauma (specially brain stroke) and demonstrate the cell transplantation effects on brain trauma improvement.

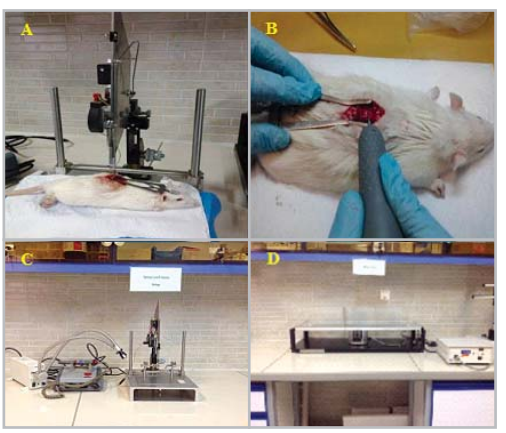

Figure: A) NYU Impactor system that use for making spinal cord injury models in Rat. B) Surgery procedures for spinal cord injured modeling C) NYU Impactor and drill D) Plantar test system use for evaluating the sensitivity to heat stimulus.

Students

Jaberi, Razieh, MSc
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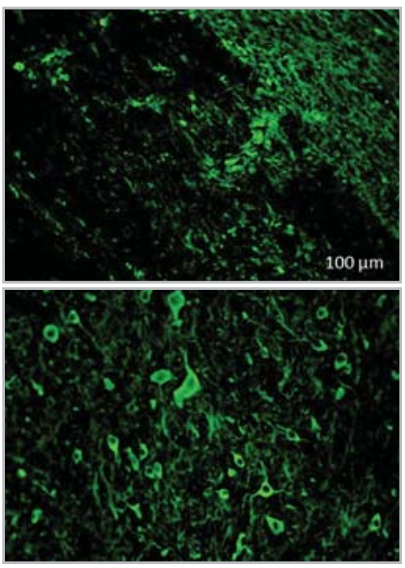
Publications

Nemati Sh., Jabbari R., Hajinasrollah M., Zare Mehrjerdi N., Azizi H., Hemmesi K., Azhdari Z., Talebi A., Mohitmafi S., Vosough Dizaj A., Sharifi G., Baharvand H., Kiani S., Rezaee O., **Transplantation of Adult Monkey Neural Stem Cells into Contusion Spinal Cord Injury Model in Rhesus Macaques Monkey,** accepted for Cell Journal, 2013

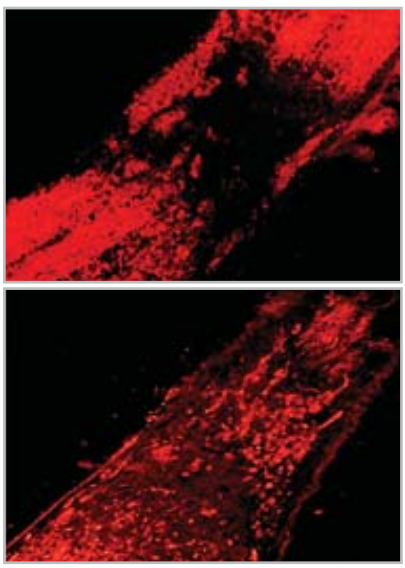
Neural Cells-Neurodegenerative Diseases

Introduction

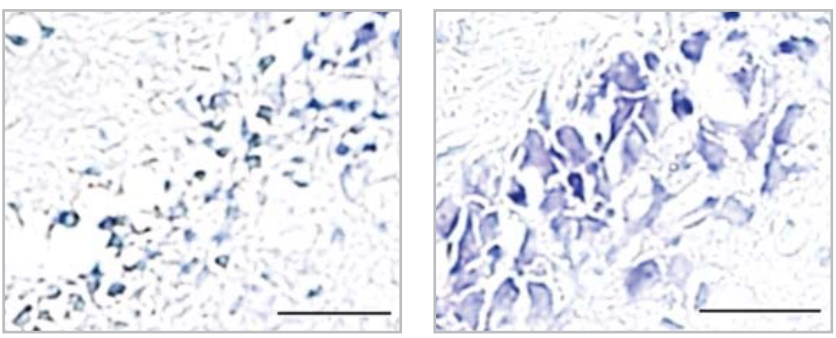
The major research interest of this program is to understand the cellular and molecular mechanisms underlying neurodegenerative diseases. The researchers of this group are interested in brain repair following neurodegenerative diseases, especially multiple sclerosis. In collaboration with Department of Physiology at Tarbiat Modares University, this group tries to enhance endogenous stem/progenitor cells mediated myelin repair using experimental model of multiple sclerosis and also optic nerve injury. The researchers try to increase the repair by increasing endogenous stem cells migration using knocking down of some myelin inhibitory protein, growth factors and also magnetic fields. Since the limited number of endogenous stem cells is suggested as the main cause of myelin repair failure in the context of demyelinating diseases, in the recent years it has been tried to use somatic cell-reprogramming strategies for partial reprogramming of neural stem/progenitor cells to increase the repair capacity within the brain. These attempts include application of reprogramming factors, miRNAs and epigenetic modifiers. Furthermore the researchers try to differentiate OPCs from different source of human stem cells, optimize the differentiation protocols and also assess their remyelinating efficacy in different animal models.



Pharmacological treatment increased the number of OPCs in the spinal cord of EAE-induced mouse as compared to control (upper panel)



Improved myelination in the crushed optic nerve of rats following transplantation of iPS-NPs as compared to control (left panel).



Efficient repair of hippocampus following in vivo reprogramming in mouse brain. Upper panel shows the control.

Group Leader:
Mohammad Javan, PhD

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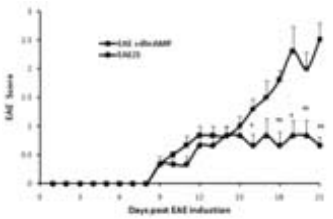
Biography
Mohammad Javan received his BSc from department of Biology, Mashhad University in 1994. He continued his studies in Shahid Beheshti University in Tehran and graduated with an MSc in Physiology in 1977. Then, he began his PhD at Shahid Beheshti University of Medical Science and graduated in 2003. He passed his post-doctoral studies in Kyorin University Medical School, Tokyo in Molecular Pharmacology. From 2005, he joined the department of Physiology in Tarbiat Modares University, Tehran. Currently, he is an associate professor in physiology department and holds a part time PI position in Royan Institute for Developmental Biology and Stem Cells. His major research interest has been repair in neurodegenerative diseases, particularly multiple sclerosis, neural stem cells and oligodendrocyte precursors.



cAMP analogue reduced symptoms severity in EAE-mice as model of multiple sclerosis.

Research Assistant

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Students

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Yazdi, Azadeh, PhD

Publications

Khezri S, Javan M, Goudarzvand M, Semnanian S, Baharvand H. **Dibutyryl Cyclic AMP Inhibits the Progression of Experimental Autoimmune Encephalomyelitis and Potentiates Recruitment of Endogenous Neural Stem Cells.** J Mol Neurosci, E-pub: DOI 10.1007/s12031-013-9959-x

Dehghan S, Javan M, Pourabdolhossein F, Mirnajafi-Zadeh J, Baharvand H. **Basic Fibroblast Growth Factor Potentiates Myelin Repair Following Induction of Experimental Demyelination in Adult Mouse Optic Chiasm and Nerves.** J Mol Neuroscience. 2012; 48: 77-85.

Eye Cells

Group Leader:
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Chief Researcher:
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Biography
Leila Satarian received BSc in Nursing from Isfahan University. She completed her studies on human physiology in Tarbiat Modares University and continued at same department for PhD degree while worked on her projects in Royan Institute. She graduated at 2013 where she is currently a Postdoc student in Royan Institute.

Introduction

The retina is a part of CNS that is very noticeable because of relatively simple structure and accessibility for any manipulation. Moreover eye serves as useful models for cell therapy because of its unique window. Our research in retinal regeneration is based on developing safety and efficacy of methods for inducing pluripotent stem cells to retinal epithelium pigmented cells for using in human eyes which lost these cells.
Another goal of Eye group in Royan Institute is to discover the basic mechanisms that control optic nerve regeneration and applying insights from this effort to promote regeneration and functional recovery after Axonal loss.

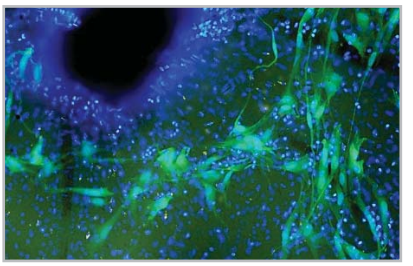

Fig1. Whole mount retina with human GFP labeled cells, 30 days after crush. ONH: Optic Nerve Head.

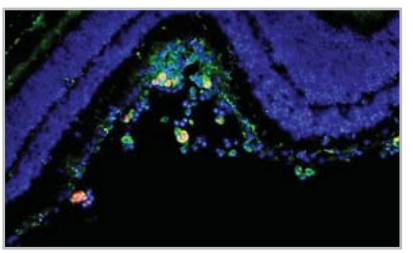

Fig2. Engulfed transplanted DiI labeled human cells by rat ED1positive cells,(Ed1 is a marker of Macrophages).

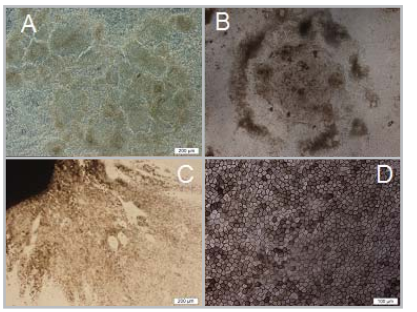

Fig3. Different stages of Induction of human Embryonic Stem cells to Retinal Pigmented Cells. A: Day 10, B: Day 21, C: Day 63 and D: Day 78.

Students

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Publications

Satarian L, Javan M, Kiani S, Hajikarm M, Mirnajafi-Zadeh J, Baharvand H, **Engrafted Human Induced Pluripotent Stem Cell-Derived Anterior Specified Neural Progenitors Protect the Rat Crushed Optic Nerve.** Submitted to PLoS One. 2013;

Amirpour N, Karamali F, Rabiee F, Rezaei L, Esfandiari E, Razavi S, Dehghani A, Razmju H, Nasr-Esfahani M H, Baharvand H. **Differentiation of Human Embryonic Stem Cell-Derived Retinal Progenitors into Retinal Cells by Sonic Hedgehog and/or Retinal Pigmented Epithelium and Transplantation into the Subretinal Space of Sodium Iodate-Injected Rabbits.** Stem Cells Dev. 2012, 21(1):42-53.

Zahabi A, Shahbazi E, Ahmadideh H, Hasani N, Totonchi M, Taei A, Masoudi N, Ebrahimi M, Aghdami N, Seifinejad A,

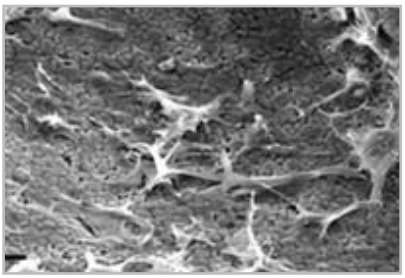
Mehrnejad F, Daftarian N, Salekdeh GH, Baharvand H.**A new efficient protocol for directed differentiation of retinal pigmented epithelial cells from normal and retinal disease induced pluripotent stem cells.** Stem Cells Dev. 2011 Dec 6. Epub ahead of print

Pouya A, Satarian L, Kiani S, Javan M, Baharvand H. **Human induced pluripotent stem cells differentiation into oligodendrocyte progenitors and transplantation in a rat model of optic chiasm demyelination.** PLoS One. 2011; 6(11):e27925.

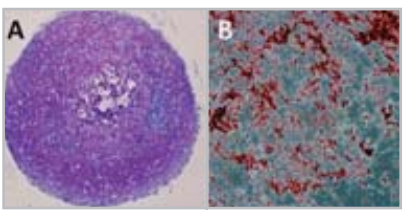
Bone and Cartilage/Mesenchymal Stem Cells

Activity Areas

- Biology of tissue –specific MSCs
- Dental stem cell
- Bone and cartilage engineering
- Bone and cartilage regeneration in animal models
- Clinical trials regarding the application of MSC in cell-based treatment of bone and cartilage hard-to-cure lesions



Human dental pulp stem cells loaded onto TCP surface



Human MSCs differentiated into A) Cartilage and B) Bone

Research Assistants

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Jahangir, Shahrbanoo, MSc

Technical Staff

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Publications

Khojasteh A, Baghaban Eslaminejad M, Nazarian H, Morad G, Dashti SG, Behnia H, Stevens M. **Vertical bone augmentation with simultaneous implant placement using particulate mineralized bone and mesenchymal stem cells: a preliminary study in rabbit.** J Oral Implantol. 2012; 1:1-13.

Hafezi-ardakani, Kavian F, Moztarzadeh F, Eslaminejad MB, Zamanian A, Bagheri F. **Poly (lactic-co-glycolic)/Nanostructured merwininte porous composite for bone tissue engineering. I.preparation and morphology.** Key Engin Mater. 2012; 493-494: 718-722.

Zomorodian E, Eslaminejad MB. **Mesenchymal Stem Cells as a Potent Cell Source for Bone Regeneration.** Stem Cell Internat, 2012:1-9, doi:1101155/2012/980353.

Emadedin M, Aghdami N, Taghiyar L, Fazeli R, Moghadasali R, Jahangir S, Eslaminejad MB. **Intra-articular Injection of Autolougous Mesenchymal Stem Cells in Six Patients with Knee Osteoarthritis.** AIM, 2012; 15(7):422-428

Karimi T, Eslaminejad MB, Aminlari M, Shahverdi A, Bahmanpour S. **Study of telomerase activity, proliferation and differentiation characteristics in umblicard cord blood mesenchymal stem cells.** Iran J Vet Res., 2012; 11:176-185

Eslaminejad MB, Bordbar S. **Blastema from rabbit ear contains progenitor cells comparable to marrow derived mesenchymal stem cells.** Vit Res Fourum, in press, 2012; 3:159-165.

Group Leader:
Baghaban Eslaminejad, Mohamadreza, PhD

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Biography
Mohamadreza Baghaban Eslaminejad has obtained PhD degree in anatomical sciences from Tarbbiat Modarress University in 2004. Since then he has worked in Royan Institute as an academic staff. Initially he established a lab for adult stem cells at Royan Institute in order to start the investigation regarding mesenchymal stem cells (MSCs). The objective of the lab was to make MSCs applicable at human orthopedic diseases in particular as those related to bone and cartilage large lesions. To achieve these goals he had conducted multiple basic animal studies using mice, rabbit and even dog models. The results of such studies have been published in over 200 full papers and abstracts in international and national journals as well as conferences. At present his researches achieve to clinical trials. In this context several clinical studies has been finished and many are ongoing. During the years of investigations, Dr Eslaminejad has been honored by several awards: 1- Winner of the 7th Royan International Research award on reproductive biomedicine and stem cells, 2006; 2- Distinguished investigator of Tehran province in 2007; 3- Selected researcher in 14th Razi Research Festival on Medical Sciences Award, 2008; 4- Iranian Excellent Researcher in 10th Festival of Appreciation of Selective Researchers and Technologists, 1388, Tehran; 5- The editorial board member of several international journals.

Farrokhi A, Eslaminejad MB, Nazarian H, Moradmand A, Samadian A, Akhlaghi A. **Appropriate Reference Gene Selection for Real-time PCR Data Normalization during Rat Mesenchymal Stem Cell Differentiation.** Cell. Mol. Biol. 2012: 58(Supp): 1660-1670.

Eslaminejad MB, Jahanghir S. **Amniotic Fluid Stem Cells and their Application in Cell-based Tissue Regeneration.** Inter J Fer Ster. 2012; 6:147-156.

Khorsand A, Eslaminejad MB, Arabsolghar M, Paknejad M, Ghaedi B, Rokn AR, Moslemi N, Nazarian H, Jahangir SH. **Autologous Dental Pulp Stem Cells in Regeneration of Defect Created in Canine Periodontal Tissue.** J Oral Implant. In press 2013.

Ghasemzadeh-Hasankolai M, Batavani R, Eslaminejad MB, Seddighi Gilani M. **Effect of Zinc ion on Differentiation of Bone Marrow-derived Mesenchymal Cells to Male Germ Cells and Some Germ Cell-specific Gene Expression in Rams.** Biol Trace Element Res. In press 2013.

Khoshchehreh R, Ebrahimi M, Eslaminejad MB, Aghdami N, Samani F, Baharvand H. Rat pancreatic stromal cells (PSC) affect differentiation of human mesenchymal stem cells v(hMSC) into insulin-producing cells (IPCs) in vitro. J Cell Sci Ther. 2012, in press.

Karamzadeh R, Eslaminejad MB, Aflatoonoan R. **Isolation, Characterization, and Comparative Differentiation of Human Dental Pulp Stem Cells Derived from Permanent Teeth by Using Two Different Methods.** J Vis Exp. 2012 ; e4372:1-10.

Eslaminejad MB, Bordbar S. **Isolation and characterization of the progenitor cells from the blastema tissue formed at experimentally-created rabbit ear hole.** Iran J Bas Ned Sci. 2012; 16:1-7.

Ghasemzadeh-Hasankolai M, Eslaminejad MB, Batavani R, Seddighi Gilani M. **Comparison of the Efficacy of three Concentrations of Retinoic Acid for Transdifferentiation Induction in Sheep Marrow-derived Mesenchymal Stem Cells into Male Germ Cells.** Andrologia, 2012, in press.

Eslaminejad MB, Fani N, Shahhosseini M. **Epigenetic Regulation of Osteogenic and Chondrogenic Differentiation of Mesenchymal Stem Cells in Culture.** Cell J., 2013, 15:1-10.

Faghihi F, Eslaminejad MB, Nekookar H, Najar M, Salekdeh GH. **The effect of purmorphamine and sirolimus on osteogenic differentiation of human bone marrow-derived mesenchymal stem cells.** Biomede pharmacother. 2013; 67:31-38.

Azhdari M, Eslaminejad MB, Baharvand H, Nasser Aghdami1 N. **Therapeutic potential of human-induced pluripotent stem cell-derived endothelial cells in a bleomycin- induced scleroderma mouse model.** Stem Cell Res, 2012, in press

Nadri S, Kazemi B, Eslaminejad MB, Yazdani S, Soleimani M. **High yield of cells committed to the photoreceptor-like cells from conjunctiva mesenchymal stem cells on nanofibrous scaffolds.** Mol Biol Rep, in press, 2013.

Faghihi F, Eslaminejad MB, **The effect of nano-scale topography on osteogenic differentiation of mesenchymal stem cells.** Biomedical papers. 2013, in press.

Nadri S, Yazdani S, Arefian E, Gohari Z, Eslaminejad MB, Kazemi B, Soleimani M. **Mesenchymal stem cells from trabecular meshwork become Photoreceptor-like cells on amniotic membrane.** Neuroscience Letter, 2013, In Press.

Cardiomyocytes and Endothelial Cells

Group Leader:
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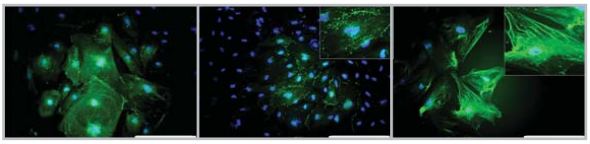
Biography
Nasser Aghdami received his MD from Urmia University of Medical Sciences in 1998 and his PhD in Immunology from Tarbiat Modarres University in 2007. From 2006 to 2008 he was the Head of the Transplantation Laboratory at Royan Institute. Since 2008 he has been the Head of the Department of Regenerative Medicine and also Royan Cell Therapy Center.

Introduction

The main goal of cardiovascular group is to establish an efficient protocol for production of cardiovascular cells from embryonic and adult stem cells. Enhancing current protocols or finding new methods for differentiation toward cardiovascular cells with modern technologies like small molecules, protein transduction and tissue engineering are among the activities that are ongoing in this group. For example, the data showed that protein transduction of ISL1 has the ability to improve the efficiency of cardiac differentiation from embryonic stem cells. In another ongoing project protein transduction of GATA4 will be evaluated. The application of desired proteins instead of their genes increases the safety of these methods and paves the way for their further application.
Stem cells derived from adult hearts can be assumed as suitable source for cell therapy. In one of the studies of this group, cardiac stem cells were isolated from patients with defects in heart valves and differentiated to cardiomyocytes. In order to find the best cells for transplantation, transcriptome and proteome of these cells in different passages were assessed. In other ongoing projects, a pricard-scaffold is used to enhance the cardiomyocytes differentiation efficiency of cardiac stem cells.
In recent years, studies with the aim of reprogramming and trans-differentiation of dermal and heart fibroblasts into cardiac cells have been considered in this group. In these studies the researchers have tried to produce safe cells in addition to increasing the efficiency. So, small molecules and protein transduction is used in this methods as an alternative of gene delivery in trans-differentiation of fibroblasts into cardiomyocytes. The consequence of these studies is to understand the mechanisms of heart regeneration and testing these mechanisms on animal models to enhance the regeneration after heart diseases such as infarction.

There are similar plans for differentiation to smooth muscle cells and endothelial cells. The projects of this part are increasing the differentiation efficiency of embryonic stem cells into smooth muscle cells and testing endothelial cells derived from induced pluripotent stem cells on animal model of Scleroderma. Now, with the availability of methods for differentiation of vascular cells from induced pluripotent stem cells the researchers are trying to produce and analyze these cells from patients with Scleroderma and compare them with normal cells.

A) Human cultured explants on fibronectin coated plates, after 10-14 days a monolayer of fibroblast cells grow from explants and over them phase bright cells migrate, B) Human cultured explants with higher magnification, C) cardio-sphere derived from human explants on poly D-lysine coated plates. Scale bar: 200 μm.



Immunostaining of differentiated cardiosphere –derived cells into cardiomyocytes. Cardiac strucrtural proteins, cardiac TROPONIN I (A), CONNEXIN43 (B) and α-MHC (C) could be observed after end of the differentiation period. The nuclei were counter-stained with DAPI. Scale bar: 200 μm.

Students

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Rajabi, Sareh, PhD
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Shabani, Parisa, PhD
Vahdat, Sadaf, PhD

Publications

Fonoudi H, Yeganeh M, Fatahi F, Ghazizadeh Z, Rassouli H, Alikhani M, Adhamimojarad B, Baharvand H, Hosseini Salekdeh GH, Aghdami N. **ISL1 Protein Transduction Promotes Cardiomyocyte Differentiation from Human Embryonic Stem Cells.** PLoS One. 2013;8(1):e55577.

Azhdari M, Baghaban-Eslaminejad M, Baharvand H, Aghdami N. **Therapeutic potential of human-induced pluripotent stem cell-derived endothelial cells in a bleomycin-induced scleroderma mouse model.** Stem cell Research, 2013 May;10(3):288-300

Skin Cells

Introduction

Skin is the largest organ in our body that with its appendages plays an essential role in animal life survival. There are 20 different types of cells residing in skin of which the most important ones are fibroblasts, keratinocytes, melanocytes, dermal papilla, and hair follicle stem cells. Skin cells group in Royan Institute can isolate these cells, culture and apply them in vitiligo, burn, wrinkle, acne scar and epidermo lysis bollusa disease cure. Skin group can produce artificial skin with fibroblast and keratinocyt cells culture on scaffolds such as: chitosan, fibrin glue and Albumin sponges so skin regeneration in vitro can be evaluated in this way.

At this stage the researchers purify and characterize melanocyte cells then evaluate tumorigenicity and metastatic capabilities of these cells in vitro. Additionally skin group studies mechanisms involved in androgenic alopecia. In future it is hoped to treat numerous patients with various skin diseases after finishing the following projects:

- Hair induction by transplantation of human follicular stem cells, dermal papilla cells or their combination with or without laser pretreatment in Nude Balb/c mice
- Evaluation of the attachment and proliferation of fibroblasts and keratinocytes on fibrin based scaffolds for skin tissue engineering
- Comparison between effects of fat injection and adipose derived stem cells in deep burn wound healing on mice
- Investigation the effect of mesenchymal stem cells derived from adipose tissue (ADSC-CM) on synthesis and degradation of hyaluronic acid in human dermal fibroblast
- Designing and Fabrication of gelatin/chitosan/chondroitin sulfate nanofibrous scaffolds for skin tissue engineering using electro spinning process
- Investigation of interactions of fibroblast cells with chitosan/gelatin scaffolds
- Evaluating the effects of conditioned medium of three different sources of mesenchymal stem cells in wound healing

Group Leader:
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Chief Researcher:
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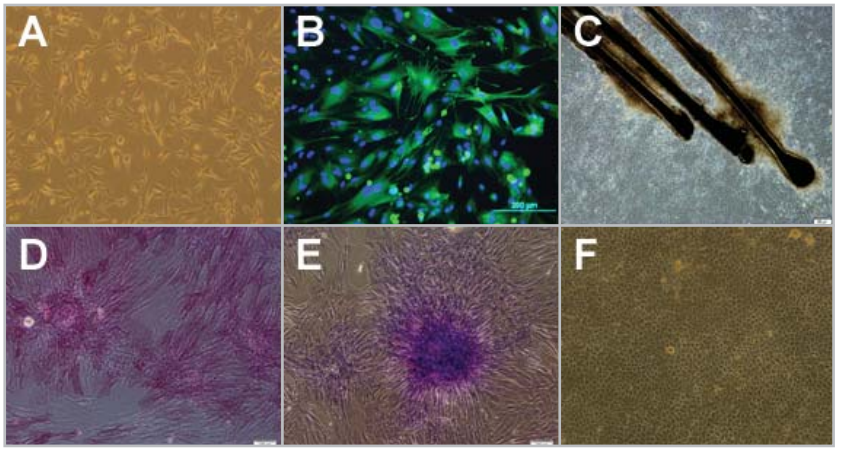
Biography
Parvaneh Mohammadi obtained a BSc in animal biology at Shahid Chamran University, Ahwaz, Iran in 2006. She received her MSc in developmental biology at the joint program between Royan Institute and University of Science and Culture in 2009. She began working at Royan Institute as a research assistant. In 2010, she began a PhD position in developmental biology in a joint program between Royan Institute and the University of Science and Culture. Her major research interest is the biology of epithelial stem cells.



A: Melanocyte cell culture from human skin B: Fluorescent staining shows HMB45, a melanocyte marker, expressed in cytoplasm. The nuclei were stained by Dappi (Blue) C: Hair follicle explants were expanded and give rise to epithelial outgrowths D: Toluidine blue is detected in dermal papilla cell culture E: Higher alkaline phosphatase enzyme activity is detected in dermal papilla cell culture
F: The primary culture of keratinocyte cells from human skin

Research Assistants

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Renal Cells

Group Leader:
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Biography
Reza Moghadasali was born in 1978 in Tehran, Iran. He received his BSc in Biology at Tarbiat Moalem University from 1996 to 2000. In 2005, he received his MSc in the field of Developmental Biology from the Faculty of Science, Tehran University in a joint program with Royan Institute. For the next three years, he was a research assistant in Urology and Nephrology Research Center (UNRC) at Shahid Beheshti University. In 2008, he began a PhD position in Cell Developmental Biology in a joint program between Royan Institute and Tarbiat Moalem University. His major research interest is the stem cell therapy in renal diseases.

Introduction

Kidney and urinary tract research group started its activities by the research charity institute support from 2012. Its strategy has mainly focused on the following topics:

- Development and generate of pluripotent cells or kidney tissue stem cells
- Create animal models of acute and chronic renal failure and transplantation of stem cells for therapeutic effects
- Transplantation Immunology and provided solutions for clinical studies using animal models of transplantation
- Understanding the mechanisms involved in the pathogenesis of renal polycystic to aid to the healing process of the patient

This group has designed two PhD proposals for study the safety and efficiency of cell transplantation. In the first study the researchers are evaluating the effect of mesenchymal stem cells co-culture in decreasing the proliferation of T17 cells as stimulator cells and increasing the migration of Treg cells as immune regulator cells. In this study, the immunomodulatory effects will be studied in the laboratory, but in the second study, the effects of immune regulation will be evaluated by transplant of different sources of stem cells such as bone marrow or adipose tissue in animal models.
Preparation of renal cells with different functions is designed for looking at the effects of mesenchymal stromal cells on the increase of cell proliferation or differentiation of embryonic stem cells into tubular cells. The proposal has been trying to plan the initial differentiation of pluripotent cells into renal progenitor cells. In the study it is wanted to examine the proliferation and maturation of renal progenitor cells in present of mesenchymal stem cells.
It is tried to provide the normal kidney tissue engineering scaffolds. In this study the researchers want to transfer progenitor cells to acellular renal tissue scaffold of monkey kidney and evaluate the renal function with new cells.
Research on stem cells and pathological effects of polycystic kidney disease on stem cells proliferation is the other goal according to which the current project is designed to isolate these cells from polycystic kidney tissue and compare with cells obtained from normal kidney tissue. Accordingly, the kidney group intends to soon develop a rat animal model for studies of polycystic kidney disease.

According to above goals, after equipment of non-human primate animal's lab, model of renal failure was established in these animals as a way to study the effects of stem cells transplantation in decrease of inflammation and increase of regeneration. The results showed that injection of bone marrow mesenchymal stem cells (BM-MSCs) as intra-renal vascular can be effectively reduced cisplatin-induced acute renal failure. Although the histological findings of increased markedly restored after cell injection compared with the control group did not show, but it seems that cells reduce inflammation and prevent apoptosis through cell immune regulatory mechanisms, reduce symptoms and improve quality of life of treated animals (Fig 1 and 2).

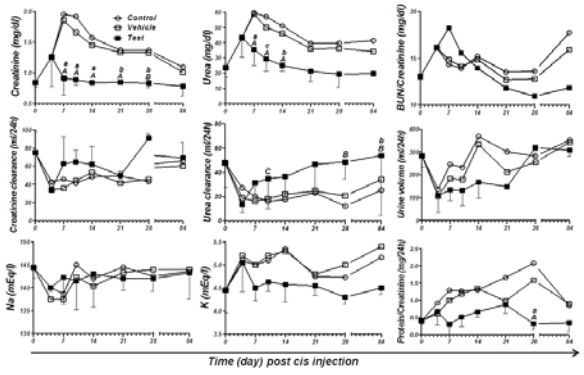

Figure 1. Effect of bone marrow mesenchymal stem cells (BM-MSCs) on renal function after cell transplantation.
Dynamics of serum creatinine, urea, BUN to creatinine, Na+ and K+ ions, creatinine clearance, urea clearance, urine volume, and urine protein excretion levels in monkeys with acute kidney injury (AKI) following intra-renal arterial injections of normal saline (vehicle group) and bone marrow mesenchymal stem cells (BM-MSCs; cell Tx group) compared with the cisplatin alone group (control) during 84 days of follow up. Values are means ± SD. A p<0.001, B p<0.01, C p<0.05 compared between the cell Tx and control groups; a p<0.001, b p<0.01, c p<0.05 compared between the cell Tx and vehicle groups.

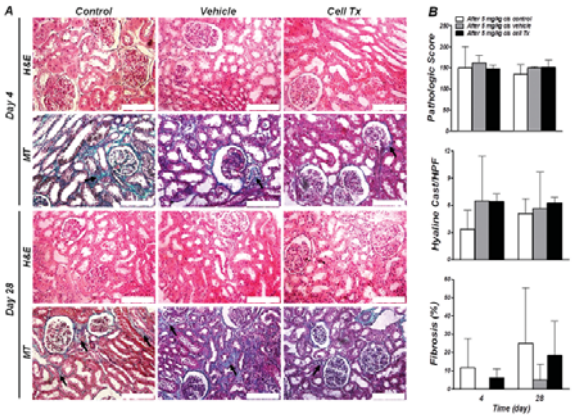

Figure 2. Effect of bone marrow mesenchymal stem cells (BM-MSCs) on renal histopathology.
(A) Renal injury characterization and morphological changes following intra-renal arterial injection of bone marrow mesenchymal stem cells (BM-MSCs). Histopathological changes, number of hyaline casts/HPF and the degree of fibrosis in the monkeys' kidneys were compared 4 and 28 days after injection of 5 mg/kg cisplatin in the control, vehicle and cell Tx groups. The degree of fibrosis visualized by Masson trichrome (MT) staining (arrow). Interstitial fibrosis was observed in tissues treated with cisplatin (5 mg/kg) after 4 and 28 days. (Original magnification 20x, scale bar: 100 µm). (B) Histopathological analysis, hyaline casts and fibrosis scores were not significantly different between the control, vehicle and cell Tx groups at 4 and 28 days after cisplatin (5 mg/kg) injection. Data are mean ± SD.

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Moghadasali R, Mutsaers HA, Azarnia M, Aghdami N, Baharvand H, Torensma R, Wilmer MJ, Masereeuw R. **Mesenchymal stem cell-conditioned medium accelerates regeneration of human renal proximal tubule epithelial cells after gentamicin toxicity.** Exp Toxicol Pathol, 2013.

Molecular Systems Biology

Group Leader:
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Biography
Dr Salekdeh's research effort focuses on proteome and molecular systems biology. He is a council member of Asia Oceania Human Proteome Organization (AOHUPO) and member of HUPO educational committee. He is the Director of the Human Y Chromosome Proteome Project (an official project of HUPO) and Chair of AOHUPO Embryonic Stem Cell (ESC) Membrane Proteome Initiative (AOHUPO ESC-MPI). On a national level, Dr Salekdeh is a co-founder of the Iranian Proteomics Society and President of this society since 2004. He is also the Head of the Molecular Systems Biology Department at Royan Institute. He is on a number of editorial boards, including the Proteomics Journal. He has received several awards and honors including, the National Biotechnology Award (2007), National Razi Medical Science Award for Advanced Technologies (2009), the Khwarizmi International Award for Fundamental Research (2010) and Hadavi Award from the Iranian Academy of Medical Sciences (2010). He has published more than 60 papers in international journals including Nature Biotechnology, Nature Protocols, Trends in Plant Science, Journal of Hepatology, Molecular Cellular Proteomics, Stem Cells, and Journal of Proteome Research.

Introduction

Cellular functions are controlled by different complex and inter-related mechanisms. Characterization of these mechanisms can lead to a better understanding of the cellular regulatory processes. "Molecular systems biology" program is integrating high-throughput "-omics" technologies such as genomics, epigenomics, transcriptomics and proteomics as well as bioinformatics in an interactive and collaborative environment to use the acquired knowledge in order to understand and control cellular behavior.
The main project includes the following items:

- Discovering the mechanisms which regulate the differentiation of human embryonic stem cells (hESCs) by employing transcriptomics, epigenomics and proteomics approaches
- Exploiting recombinant protein technology to increase the efficiency of human embryonic stem cell differentiation
- Asia Oceania Human Proteome Organization (AOHUPO) project entitled AOHUPO human Embryonic Stem Cells Membrane Proteome Initiative (AOHUPO hESC-MPI) chaired by Royan Institute. This project aims to analyze hESC membrane proteome in several laboratories across Asia Oceania to identify novel plasma membrane proteins in hESC and its differentiated cells. This is a multi-laboratories project involving laboratories in Australia, China, Singapore, Taiwan, South Korea, Japan, and Iran (Royan Institute). Each lab employs its best technology for analyzing hESC-MPI samples to provide a more inclusive and comprehensive portrait of hESC proteome particularly membrane proteome.
- Human Y chromosome proteome project. This ongoing project seeks to identify the function of all proteins encoded by chromosome Y and any potential connection with various disorders like infertility. This project is under Human Proteome Project (HPP) leading by Human Proteome Organization (HUPO). Currently, more than 20 countries are exploring 19 human chromosomes throughout human proteome projects (HPP).

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Fonoudi H, Yeganeh M, Fattahi F, Ghazizadeh Z, Rassouli H, Alikhani M, Mojarad BA, Baharvand H,Salekdeh GH, Aghdami N. **ISL1 protein transduction promotes cardiomyocyte differentiation from human embryonic stem cells.** PLoS One. 2013; 8(1).

Hosseinifar H, Gourabi H, Salekdeh GH, Alikhani M, Mirshahvaladi S, Sabbaghian M, Modarresi T, Gilani MA. **Study of sperm protein profile in men with and without varicocele using two-dimensional gel electrophoresis.** Urology. 2013 Feb; 81(2):293-300.

Kakhki SA, Shahhoseini M, Salekdeh GH. **Comparative SRY incorporation on the regulatory regions of pluripotency/differentiation genes in human embryonic carcinoma cells after retinoic acid induction.** Mol Cell Biochem. 2013 Apr; 376(1-2):145-50.

Jangravi Z, Alikhani M, Arefnezhad B, Sharifi Tabar M, Taleahmad S, Karamzadeh R, Jadaliha M, Mousavi SA, Ahmadi Rastegar D, Parsamatin P, Vakilian H, Mirshahvaladi S, Sabbaghian M, Mohseni Meybodi A, Mirzaei M, Shahhoseini M, Ebrahimi M, Piryaei A, Moosavi-Movahedi AA, Haynes PA, Goodchild AK, Nasr-Esfahani MH, Jabbari E, Baharvand H, Sedighi Gilani MA, Gourabi H, Salekdeh GH. **A fresh look at the male-specific region of the human Y chromosome.** J Proteome Res. 2013 Jan 4; 12(1):6-22.

Fattahi F, Asgari S, Pournasr B, Seifinejad A, Totonchi M, Taei A, Aghdami N, Salekdeh GH, Baharvand H. **Disease-corrected hepatocyte-like cells from familial hypercholesterolemia-induced pluripotent stem cells.** Mol Biotechnol. 2013 Jul; 54(3):863-73.

Faghihi F, Baghaban Eslaminejad M, Nekookar A, Najar M, Salekdeh GH. **The effect of purmorphamine and sirolimus on osteogenic differentiation of human bone marrow-derived mesenchymal stem cells.** Biomed Pharmacother. 2013 Feb; 67(1):31-8.

Klionsky DJ et al. **Guidelines for the use and interpretation of assays for monitoring autophagy.** Autophagy. 2012 Apr; 8(4):445-544.

Yousefi M, Hajihoseini V, Jung W, Hosseinpour B, Rassouli H, Lee B, Baharvand H, Lee K, Salekdeh GH. **Embryonic stem cell interactomics: the beginning of a long road to biological function**. Stem Cell Rev. 2012 Dec; 8(4):1138-54.

Miremadi T, Salekdeh GH, Aghdami N, Gharanfoli M, Vasei M, Kouhkan A, Baharvand H. **Stem cell research and therapy in the Islamic republic of Iran: pioneering in the Islamic world.** Stem Cells Dev. 2013 Jan 1; 22(1):51-7.

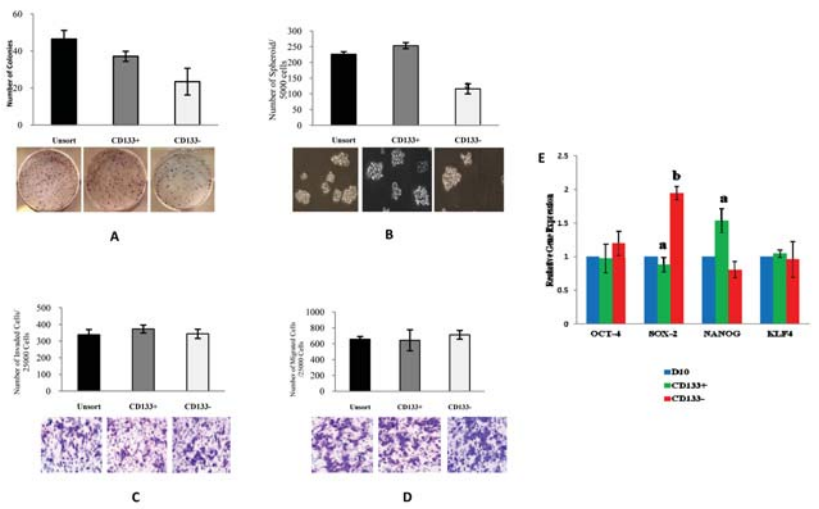
Zahabi A, Shahbazi E, Ahmadieh H, Hassani SN, Totonchi M, Taei A, Masoudi N, Ebrahimi M, Aghdami N, Seifinejad A, Mehrnejad F, Daftarian N, Salekdeh GH, Baharvand H. **A new efficient protocol for directed differentiation of retinalpigmented epithelial cells from normal and retinal disease induced pluripotentstem cells.** Stem Cells Dev. 2012 Aug 10;21(12):2262-72.

Cancer and Hematopoietic Stem Cells

Introduction

Hematopoietic stem cells (HSCs) are responsible for the constant renewal of blood and immune cells. Since more than 50 years ago, these cells have been developed to treat many diseases. Research in this area is an integrated research discipline that seeks to understand how different cells emerge from a stem cell source, which developmental pathway promotes HSCs differentiate, how the micro environment affects efficiency of cell function and other questions in the field of basic research. Additionally, many questions must be addressed in patients who receive HSCs for treatment in different disease areas. With this intent, the Hematopoietic Stem Cells Group began its activity in 2005. The main goal in this group is the high throughput expansion of HSCs using bioreactors, evaluation of cord blood mesenchymal cells (UC-M.SCs) effects on HSCs expansion efficacy, differentiation of HSCs into insulin secreting cells and the production of functional blood cells from different sources of stem cells, such as embryonic stem cells.

In 2009, research on cancer stem cells was added to the previous activities of this group, therefore its name changed to the Hematopoietic and Cancer Stem Cells Group. The main focus of cancer stem cell research is on isolation and characterization of cancer stem cells from different types of solid cancers including, prostate, gastric, breast and melanoma cancers from patient tissue or cell lines. In addition, the researchers are attempting to find and target the activated pathways in metastatic cells by using micro-RNAs, investigate the activated signaling pathways in cancer stem cells by using small molecules and study on effect of Plant extracts on treatment of breast cancer.



Investigation Of stemness propertys of CD133+ and CD133- isolated cells from D10 (melanoma) using a colony assay (A), the ability of spheroid formation (B), the ability of migration (C) the ability of invasion (D) and expression of stemness genes(E)

Group Leader:
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Biography

Marzieh Ebrahimi received her BSc in Cell and Molecular Biology from the Department of Biology at Tehran University in 1996. To pursue the underlying sciences in more depth, she obtained a Master's degree and PhD in Immunology from the Medical Faculty at Tarbiat Modarres University in 2000 and 2007, with a focus on tumor therapy by proteins derived from garlic and activation of DCs derived from cord blood stem cells using tumor lysate. During July 2009 to July 2010, she worked in the Oncology Surgery, ZLF, Unihospitale of Basel, Switzerland as a guest researcher. In June 2009, she received an award from the Iranian Presidential Office, Center for Women and Family Affairs as a Woman Elite.

Dr Ebrahimi began research in the field of stem cells in the Department of Stem Cells at Royan Institute in 2003 as a researcher and in 2007, she got an assistant professor. Currently, she is the leader of the Hematopoietic and Cancer Stem Cells Group and Royan Public Cord Blood Bank programs, and also the head of the Cytometry Laboratory.

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Khoshchehreh R, Ebrahimi M, EslamiNejad MB, Aghdami N, Samani Fand Baharvand H. **Rat Pancreatic Stromal Cells (PSC) affect Differentiation of Human Mesenchymal Stem Cells (hMSC) into Insulin Producing Cells (IPCs) In vitro.** Cell Science & Therapy, 2012 3,5.

Shayan N, Ebrahimi M, Beiki B, Janzamin E. **A non-rotational, computer-controlled suspension bioreactor for expansion of umbilical cord blood mononuclear cells.** Biotechnology letters , 2012.

Jangravi Z,Mehdi, Hosseini Salekdeh Gh, et al. **A Fresh Look at the Male-specific Region of the Human Y Chromosome.** Proteome Research, September 10, 2012.

Azimian-Zavareh V, Hossein G, Janzamin E. **Effect of lithium chloride and antineoplastic drugs on survival and cell cycle of androgen-dependent prostate cancer LNCap cells.** Indiaan J pharmacology 2012.

Salehinejad P Alitheen NB, Nematollahi-Mahani SN, Ali AM, Omar AR, Janzamin E, Hajghani M. **Effect of culture media on expansion properties of human umbilical cord matrix-derived mesenchymal cells.** Cytotherapy 2012.

Cell Engineering

Group Leader:
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Biography
Mohammad Kazemi-Ashtiani obtained his BSc in Polymer engineering from the Amirkabir University in 2010. Immediately after obtaining undergraduate degree, he undertook a full-time taught MSc degree in Polymeric Biomaterial Engineering in Iran Polymer and Petrochemical Institute, graduating in 2012. He joined Royan Institute at 2010 right after BSc graduation as a research assistant. Now, he is a PhD candidate in polymer engineering at Iran Polymer and Petrochemical Institute. He is focused on designing growth factor delivery systems for tissue engineering.

Introduction

Using engineered biomaterials brings out new opportunities to direct stem cell fate in vitro or in vivo. For applying biomaterials in stem cell culture and transplantation, engineers and biologists increasingly need to work together. The "Cell Engineering" is a highly interdisciplinary group, incorporating researchers from the fields of materials engineering and developmental biology. The researchers believe that true collaborative efforts between these disciplines, as well as a new generation of bioengineers with in-depth training in biology and material science, are critical to move stem cell biology closer to the clinic.
The main areas of focus in this lab include scaffold fabrication and surface modification, designing controlled delivery systems and bioprocess engineering of stem cells. The Cell Engineering group is interested in a wide range of applications including the study of engineering strategies for regenerating nerve, skin, cardiovascular, liver and strategies that promote integration of the engineered structures into the host tissue.

Research Areas

- **Scaffold Fabrication/ Surface Modification:**
  - Fabrication and surface modification of acellular matrices for heart tissue engineering
  - Designing macroporous natural-based scaffolds for wound healing
  - Conductive substrate for heart and nerve tissue engineering
  - Growth factor immobilization for directing stem cell fate
  - Tailoring topographic features of electrospun nanostructures
- **Controlled Delivery Systems:**
  - Morphogen delivery for engineering pluripotent stem cell aggregates
  - Oxygen delivery for transplantation of pancreatic islets
  - In vivo angiogenesis using growth factor-laden hydrogels
- **Bioprocess Engineering of Stem Cells:**
  - Development of scalable culture system for large scale expansion of human pluripotent stem cells under fully controlled conditions
  - Bioprocess development for manufacturing of pluripotent stem cell therapeutic derivatives for allogeneic cell therapies
  - Large scale expansion of human mesenchymal stem cells and dermal fibroblasts in stirred suspension bioreactor using microcarriers

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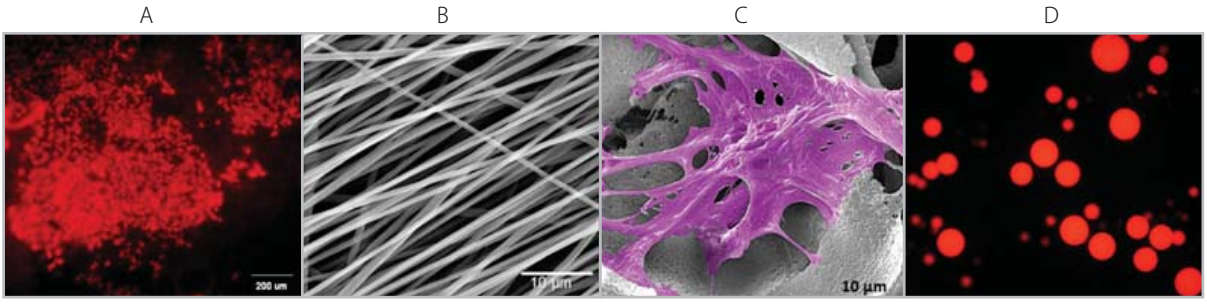

A) Sox17-positive cells on Activin immobilized nanofibers B) Aligned polycaprolactone nanofibers for nerve tissue engineering C) Human dermal fibroblasts in 3D macroporous natural scaffold D) Protein loaded microparticles for cell aggregates engineering

CORE FACILITIES

Royan Stem Cell Bank (RSCB)

Laboratory Head:
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Introduction

Today, the biology of stem cells as a growing scientific field, has afford the possibility for scientists to work and research extensively in some fields such as developmental biology, drug industry, toxicology, disease modeling and cell therapy. According to the growing demands of scientific research for stem cell lines including embryonic stem cells, adult stem cells, induced pluripotent stem cells and embryonic carcinoma cells, Royan Institute decided to invest on and establish a human and other mammalian stem cell bank. In 2003 Royan Stem Cell Bank (RSCB) starts its activity by derivation of its first mouse embryonic stem cell line (Royan B1) from C57BL/6 strain and a year later, in 2004, RSCB established its first human embryonic stem cell line (Royan H1). These lines were assessed and applied in researches. Afterward, for increasing the efficiency of line production and genetic variation, other lines have been derived from different species and individuals. Because of being well-founded of required equipment and having enough experience, Royan Institute, in parallel with other qualified research centers of the world, is proud to offer the results of one decade research in the form of production and maintenance of more than 300 stem cell lines with different origins listed below:

- Adult Human Stem Cells
- Human Embryonic Stem Cells (hESCs)
- Mouse Embryonic Stem Cells (mESCs) including different strains like C57BL/6, BALB/c, NMRI, NIH/Swiss, FVB/N, DBA/2, and SW.
- Human Induced Pluripotent Stem Cells with normal karyotypes and different disease phenotypes including Bombay Blood Group, Familial Hypercholesterolemia, Glycogen Storage, Type I Tyrosinemia, Hereditary Cholestasis, Retinitis Pigmentosa, Leber's Congenital Amaurosis, Usher Syndrome, Age Related Macular Degeneration, Leber's Hereditary Optic Neuropathy, Cligler Najjar Syndrome.
- Mouse Induced Pluripotent Stem Cells (NMRI Strain)
- Human Carcinoma Stem Cells

RSCB Data base software contains accurate information about its cell lines like type of the cell, its origin, its passage number, number of cryopreserved vials of a specific cell line, the exact place of the vial in the liquid and vapor-phase nitrogen storage tanks and its freeze and thaw dates.

Stem Cell lines available in RSCB are checked regularly for stem cell characteristics and lack of bacterial, fungal and mycoplasma contamination with accurate techniques.

For simulation of the current operating procedures in the Bank in order to prevent the unwanted changes done by different persons, SOPs (Standard Operating Procedures) have been codified which explain accurately current methods for maintenance and deposition of the cells. These SOPs are available in Royan Stem Cell Bank web site.

According to these data, RSCB is ready to provide written contract in order to collaborate closely with research and therapeutic societies for providing high quality and authenticated stem cell lines with respect to financial and moral rights.

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Public Cord Blood Bank

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Introduction

Cord blood hematopoietic stem cells (HSCs) as well as bone marrow stem cells are responsible for the constant renewal of blood and immune cells. Since the first cord blood transplant performed in 1988 by Elian Gluckman, cord blood transplantation has been increasingly used as a new source of HSC, and many countries established cord blood banks. At that time, most attempts focused on differentiation of HSCs into other cells to develop new therapy in diseases that need stem cells. However, since 1988, cord blood stem cells are well known, but many questions remain to be addressed such as which kind of stem cells in cord blood or bone marrow help to reconstruct immunity and blood cells, which developmental pathway promotes HSCs expansion and differentiation, and numerous other questions. Royan Public Cord Blood Bank was established in 2007. The main goals of this bank include; the storage of high quality cord blood units, development of new methods for cryopreservation and thawing cells, improving quality control experiments to select the best units for transplantation and the development of new criteria for donors.
Selecting healthy donors, shipping cord blood units, processing the units using red blood cell depletion, and decreasing volume and cryopreservation of cord blood samples are performed in Public Cord Blood Bank. The researchers have cryopreserved about 5111 units that include>8*108 cells which have successfully passed microbial testing, viral testing and the numbers of CD34+ cells as well as their colony forming potential before long term storage.
Royan Public Cord Blood Bank technicians are expert in freezing all types of stem samples such as bone marrow, peripheral blood, mesenchymal cells from different sources as well as fibroblasts and keratinocytes which come to this lab.
HLA typing of units gives researchers valuable genetic information about the Iranian nation. Recently, the Research and Development Group began to work on developing the techniques, standardizing the methods and producing products from cord blood serum. This group can assist other researchers who work in the field of cord blood stem cells by providing cells for them.
In the beginning of 2012, BMDW (Bone Marrow Donors Worldwide) were registered to share all HLA date to patients and specialist.

Molecular Biology Lab

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Introduction

The pivotal differences among different cell types are linked to the differential expression of tissue-specific genes during development. To further discriminate different cell types during differentiation of stem cells and to follow cell state and intracellular signaling the researchers need to check marker genes transcription in target cells.
The Molecular Biology Core facility was established to help the researchers of RI-SCBT obtain molecular data (DNA and RNA level) for their cellular experiments. In our molecular biology laboratory PCR and quantitative real-time PCR routinely applied in stem cell research. This technique enables investigators to evaluate low-abundance mRNAs, often obtained from their scarce cell cultures and tissue samples.

Activities and Services

- Primer designing and banking
- RNA extraction from cultured cells or tissues samples
- Checking RNA purity and quantity
- cDNA synthesis (reverse transcription)
- Gel electrophoresis
- RT-PCR analysis
- Real-time PCR (ABI 7500 Applied Biosystem and Rotor Gene 6000 Corbett systems are available)
- Real-time PCR data analysis
- Gene isolation and cloning

This group is collaborating in more than 40 research projects and with the aim of providing high quality data for research and practice.
Working in the MB lab needs permission from principal investigators in the RI-SCBT, and researchers or students should pass the qualities of working with molecular samples according to the guidelines in addition of GLP.

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Electrophysiology Lab

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Introduction

The Electrophysiology Laboratory performs experiments pertaining to the functional analyses of differentiated cells. In this lab the researchers can record inward ionic currents and action potentials of these cells. Additionally, extracellular recording is performed from the brain and spinal cord. Microelectrode array is a new setup in this lab that enables the researchers to record extracellular events in cultured cells.
Electrophysiological lab is currently engaged in three major research areas, including in vitro, Ex vivo and in vivo recording.

In vitro:

- **Patch Clamp Technique:** the first area includes the studies on the functional properties of biological membrane in differentiated cells derived from different kinds of stem cells by patch clamp technique.
- **Microelectrocardiogeraphy:** for extracellular recording from biting differentiated cardiomyocite by microelectrode array tool.

Ex vivo: The second area includes recording microERG from isolated rat retina.
In vivo: The third area includes functional improvement of the neurodegenerative animal model after cell transplantation by advanced electrophysiological tool for recording EEG, ERG, VEP, EMG and single unit recording.

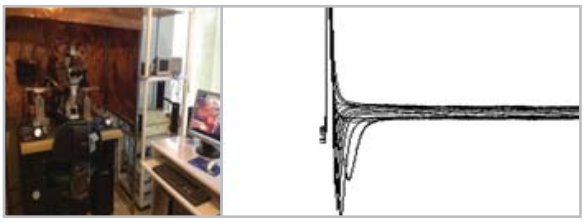

Figure1. patch clamp set up and inward ion currents in neural cells

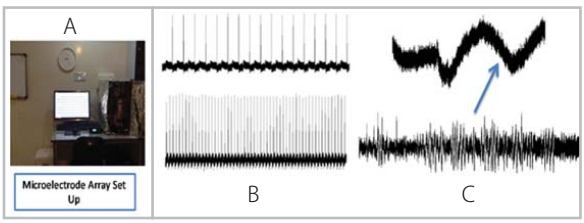

Figure2. A. Microelectrode array setup. B. extracellular recording of differentiated cardiomyocite. C. Recording of differentiated cardiomyocite isolated retina.

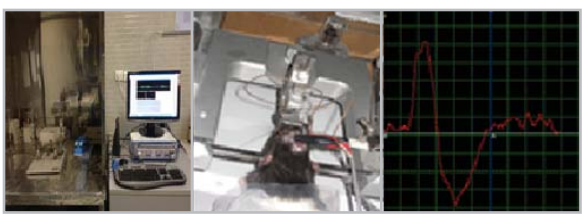

Figure3. in vivo recording .VEP recording after light stimulation.

Technical Staff

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Cytometry and Imaging Lab

Laboratory Head:
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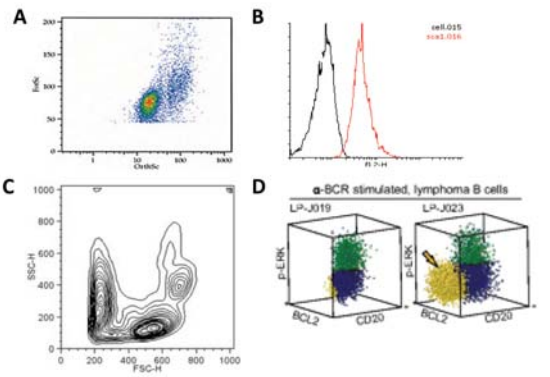
Introduction

This lab, established in 2007 is equipped with a FACSCalibur. Flow cytometry, typically using fluorescent probes which bind to specific cell-associated molecules, allows for measurements of various phenotypic, biochemical and molecular characteristics of individual cells (or particles) suspended in a fluid stream. Since the latter part of 2010, the researchers of this lab began to sort different types of stem cells using BD FACS Aria II.
The key aims of this lab's facility are analyzing, sorting and imaging of numerous samples and cells needed by researchers. Moreover, the flowcytometry workshop is yearly been held to train users for obtaining the best possible flowcytometry data for their experiments. The cytometry facility is available by outside groups on a special basis.

Cell Analysis by Flowcytometry

This lab equipped with BD FACSCalibur which has 5 parameter analysis capability - forward and side scatter and 3 colors of fluorescence using 488 excitations. Cell marker/ antigen, cell cycle analysis, apoptosis assay are the most common activities in this lab.

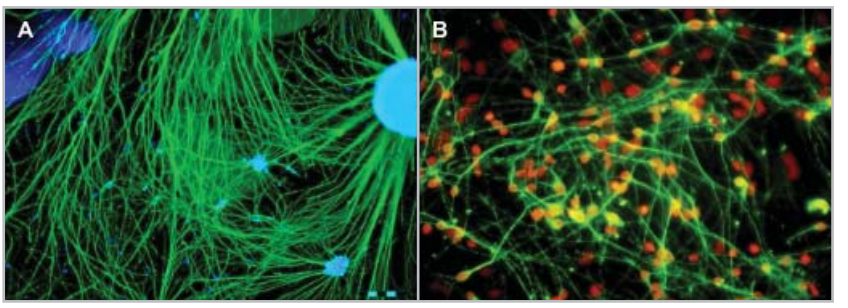


Different kind of plot in flowcytometry: (A) Dot Plot, (B) Histogram, (C) Countor plot, (D) 3D Plot

The Fluorescence Activated Cell Sorting Facility contains BD FACS AriaII. This is a high speed cell sorter with 3 lasers: blue (488), red (633), violet (405).Aria II-A can detect up to 11 parameters (9 colors plus forward and side scatter). There are many applications for this type of technology, for example isolation of GFP positive cell, cancer stem cell, differentiated cells, etc.

Imaging

Immunostained cells or tissues can be observed as well as precise, high quality photographs taken by the BX51 and IX71 microscopes located in the imaging room.



The images captured by IX71, BX51 microscopes in royan institute. (A) Expression of Neurofilament factor, nuclear staining by DAPI. (B) expression of Tubulin III nuclear staining by Propidium Iodide(PI) in Mature neuron derived of hESC-NPCs. both markers were stained with Alexa flour 488.

Technical Staff

Janzamin, Ehsan, BSc
Khosravani, Pardis, MSc
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Histology Lab

Introduction

Laboratory Head:
Abbas Piryaei, PhD

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This lab was established to provide histology services, and support investigators associated with Royan Institute. The mission of the Histology Core is to provide the necessary training and/or services that will enable investigators to study their research samples.
The Histology Core provides full service histology, training and equipment use for frozen tissues and tissues embedded in paraffin or resin and a variety of counterstaining procedures. Cell and tissue processing for transmission and scanning electron microscopy and ultra-thin sectioning for transmission electron microscopy are also available. Specialized histological procedures are available as well for unique samples such as in vitro cultured cells, tissues, embryos and engineered tissues. Furthermore the lab provides a unique serial interrupted sectioning technique. Also based on new strategy of the Royan Institute, since November 2012, the lab has initiated to accept pathological samples from the medical clinic of the Institute. Moreover, by presenting immunostaining workshop, the lab has active participation in "The 3rd Royan International Summer School". In overall during last year the lab worked on more than 2500 samples (more detailed in balance sheet).
The Histology Core is managed and operated by a full-time histotechnologist with more than six years of experience in this field. The Core Director oversees all operations and assists in the interpretation and evaluation of histological specimens.

Services Available

- Setting up and optimizing the histological approaches for scientific project
- Training on any aspect of histology
- Tissue processing for LM, IHC, IF, SEM and TEM
- Decalcification of bone and teeth specimens
- Sectioning for LM, IHC, IF, and TEM
- Routine and special staining for LM and TEM
- Biopsy samples preparation for diagnostic pathology

Users of the Histology Core can choose to submit full service jobs and allow Core personnel to proceed the samples, or they can sign up to use the equipment themselves. Training on any aspect of the histological process is available on request. After training, users have free access to the equipment in the Core facility.

Technical Staff

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Gene Targeting Lab

Introduction

Laboratory Head:
Yaser Tahamtani, PhD

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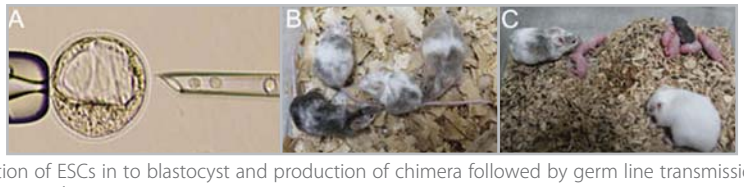
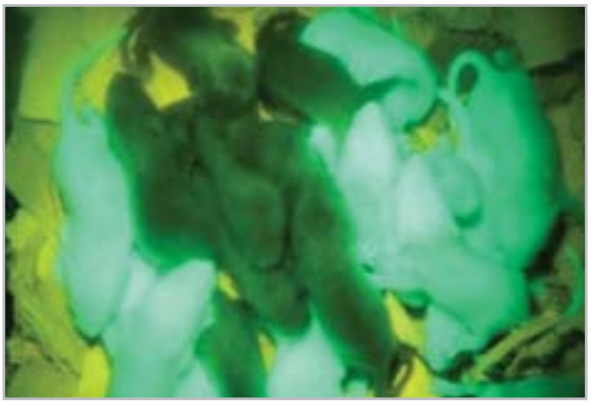
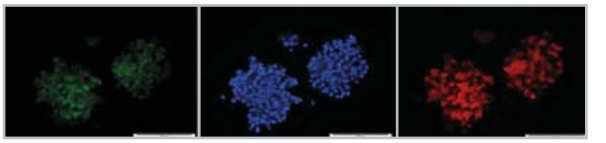
Royan Transgenic Core Facility provides all appropriate procedures and technology for production of transgenic, knockout and knock-in mice. This Core offers the following services to Royan Institute as well as researchers from external institutions:

- Pronuclear microinjection for production of standard transgenic mice
- ES blastocyst injection which involves injections of gene targeted mouse embryonic stem cells into blastocysts for the production of knockout and knock-in mice
- Preparation of pre-implantation mouse embryos
- Aggregation Chimeras: Combining ES Cells, Diploid, and Tetraploid Embryos
- Embryo cryopreservation
- Consultation services for the design of transgenes, animal husbandry and genotypic analysis of transgenic animals



Injection of ESCs in to blastocyst and production of chimera followed by germ line transmission to next generation


pCAG-EGFP IRES PuroR transgenic mice


Islets of langerhans isolated from "Pdx1-EGFP" transgenic mice

Technical Staff

Asgari, Behrouz, BSc
Sahraie, Saiedeh, MSc
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Viral Transduction Lab

Laboratory Head:
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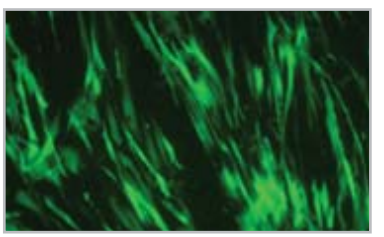
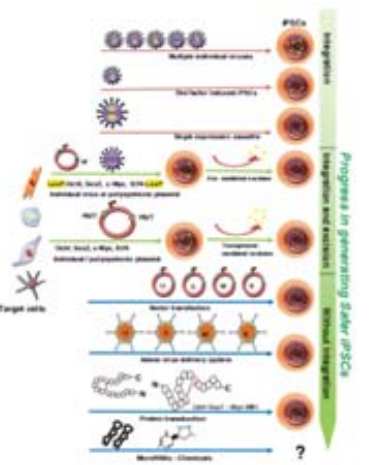
Introduction

RNA viruses, one of the diverse groups of viruses, can infect a broad spectrum of cells from prokaryotic to eukaryotic. Among them, the Retroviridae family is more applicable in molecular biology studies. Retroviruses that replicate in the host cell by the reverse transcriptase enzyme are one of the interesting viruses used in molecular biology. These viruses can incorporate into the host genome after the production of DNA from its RNA genome, by an integrase enzyme. The retroviral genome consists of 3 ORFs, including gag, pol and env genes. The core and structural proteins of the virus are encoded by the gag sequence; the enzymes required for its life cycle including RT, protease and integrase are encoded by the pol sequence; and coat proteins are encoded by env gene. Regulatory sequences of the retrovirus genome consist of two long terminal repeats (LTRs) on both sides of the coding sequence. 5'LTR, which acts as a promoter and transcription start site and 3'LTR which is involved in posttranscriptional processing (i.e. polyadenylation). The packaging signal placed just after the 5'LTR is responsible for packaging all sequences as a retrovirus genome. Lentiviruses are other members of the Retroviridae family with complex a genome that could infect both dividing and non-dividing cells. By replacing viral genes with available gene of interest and placing a transgene juxtaposed to the packaging signal on one vector, and engineering viral coding genes on the other vectors, it is possible to produce recombinant viruses carrying the gene of interest that capable of transduction into any target cell.
The researchers began their work by first establishing human iPS cells in 2008. Currently, they have the capability to produce iPS cells from any cell type.

Core Facility Services

- Viral production for other groups
- RNAi trials for gene silencing and functional analysis studies
- Over-expression and ectopic expression of genes for functional analysis
- Generation of Safe iPS cells using miRNAs and minicircles
- iPSC generation from scleroderma fibroblast cells
- Generation of cell lines with GFP marker
- Viral transduction training


hFF-GFP cell line


Ali Seifinejad et al, Progress and promise towards safe induced pluripotent stem cells for therapy, 2010, Stem Cell Rev and Rep

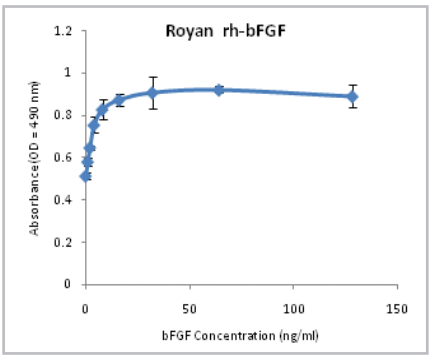
Technical Staff

Hajikaram, Maryam, MSc
Hesaraki, Mahdi, MSc

Recombinant Proteins Quality Control Lab

Introduction

Developmental biology studies and stem cell researches rely on supplementing culture media and qualified growth factors. In Royan Instituted many growth factors needed for stem cell research are produced to supply research in the Institute and other research organizations and universities in Iran. As the produced protein needs to pass the quality controls test before use, a group formed to use standard methods for analysis of recombinant proteins purity and assessment of bioactivity of these proteins after manufacturing. Additionally sterility tests, endotoxin assay and mycoplasma detection tests is a part of the standard QC tests of this lab to ensure that the researchers use the best quality of recombinant protein for their research. It is also tried to develop new methods for bioassay of produced growth factor. Recombinat proteins quality control lab is aimed to ensure Royan Recombinant Proteins are of the highest quality for research.



bFGF biological Activity: Tested by dose dependent stimulation of proliferation of murine 3T3 fibroblast cell line.

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Technical Staff

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"Stem Cells for All" Lab

Introduction

The perspective of "stem cells labs for everyone" is to expand the knowledge of society in the field of stem cell technology and cell therapy as well as developing targeted students and researchers for future. Since establishment (January 2012), 354 high school students and 162 under/post graduate students have been trained in these laboratories. Familiarizing of Biology teachers and elite students with basic knowledge and practical aspects of stem cell science and technology can lead to quality promotion of education and increasing the student's trends to continue their academic training in these fields. With this scope, Royan Institute has established and equipped series of educational labs for high school students, teachers and under/post graduate students. These series are including with Stem Cells, Genetics and Biotechnology, Protein Science, Histology and Developmental Biology educational labs.

Laboratory Head:
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DEPARTMENT OF REGENERATIVE MEDICINE OF RI-SCBT

Laboratory Head:
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Introduction

Branch of biological science that was first introduced by Trembly, which caused many of the cognitions in the development and revolution in medical treatment, suggested to cure the cause of disease rather than treating their symptoms. Regenerative Medicine is a collection of applied data from biology, such as growth factors, cell therapy, tissue engineering and organ transplantation with the aim of reducing tissue destruction-related mortality. Currently in spite of advances in identification of growth factors involved in the normal regeneration of the body or improvement in tissue engineering and organ transplantation, cell therapy with the simple idea of replacing the missing parts by using stem cells is still the best choice. As a result most of the research activities conducted at the Department of Regenerative Medicine focused on translational and clinical studies using cell therapy.

Clinical use of cell therapy requires provision of specific infrastructure constructions. One of them is providing GMP condition for cell production. In these units, as well as isolation and culturing cells in completely sterile conditions, plenty of efforts are made to produce cells with highest quality for cell therapy. Therefore, quality control laboratories in addition to clean rooms are important parts of this unit. Translating the results obtained from studies in animal models is another feature of this group. In this regard, model of acute renal failure with use of cyclosporine and kidney transplantation in monkeys was set in 2012. Besides the above-mentioned potential, the active research groups in the department include:

- Skin disorders
- Cardiovascular disorders
- Bone and Joint disorders
- Neuromuscular disorders
- Kidney disorders

Skin Disorders

Group Leader:
Saeed Shafieyan, MD

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Introduction

After providing service for vitiligo and wrinkle patients using injection of cultured melanocytes, keratinocytes and fibroblasts, an important action of this group in 2012 focused on doing clinical trials stage I and II on Epidermolysis Bullosa, burn and also to find new methods to treat vitiligo.

Mitted hand after surgery and using amniotic membrane autologous cultured fibroblasts

Epidermolysis Bullosa or EB is a genetic disease in which there are defects in several layers of skin, such as epidermis sticking to the dermis. In EB, patients always suffer from massive injuries and pain - even in the mucosal tissue of their body - which are often resistant to treatment. Today, especially in medicine and cell therapy researchers try to create suitable biological coverage to heal pain and wound's EB patients. To help these patients in a phase I clinical trial, the specialists evaluated the safety and efficacy of usage of fibroblasts cultured on amniotic membrane in healing of refractory ulcers. The results of this study in 10 patients showed amniotic membrane with cultured cells can improve wound healing better than amniotic membrane without cells and also it can reduce hospital stay and side effects. But as the major problem in these patients is due to genetic defect in their fibroblast cells and not producing collagen, it seems logical to use allogenic fibroblasts instead of one's own fibroblast. The specialists can isolate allogenic fibroblast from parents' fibroblast or fetal fibroblast. So phase1 and 2 of clinical trial is planned in collaboration with Hazrate Fatemeh Hospital to use these cells in refractory ulcers. The results of this study suggest that not only this method can heal the wound faster but also it hasn't any side effect. According to these results, this group intends to plan larger study for EB in collaboration with community health centers, Tehran University of Medical Sciences (Hospital Fatimah Zahra) in the near future.

Mitted hand after surgery and using amniotic membrane allogeneic cultured fibroblasts

This group is following two purposes in stem cell therapy for patients with high-grade skin burns. First, decreasing scar formation following damage and second increasing regeneration in damaged tissue. Therefore, fibroblasts and keratinocytes are transplanted in a controlled phase I trial involving 10 patients. Initial reports showed that although transplantation facilitates regeneration process, but it doesn't reduce total scar size significantly. It seems that high turn-over and fast proliferation, should be an important factor for determining regeneration efficacy in skin burns. Therefore, the researchers are conducting a study in which they use fetal fibroblasts derived from amniotic membrane for treatment of skin burns

Scar regeneration in patient with old scar because of burn victim after treatment with autologous culture Keratinocyte and Fibroblast

Research Scientists

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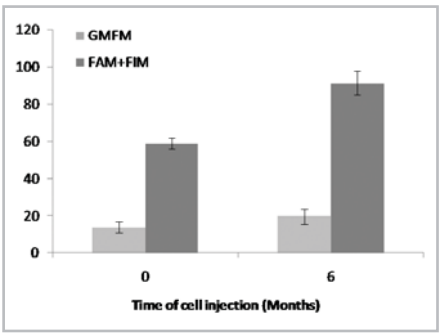
Neuromuscular Disorders

Introduction

In Neurology group, the researchers have tested the efficacy and safety of stem cell transplantation in multiple sclerosis (MS), amyotrophic lateral sclerosis (ALS) and cerebral palsy. Eleven patients with cerebral palsy were enrolled in this study. It is showed that Intrathecal injections of bone marrow derived CD133 positive cells to these patients were safe and there were no significant adverse reaction. In addition, treated group, showed improvements in motor and cognitive functions to some extent in comparison to control group. Seven patients received a second injection of CD133 positive cells within 6 months and result of serial injection were compared to single injection in its efficacy in motor and cognitive functions improvement.



Intravenous injection of bone marrow derived mesenchymal stem cells for patients with MS were evaluated in a controlled double blind clinical trial. Patients are being evaluated with several tests including physical exam, serum biochemical markers and imaging. Safety and efficacy of intravenous, intrathecal and intraventricular injection of bone marrow derived mesenchymal stem cells (BM-MSC) for patients with ALS are being tested. Currently, six patients underwent intravenous transplantation.

GMFM; Gross Motor Functional Measurement, FIM+FAM; Functional Independence Measure+ Functional Assessment Measure in patients who are treated with bone marrow derived CD133 cells (before, 0 and six months 6, after intrathecal injection)

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Research Scientists

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Bone and Joint Disorders

Group Leader:
Mohsen Emadoddin, MD

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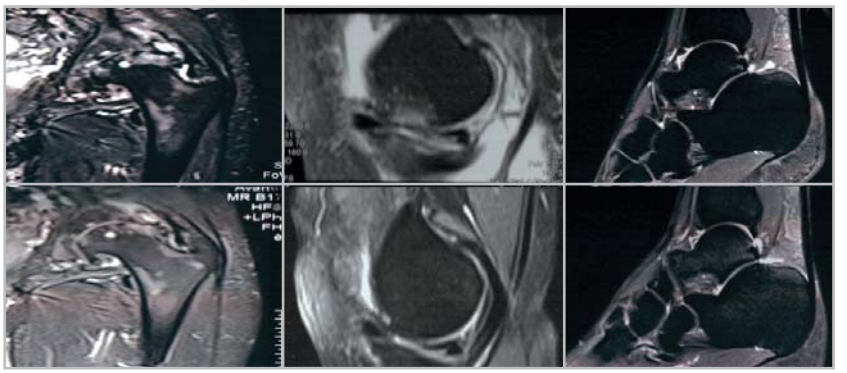
Introduction

Numerous studies are being conducted in orthopedics group including benign bone cysts, non-union complications following fractures, avascular necrosis of neck of femur, cartilage avulsion and osteomyelitis. Among these disorders, stem cell therapy for osteoarthritis is undergoing its last steps.



Sagittal T2 weighted MR image of patient with ankle, Knee or Hip osteoarthritis, Note patchy subchondral edema (arrowhead) that decreased six month after MSC transplantation (arrowhead).

The results in phase I and II, showed that transplantation of bone marrow derived mesenchymal stem cells can reduce joint pain in addition to increasing joint function. These results were confirmed with MRI imaging of injected joints. As a pre-clinical study, in step III, 30 patients with osteoarthritis were enrolled in this study and the researchers have obtained important results regarding application of these stem cells in clinical grade. Non-union is a common complication following fractures in bones. The researchers have conducted phase I and II clinical trials for efficacy of BM-MSC transplantation in facilitating bone re-union. BM-MSC were transplanted with platelet lysis in twelve patients and resulted in a significant improvement in re-union.
In order to be able to use BM-MSCs as an option in clinical settings, a double blind clinical trial should be performed comparing its effect with placebo and other available effective treatment options. Cartilage avulsion is another disease being treated with transplantation of BM-MSC.

Research Scientists
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Research Assistants
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Ghorbani, Maedeh, MD
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Cardiovascular Disorders

Laboratory Head:
Nasser Aghdami, MD, PhD

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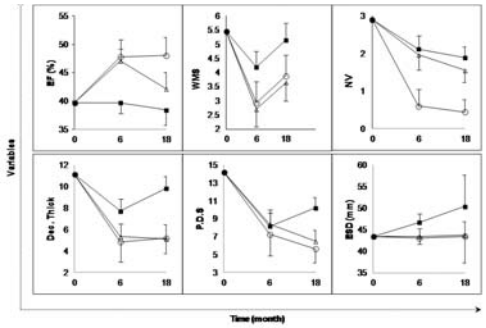
Introduction

Cardiovascular Disease Research Group is one of the oldest groups in the Department of Regenerative Medicine and during of its research course -after numerous clinical studies in phases II, III- has provided using bone marrow stem cells in patients with acute and chronic myocardial ischemia as a service.
Studies in this group show that the injection of bone marrow stem cells in the heart muscle and even vessels has no complications for the patients, can significantly increase the activity of heart (ejection fraction) and improve the survival of other affected tissues. Although comparison of the effect of bone marrow-derived mononuclear cells with CD133 cells shows that CD133 cells perform better. In general, this method of cell therapy is beneficial for the patients.



In this chart the studied indicators for evaluation of heart function includes ejection fraction (EF), wall motion score (WMS), the number of non-viable segments (NV), decreased myocardial wall thickness (Dec. thick), perfusion defect score (PDS) and end-systolic diameter (ESD). White circles and triangles indicate the MNC and CD133 cells recipient groups respectively and the black squares are the symbol of control group. As it is obvious, the increase in ejection fraction and decrease in other variables such as wall motion score, the number of non-viable segment, reduced wall thickness, cardiac perfusion defect score and also no change in end-systolic diameter in cell therapy groups compared to control group are signs of the therapeutic effects of cell therapy.

The development of available treatments and application of new therapeutic methods are as primary goals of this group for treatment of diseases which are the most common and deadly diseases in Iran. The use of bone marrow stem cells in children with heart problems and injection of these cells in patients with ischemic valvular defects are as the most important studies which are designed and implemented to develop our current methods.
According to studies conducted worldwide cardiac stem cells (CSCs) are introduced as one of the most suitable cell sources for heart repair. So after the cell culture methods were set up and standardized for clinical uses, currently, a project has been designed in this group in which the use of autologous CSCs in patients with chronic ischemic heart will be evaluated in a phase III placebo-controlled, multi-center clinical trial.

Wound regeneration after injection of Bone Marrow derived MNC

In addition to conducted research activities in patients with heart diseases, in the cardiovascular group some studies have been performed for wound healing in patients with peripheral vascular diseases such as Buerger and the data shows that cell injection is an effective method to avoid amputation in patients candidate for organ transplantation due to peripheral vascular problems for whom surgery is not possible.
Treatment of refractory wounds in patients with diabetic foot ulcers and the use of cell therapy in patients with lymphatic vessel involvement are also as another group objective which are being followed by the design and implementation of several projects in this field.

Research Scientists

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Kidney Disorders

Laboratory Head:
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Tara, Ahmad, MD

Research Assistant

Moghadasali, Reza, PhD

Introduction

Kidney and urinary tract research group is one of the newly established groups in Department of Regenerative Medicine, and at present, most of its activities have focused on the administration cell therapy in patients with incontinence, renal transplantation and acute renal failure.
This group whose costs in the basic sciences and the clinical sciences are financed by research charity group intends to detect the mutations in Iranian patients with renal Polyclinic disease in collaboration with Nephrology and Urinary Tract Research Center of Shahid Beheshti Medical Science University.
Recently, almost 20 patients have been treated in the clinical trial for evaluation of the effect of intramuscular injection of muscle stem cells in improving incontinence and the primary results show that this method can improve the patients' symptoms without any special complication.
In another study which is being designed, the group intends to decrease the use of immunosuppressive drugs in patients receiving transplants by administration of autologous mesenchymal stem cells. In this study which is in collaboration with Shahid Modarres Hospital, approximately 50 patients in two groups of cells and drug will be evaluated.

CORE FACILITY

Production Facility

Sections

- Clean Rooms
- Cytogenetic and molecular Lab
- Microbiology and serology Lab

Production Facility Head:
Masoud Vosough, MD, PhD

masoudvosough@royaninstitute.org

CLEAN ROOMS

Introduction

Active clean rooms for the department of Regenerative Medicine are located in Bani Hashem (100 square meters) and Zaferaniyeh (70 square meters), while it is considered to be extended. The group has the ability to isolate and culture different kind of cells such as bone marrow mononuclear cells, CD133+ cells, adipose stromal cells, skin cells (melanocytes and keratinocytes), bone marrow mesenchymal stem cells, adipose mesenchymal stem cells, cardiac stem cells and cartilage and embryonic fibroblasts. This group can also provide these cells for researchers.
The new units are going to be designed with highest quality for GMP production. Providing a separate room for incubators and essential facilities for pancreatic islets isolation, dedicating separate rooms for different cell types and tissues are among the features of the new units.

Technical Staff

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Mohamadi, Parvaneh, PhD
Nazari, Abdolreza, MSc
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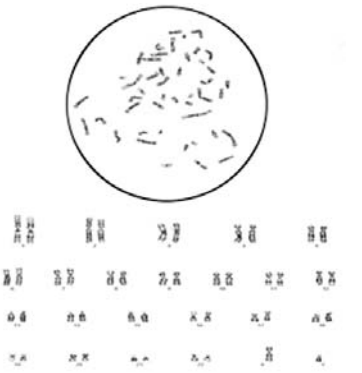
Vaezi, Fatemeh, BSc

CYTOGENETIC AND MOLECULAR LAB

Introduction

The main activities of this laboratory are performing essential tests using Quantitative-RT-PCR or PCR to ensure the absence of viral infection of the lab's products like PL, tissue glue and amniotic membrane, especially when they are used as allogeneic. In addition, considering the probability of cells chromosomal defects, since 2012 karyotype of bone marrow mesenchymal stem cells, skin fibroblasts, muscle cells and cardiac stem cells have been checked. To guarantee the quality of products produced in cell culture and isolation units HLA and Mycoplasma detection tests using Nested-PCR are also performed.



Mesenchymal stem cells Karyotype from patients with ALS

Technical Staff

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Miri, Monireh, BSc
Rezakhani, Zahra, BSc
Yektadoost, Elham, BSc

MICROBIOLOGY AND SEROLOGY LABORATORY

Introduction

This laboratory uses advanced diagnostic equipment and BACTech system by detection of bacterial and fungal infections. In 2012 the differential diagnosis is also added to this lab. It is responsible for identification of possible contaminations of the products and as well as testing contamination persistently by daily or weekly sampling in clean room facilities and reporting the documentations for necessary evaluations.
Due to the availability of molecular tests for viral infections, currently the main activities are limited to LAL tests for diagnosis of infections and determining collagen level to assess functionality of fibroblasts.

Technical Staff

Mohammadi, Ladan, BA
Mohseni, Mohammadali, MSc

ROYAN INSTITUTE FOR BIOTECHNOLOGY (RI-B)

Message from the Department Head

Recent advance in the last decade has shortened the gap between basic science and its applications. This phenomenon is at its uttermost in the field of biotechnology. Therefore, in Royan Institute for Biotechnology, we hope to participate in this contest and through this participation, improve the standards of life for the mankind and help those in needs. Therefore, we believe this vision can only come true through interactive science between experience researcher and the young researcher. Therefore, by encouraging interactivity and opportunity for scientific discussion between students and the scientists, we hope to broaden our boundaries of science and make it applicable for those in need, in addition to expanding our research facilities.

Department Head:
Mohammad Hossein Nasr-Esfahani, PhD
(Embryology)

mh.nasr-esfahani@royaninstitute.org

Biography
Dr Nasr-Esfahani graduated in the field of embryology from the University of Cambridge, UK in 1991. He started his carrier as clinical embryology is Born Hall Assisted Reproductive Center in Cambridge, where the first IVF child was born. Since then he has worked intensely as a clinical embryologist. In 1992 he started his academic carrier in Iran and became actively involved in research projects of Royan Institute. He established the Royan Institute for Animal Biotechnology in 2004 in Isfahan. Under his supervision Biotechnology department has already achieved outstanding results. Dr Nasr-Esfahani has supervised over 167 projects and has 143 and 114 National and international publications, respectively. He is also the author of three books, several chapter books, and the editor of IJFS and member of several editorial boards of different journals.

Department History and Introduction

In 1983, the late Dr Kazemi Ashtiani, the founder of Royan Institute, along with Dr Nasr-Esfahani established Royan Institute for Biotechnology, as the third branch of Royan Research Institutes. At present, this branch homes around 100 researcher and students working in 5 departments to expand the science over their areas. The intensive seminar schedule in each department has encouraged interactivity and opportunity for scientific discussion between students and the scientists to facilitate the progress of science in their filed. Therefore, in 2010 through this interactive science, this department has achieved a number of important results, including establishment of zona free somatic cell nuclear transfer (SCNT) in goat, evaluation of epigenetic modifier on outcome of SCNT and vitrified embryos, introducing novel approach for selection of intact sperm for ICSI based on sperm functional characteristics, understanding the role of embryonic structure in neurogenesis, assessment of the role of PEP (a peroxisomal protein) and PPARγ in neurogenesis and finally role of biotechnology in production of biological products.

Head of Staff

Khodaei, Sayed Hamed, MSc

Administrative Office

Fouladgar, Maryam, BSc
Jafari, Ahmad, AA
Motiei, Mehrnoush, BSc
Shokouhi, Ahmad, BSc

News and Events

- Establishment of a molecular method for predication of failed fertilization post ICSI
- Establishment of a herd of transgenic animal
- Production of cows with high milk production through technique of IVF/cryopreservation
- Production of recombinant protein, the TPA, from cell culture technology
- Establishment and full characterization of Dental Palp stem cell line
- Establishment of diagnostic center for peroxisomal related disease

Journal Clubs

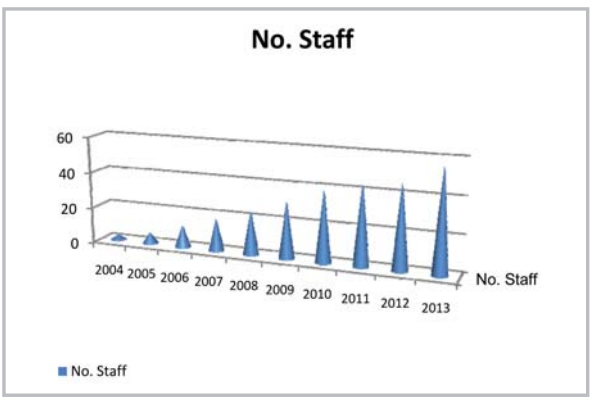
- Embryology, Every Saturday
- Genetic, Every Sunday
- Andrology, Every Monday
- Stem cell, Every Tuesday
- Recombinant Protein, Every Wednesday

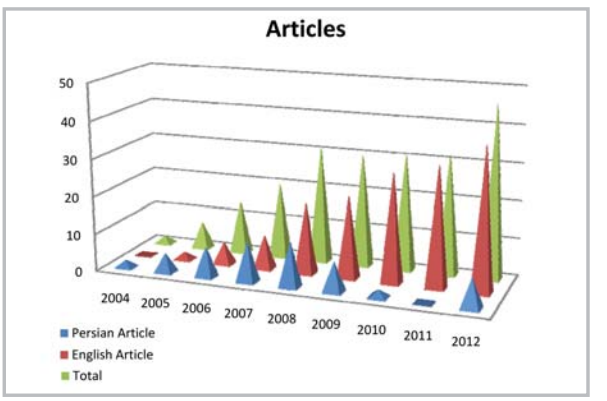
Core Facilities

- Animal Farm
- Viral Transduction
- Gene Targeting
- Flowcytometry
- Molecular Biology
- Royan Plasmid Bank
- Cell Culture Lab
- Molecular and Genetic Lab

The Departments of Royan Institute for Biotechnology

- Reproductive Biotechnology-Embryology
- Reproductive Biotechnology-Andrology
- Cellular Biotechnology-Stem Cell
- Cellular Biotechnology-Genetics
- Molecular Biotechnology-Recombinant Protein





Reproductive Biotechnology-Embryology

Group Leader:
Sayed Mortaza Hosseini, DVM, PhD Student

smhossseini@royaninstitute.org

Biography
S. Morteza Hosseini has been working on different aspects of in vitro embryo production since 2003. His doctorate project was an investigation on the effect of cumulus cells on developmental competence of in vitro matured sheep oocytes focusing on cumulus cells-oocyte interactions. The team he involved-in is well-known for animal biotechnology research worldwide, especially for their achievements in cloning domestic and wild animal species, and producing the herd of transgenic goat secreting human-tissue-plasminogen activator in its milk.

Introduction

The mechanisms of in vivo and in vitro embryo development are of paramount importance in the field of assisted reproductive technology (ART), dairy farming and biopharming. Although much effort has been put into the establishment of sequential media, further advances are required in order to overcome in vitro stress for embryo development. Therefore, optimization of culture media has remained a major goal of this department. In the field of somatic cell nuclear transfer, despite great advances achieved in recent years, there is also a need to set-up species-specific protocols to achieve higher efficiency. This implies further focus on both cellular and molecular bases of cellular reprogramming. Searching for alternative method for production of transgenic animals may provide a useful platform for further studies. Cryopreservation of reproductive elements (sperm, oocyte, and embryo) is one of the other programs scheduled in this department. Finally, there is a critical need to reconsider the efficiency of current in vitro oocyte maturation protocols to access maximum oocyte capability.

Main Goals

- Establishment of different methods for somatic cell nuclear transfer (SCNT) or cloning
- Production of transgenic animals via cloning, sperm and germ cells
- Production of novel culture media for in vitro embryo development
- Cryopreservation of gametes, embryos and reproductive tissues
- Increasing cloning efficiency by epigenetic modification

The mission of this department is to achieve world-class applicative approaches in transgenesis in the hope of producing recombinant proteins.

Focused Areas

- Somatic cell nuclear transfer
- Transgenesis
- Cryobiology
- Epigenetic reprogramming

Research Asistants

Abbasi, Homayun, PhD Student
Asgari, Vajiheh, PhD Student
Forouzanfar, Mohsen, PhD
Hajian, Mehdi, PhD Student
Jafarpoor, Farnoush, PhD
Kiani, Maryam, MSc
Nekookar, Abdolhossein, DVM
OstadHosseini, Somayeh, DVM
Tanhaeivash, Nima, BSc

DAIRY ASSIST CENTER (DAC)

The Dairy Assist Center (DAC) is a newly designed center within the Reproductive Biotechnology department that provides R&D support for expanding the dairy industry throughout the country. Over the years with excellent experience in the field of mammalian in vitro embryo development, embryo transfer and genetics, DAC has now gained prominence as an advance research center whose purpose is to create the first joint effort to offer a continuum of academic, technical and applied collaboration with the local and national industrial dairy complexes.

Main Missions of DRC

- Sperm technologies: Although expensive, many farmers are concerned or even dissatisfied with the results of some semen batches used for artificial insemination. Here, they can accurately be informed of the quality of purchased semen with the use of a dozen semen tests such as: morphology, motility and integrity (DNA/plasmalemma/cytoplasm). The semen's fertilization potential can also be checked by IVF experiments.
- Ovary and oocyte technology: Frequently, champion dairy cattle are omitted due to their sudden death, critical fractures or acute diseases. In these situations, there are only two biotechnological approaches to sustain the reproductive performances of these champions: a) obtaining immature oocytes to be used for either IVF or freezing, b) cryopreservation of ovarian tissue for future use.
- Embryo technologies: In order to assist those dairy owners who desire to increase the numbers of their champion cattle, several technologies have been established to distribute superior genetic constitutes throughout the country. Some of these technologies include: multiple ovulation (MO), artificial insemination (AI), embryo flushing, embryo transfer (ET), in vitro fertilization (IVF) with sexed semen, sperm sexing, intracytoplasmic sperm injection (ICSI), in vitro embryo culture, embryo sexing, embryo splitting, assisted zona drilling, embryo freezing and embryo banking.

Publications

Pirestani A, Nasr Esfahani MH, Hosseini SM, Moulavi F, HajianM, Forouzanfar M, Abedi P, OstadHosseini S, Hosseini L. **Application of in vitro production-embryo transfer in the protection and development of lactational potential of superior cows.** African Journal of Biotechnology. 2012; 11(5), 1287-1292.

Nasiri Z, Hosseini SM, Hajian M, Abedi P, Bhadorani M, Baharvand H, Nasr-Esfahani MH. **Effects of different feeder layers on short-term culture of preppubertal bovine testicular gem cells in-vitro.** Theriogenology. 2011; 77(8): 1519–1528.

Sekhavati M.H , Dormiani K, Ghaedi K, Khazaie M, Hosseini M, Tahmoorespur, Nassiri Z, Foruzanfar M , Nasr Esfahani M.H. **Identification of a Specific Pseudo attP Site for Phage phiC3 Integrase in the Genome of Chinese Hamster in CHO-K1 Cell Line.** Iranian Journal of Biotechnology. 2013; 11(1): 54-8.

Eghbalsaied SH, Ghaedi K, Laible G, Hosseini M, ForouzanfarM, HajianM, Oback F, Nasr-Esfahani M.H, Oback B**. Exposure to DNA is insufficient for in vitro transgenesis of live bovine sperm and embryos.** Reproduction. 2013; 145(1): 97-108.

AsgariV, Hosseini M, Forouzanfar M, Hajian M, Nasr-Esfahani M.H. **Vitrification of in vitro produced bovine embryos: Effect of embryonic block and developmental kinetics.** Cryobiology. 2012; 65(3): 278-83.

AsgariV, Hosseini M,Ostadhosseini S, Hajian M, Azhdari, Mosaie, Nasr-EsfahaniM.H. **Specific activation requirements of in vitro-matured sheep oocytes following vitrification-warming.** Molecular Reproduction & Development. 2012; 79(7): 434-44.

Sekhavati M.H, Shadanloo F, Hosseini M, Tahmoorespur M , Nasiri MR, Hajian M, Nasr-Esfahani MH. **Improved Bovine ICSI Outcomes by Sperm Selected after Combined Heparin- Glutathione Treatment.** Cellular Reprogramming. 2012; ;14(4):295-304.

Bahadorani M,Nasr-Esfahani M.H, Hajian M,Abbasi H,Abedi, Baharvand H,Hosseini M. **The effect of growth factors on in vitro-cultured caprine testicular cells.** Manuscript submitted for review to Reproduction. 2012.

Hosseini M, Asgari V, Ostadhosseini S, Hajian M, Piryaei A, Najaras M, Nasr-Esfahani MH. **Potential applications of sheep oocytes as affected by vitrification and in vitro aging.** Theriogenology. 2012; 77(9): 1741-53.

Bahadorani M, Hosseini M, Abedi, Hajian M, Hosseini M, Vahdati, Baharvand H, Nasr-Esfahani MH. **Short-term in-vitro culture of goat enriched spermatogonial stem cells using different serum concentrations.** Assist Reprod Genet. 2012; 29(1): 39-46.

Sekhavati MH, Tahmoorespur M, Ghaedi K, Dormiani K, Nassiri MR, Khazaie Y, Foruzanfar M, Hosseini M, Nasr Esfahani MH. **Cloning, Expression, and In Vitro Functional Activity Assay of phiC31 Integrase cDNA in Escherichia coli.** Cell Journal(Yakhteh). 2013;14(4): 264-9.

Forouzanfar M, FekriErshad S, Hosseini SM, Hajian M, Ostad-Hosseini S, Abid A, Tavalaee M, Shahverdi A, VosoughDizaji A, Nasr-Esfahani MH**. Can permeable super oxide dismutase mimetic agents improve the quality of frozen-thawed ram semen?** Cryobiology. 2013; 66(2):126-30.

Esmaeilzadeh F, Hosseini S.M, Nasiri Z, Hajian M, Chamani M, Gourabi H, Shahverdi AH, Vosough A.D, and Nasr-Esfahani MH. **Kit Ligand and Glial-Derived Neurotrophic Factor as Alternative Supplements for Activation and Development of Ovine Preantral Follicles In Vitro.** Molecular Reproduction & Development. 2013; 80(1): 35-47.

MoulaviF , HosseiniM, Hajian M, ForouzanafrM, AbediP, Ostadhossini S, AsgariV and Nasr-EsfahaniMh. **Nuclear transfer technique affects mRNA abundance, developmental competence, and cell fate of the reconstituted sheep oocytes.** Reproduction. 2013; 145(4):345-55.

Hosseini S. M, Hajian M, Forouzanfar M, Moulavi F, Abedi P, Asgari V, Tanhaei S, Abbasi H, Jafarpour F, Ostadhosseini S, Karamali Fe, Karbaliaie Kh, Baharvand H,. Nasr-Esfahani M H. **Enucleated Ovine Oocyte Supports Human Somatic Cells Reprogramming Back to the Embryonic Stage.** Cellular Reprogramming. 2012; 14(2):155-63.

Gharibi SH, Hajian M, Ostadhosseini S, Hosseini SM, Forouzanfar M, Nasr-Esfahani MH. **Effect of phosphodiesterase type 3 inhibitor on nuclear maturation and in vitro development of ovine oocytes.** Theriogenology. 2013 May 15. doi: 10.1016/j. theriogenology.2013.04.012. [Epub ahead of print]

Hosseini SM, Hajian M, Moulavi F, Asgari V, Forouzanfar M, Nasr-Esfahani MH. **Cloned Sheep Blastocysts Derived from Oocytes Enucleated Manually Using a Pulled Pasteur Pipette.** Cellular Reprogramming. 2012; 15(1):15-23.

Reproductive Biotechnology-Andrology

Introduction

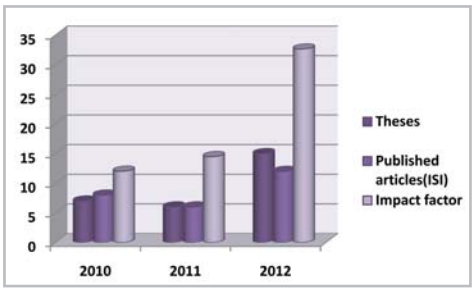
The main researches interest of this department is to improve the outcomes of male infertility treatment. This department has pioneered establishment of novel sperm selection procedures for ICSI treatment, which results have been published in international journals. This department's principal objective is to optimize the sperm selection for ICSI, to improve take-home healthy baby rate after ICSI through understanding sperm functional characteristics and sperm biology.

Main Goals

- Establishment of a screening test for assessment of sperm integrity
- Establishment of novel sperm selection procedures for ART

Focused Areas

- Novel sperm selection procedure
- Sperm functional tests
- Sperm biology
- Etiology of varicocele
- Artificial oocyte activation
- Human sperm freeze
- Animal models for infertility



Research Assistants

Arbabian, Maryam, BSc
Azadi, Leila, MSc
Deemeh, Mohammad Reza, MSc

Books

Sperm: Identification and selection of sperm from Sperm the biological and clinical aspect in ICSI patients (2010), Dr MH. Nasr-Esfahani, MarziyehTavalaee. ISBN: 978-964-8115-83-3.

Collaborated in writing an English book chapter: **"Mechanism of human oocyte activation during ICSI and methodology of overcoming low or failed fertilization".** Dmitri Dozortsev, Mohammad Hossein Nasr-Esfahani. © Springer Science+Business Media, LLC 2012

Writing an English book chapter: **"Sperm Selection for ICSI Using the Hyaluronic Acid Binding Assay"**. Dr MH. Nasr-Esfahani, MarziyehTavalaee. Springer Science+Business Media, LLC 2013.

Publications

Bassiri F, Tavalaee M, Shiravi A.H, Mansouri S, Nasr-Esfahani MH. **Is there an association between HOST grades and sperm quality?** Human Reproduction. 2012; 27(8): 2277-84.

Motiei M, Tavalaee M, Rabiei F, Hajihosseini R, Nasr-Esfahani M.H. **Evaluation of HSPA2 in fertile and infertile individuals.** Andrologia. 2012; 45(1): 66-72.

Hosseinpour, Shahverdi, Parivar, Sedighi Gilani, Nasr-Esfahani M.H, Salman Yazdi, Sharbatoghli, Tavalaee, Chehrazi. **Sperm ubiquitination and DNA fragmentation in men with occupational exposure and varicocele.** Andrologia. 2013 Apr 17. doi: 10.1111/and.12098. [Epub ahead of print]

Navaeian-Kalat E, DeemehMR, TavalaeeM, AbasiH, Modaresi M, Nasr-Esfahani MH. **High total acrosin activity in varicocele individuals.** Andrologia. 44 Suppl 1:634-41. doi: 10.1111/j.1439-0272.2011.01242.x. Epub 2011 Nov 2.

Kiani-Esfahani A, Tavalaee M, Deemeh MR, Hamiditabar M, Nasr-Esfahani MH. **DHR123: an alternative probe for assessment of ROS in human Spermatozoa.** Systems Biology in Reproductive Medicine. 2012; 58(3): 168-74.

Tavalaee M, Deemeh MR, Arbabian M, Nasr-Esfahani MH. **Density gradient centrifugation before or after magnetic-activated cell sorting: which technique is more useful for clinical sperm selection?** J Assist ReprodGenet. 2012; 29 (1): 31-8.

Group Leader:
Marziyeh Tavalaee, PhD Student

tavalaee.m@royaninstitute.org

Biography
Marziyeh Tavalaee was born in 1978 and received her MSc degree in physiological science from Azad University. She joined Royan Institute when she was an MSc student in 2004. She is currently an academic member of Royan Institute for Biotechnology, ACECR, Isfahan, Iran (2006-now). Her research interest is male infertility focusing particularly on sperm functional tests, novel and routine sperm selection procedure, etiology of varicocele and human sperm freezing. She has been involved in numerous projects and has published 35 international, 15 national papers as well as two chapters in international books. She is also coauthor of two Persian books. In 2012, she began her PhD in developmental biology at Azad University of Research Sciences.

Zarei M, Shaygannia E, Tavalaee M, Deemeh MR, Arabi M, Forouzanfar M, Javadi Gh.R, Nasr-Esfahani MH. **Evaluation of ubiquitin and annexin V in sperm population selected based on density gradient centrifugation and zeta potential (DGC-Zeta).** J Assist Reprod Genet. 2012; 29(4): 365–371.

Nasr-Esfahani M.H ,Tavalaee M ,Deemeh M ,Jelodar Eskandari-Shahraki M. **Proper ubiquitination effect on the fertilisation outcome post-ICSI.** Andrologia. 2012; 45(3): 204-10.

Tavalaee M, Deemeh M, Arbabian M, Kiyani A, Nasr-Esfahani MH**. Relationship between fertilization rate and early apoptosis in sperm population of infertile individuals.** Andrologia. 2012 Nov 7. doi: 10.1111/and.12038. [Epub ahead of print]

Tavalaee M, Abbasi, Deemeh M, Fotohi, Sadoughi Gilani, Nasr Esfahani M.H. **Semen Parameters and Chromatin Packaging in Microsurgical. Varicocelectomy Patients.** International Journal of Fertility and Sterility. 2012; 6(3): 141-207.

Bassiri F, Tavalaee M, Nasr Esfahani M.H. **Correlation between different patterns of Hypo-osmotic swelling and sperm functional tests.** International Journal of Fertility and Sterility. 2013.

Tavalaee M, Abasi H, Nasr-Esfahani MH. **Origin and Role of DNA Damage in Varicocele.** International Journal of Fertility and Sterility. 2012; 6(3): 141-146.

Motiei M, Tavalaee M, Nasr-Esfahani M.H. **The role and effect of HSPA2 in male infertility.** Journal of Iranian Anatomical Sciences. 2012; 9(37);338-358.

Abasi H, Navaeian Kalat E, Tavalaee M, Nasr Esfahani MH. **Comparison of Sperm Parameters and DNA Integrity between Fertile and Varicocele Individuals.** Journal of Cell & Tissue. 2012; 3(2): 171-177.

Cellular Biotechnology-Stem Cell

Group Leader:
Khadijeh Karbalaie, PhD Student

karbalaie@royaninstitute.org

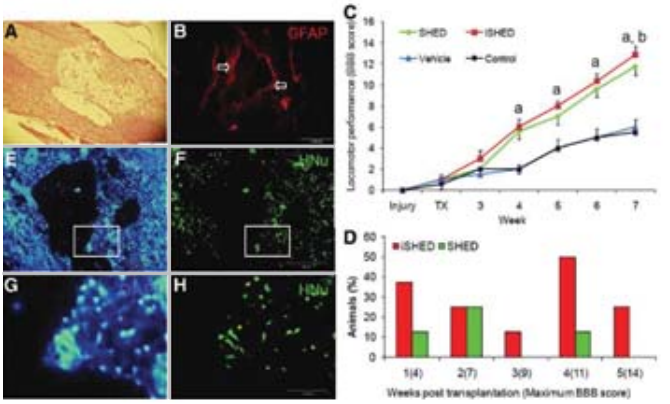
Biography
Following graduation in the field of zoology in BSc level, Khadijeh Karbalaie gained interest in cellular and molecular biology, the topic on which she obtained her MSc. Then she joined Royan institute for Biotechnology as a research assistant in stem cell department and was actively involved in different projects. Since 2010 she has been a PhD student in Molecular Genetic in Department of Biology, Faculty of Science, Isfahan University.

Introduction

The Stem Cells department was established in 2005 to advance researches on stem cell biology. This department works on different types of stem cells including human and mouse embryonic stem cells, adult stem cell including bone marrow mesenchymal stem cells and dental pulp mesenchymal stem cells which was established in this department for the first time in Iran. This department has an interest of differentiating the mentioned cells into neurons, for possible future clinical application in neurodegenerative disorders such as Parkinson and Alzimer. Besides, this department has focused on tissue engineering using nanofiber technology for three dimensional cell culture and cell transplantation as well as drug screening and toxicity assay using stem cells. All research of this department is mainly carried out under the supervision of Dr H. Baharvand.

Research Assistants

Atefi, Atefeh, BSc
Ejeian, Fatemeh, MSc
Karamali, Fereshteh, PhD Student
Nematollahi, Marziyeh, MSc Student
Shoarayenejati, Alireza, BSc



(Taghipour et al., STEM CELLS AND DEVELOPMENT, 2012)

Publications

Amirpour N, Karamali F, Rabiee F, Rezaei L, Esfandiari E, Razavi S, Dehghani A, Razmju H, Nasr-Esfahani MH, Baharvand H. **Differentiation of human embryonic stem cell-derived retinal progenitors into retinal cells by Sonic hedgehog and/or retinal pigmented epithelium and transplantation into the subretinal space of sodium iodate-injected rabbits.** Stem Cells Developments. 2012; 21(1): 42-53.

Salehi H, KarbalaieKh, Salamian A, Kiani A, RazaviSh, Nasr-Esfahani M.H, Baharvand H. **Differentiation of human ES cell-derived neural progenitors to neuronal cells with regional specific identity by co-culturing of notochord and somite.** Stem Cell Research.2012; 8(1):120-33.

Meamar R, Dehghani L, Karamali F. **Effects of methamphetamine on embryonic stem cell-derived neuron.** International Journal of Polymeric Materials Toxicity. Journal of Research in Medical Sciences. Iranian Journal of Biotechnology. 2012; 17(5):470-4.

Jahanmard F, Abadi h, Amani M, Nasr-Esfahani MH, Ghasemi L, Zamani F, Nematollahi M**. Effect of nano-porous fibers on growth and proliferation of cells on electrospun poly (ε -caprolactone) scaffolds.** International Journal of Polymeric Materials. September 2012.

Masaeli E, Morshed M, Rasekhian P, Karbasi S, Karbalaie K, Karamali F, Abedi D, Razavi S, Jafarian-Dehkordi A, Nasr-Esfahani MH, Baharvand H. **Does the tissue engineering architecture of poly (3-hydroxybutyrate) scaffold affects cell-material interactions?** J Biomed Mater Res A. 2012; 100(7): 1907-18.

Meamar R, Karamali F, Mousavi A, Baharvand H, Nasr-Esfahani MH. **Could MDMA Promote Stemness Characteristics in Mouse Embryonic Stem Cells via mGlu5 Metabotropic Glutamate Receptors?** Cell J. 2012 ; 14(3): 185-92.

Masaeli E, Morshed M, Nasr-Esfahani M. H, Sadri S, Hilderink J, van Apeldoorn A. A. van Blitterswijk C.A, L. Moroni. **Fabrication, Characterization and Cellular Compatibility of Poly(Hydroxy Alkanoate) Composite Nanofibrous Scaffolds for Nerve Tissue Engineering.** PLoS One. 2013; 8(2): e57157.

Taghipour Z, Karbalaie Kh, Kiani A, Niapour A, Bahramian H, Nasr-Esfahani M.H, Baharvand H. **Transplantation of Undifferentiated and Induced Human Exfoliated Deciduous Teeth-Derived Stem Cells Promote Functional Recovery of Rat Spinal Cord Contusion Injury Mode.** Stem Cells and De. 2012; 21(10): 1794-802.

Cellular Biotechnology- Genetics

Introduction

Understanding molecular mechanisms which are involved in cell differentiation is an interesting area in research. In this department, researchers are engaged in locating genetic and molecular factors responsible for neurogenesis at the cellular level. The peroxisome biogenesis factors which are required for the maintenance and integrity of peroxisome are tested to discover their possible roles for neural cell differentiation. Furthermore, this department is interested in the role of genes and their related promoters in the neurogenesis process.

Main Goals

- Assessment of peroxin gene expression in development and cell differentiation
- Assessment of recent peroxisomal protein (FNDC5) gene expression and function
- Implementation of RNAi technique to assess gene functions
- Analysis of promoters of genes responsible for cellular differentiation
- Analysis of protein interactions in cellular differentiation
- Molecular analysis of patients with peroxisomal disorders in our population

The mission of this department is to locate molecular mechanisms of stem cell proliferation and neural differentiation steps with the purpose of restoring or replacing tissue that has been damaged by disease or injury.

Chief Researcher

Tanhaei, Somayeh, PhD Student

Biography

Following graduation in the field of cell and molecular biology (BSc), she gained interest in Genetics and obtained her MSc on this topic. Then she joined Royan Institute for Biotechnology as a research assistant in department of genetics and was actively involved in different projects. Since 2012 she has been a PhD student in Molecular Medicine in Department of Genetics, Faculty of Medicine at Isfahan Medicine University.

Research Assistants

Esmaeili, Maryam, MSc
Ghoochani, Ali, MSc
Hashemi, Motahareh, PhD Student
Izadi, Tayabeh, BSc
Kiani, Gholamabbas, MSc
Peymani, Maryam PhD Student
Rabiee, Farzaneh, MSc Student
Salamian, Ahmad, MSc
Shiraliyan, Hanieh, BSc

Publications

Ghazvinizadegan F, Kalantar M, Ghaedi K, Hashemi MS, Nasr Esfahani MH. **Analysis of PEP expression pattern during cardiogenesis of mouse embryonic stem cells.** Genetics in the Third Millennium. 2013, 10(4): 2901-2905.

Principal Investigator:
Kamran Ghaedi, PhD

kamranghaedi@royaninstitute.org

Biography

Dr Kamran Ghaedi graduated in the field of Biology (BSc) from University of Isfahan (1989), and Clinical Biochemistry (MSc) from Isfahan University of Medical Sciences (1993). He pursued his studies toward getting a PhD degree in Molecular Cell Genetics (1999) from Kyushu University (Fujiki's Lab.) Fujik's Lab. was recognized as one of the pioneer laboratories in the world on peroxisome biogenesis. Dr Ghaedi engaged in isolation and characterization of several Chinese hamster ovary cells defect in peroxisome assembly and biogenesis. He cloned PEX3 and PEX7 genes and published several high reputed papers in this regard. After obtaining PhD degree, he was hired for two years as a post-doctoral researcher in Molecular Biology by Japan Science and Technology (JST) in Kyushu University (Fujiki's Lab.). He conducted his studies in the same Lab. as a post-doctoral fellow (Japan Society for Promotion of Science) and a senior post-doctoral researcher (JST) for more 4 years. After 10 years working in the field of peroxisome biogenesis in mammals, he started his academic carrier as a faculty member in Biology department of Isfahan University, and started his collaboration with Royan Institute for Biotechnology, while he established Cellular Biotechnology-Genetics research department working on involvement of genetic factors required for peroxisome biogenesis in neural differentiation of embryonic stem cells where in collaboration with Dr Nasr Esfahani, he was involved in production of recombinant proteins like t-PA and also has supervised several projects and has numerous international publications.

Mojbafan M, Ghaedi K, Razavi, Karamali F, Tanhaie S, Karbalaii KH, Rabiee F, Baharvand H, Nasr Esfahani MH. **Analysis of Catalase and PEX3 Gene Expression Levels in the Neural Differentiation Process of P19 Cells.** Genetics in the Third Millennium. 2012, 10(3): 2860-2867.

Salamian A, Mohamadynejad P, Ghaedi K, Nejati AS, Shafeghati Y, Ahnak MB, Nematollahi M, Karbalaie K, Hadipour F, Baharvand H, Nasr-Esfahani MH. **C86Y: as a destructive homozygous mutation deteriorating Pex7p function causing rhizomelic chondrodysplasia punctata type I.** Ann Clin Lab Sci. 2013; 43(1): 76-80.

Hashemi MS, Ghaedi K, Salamian A, Karbalaie K, Emadi-Baygi M, Tanhaei S, Nasr-Esfahani MH, Baharvand H. **Fndc5 knockdown significantly decreased neural differentiation rate of mouse embryonic stem cells.** Neuroscience. 2013; 231: 296-304.

Seifi T, Ghaedi K, Salamian A, Tanhaei S, Safari F, Hojati Z, Tavassoli M, Baharvand H, Esfahani MH. **Amplification of GC-rich Putative Mouse PeP Promoter using Betaine and DMSO in Ammonium Sulfate Polymerase Chain Reaction Buffer.** Avicenna J Med Biotechnol. 2012; 4(4): 206-9.

Elinati E, Kuentz P, Redin C, Jaber S, Vanden Meerschaut F, Makarian J, Koscinski I, Nasr-Esfahani MH, Demirol A, Gurgan T, Louanjli N, Iqbal N, Bisharah M, Pigeon FC, Gourabi H, De Briel D, Brugnon F, Gitlin SA, Grillo JM, Ghaedi K, Deemeh MR, Tanhaei S, Modarres P, Heindryckx B, Benkhalifa M, Nikiforaki D, Oehninger SC, De Sutter P, Muller J, Viville S. **Globozoospermia is mainly due to DPY19L2 deletion via non-allelic homologous recombination involving two recombination hotspots.** Hum Mol Genet. 2012; 21(16): 3695-702.

Ghoochani A, Shabani K, Peymani M, Ghaedi K, Karamali F, Karbalaei K, Tanhaie S, Salamian A, Esmaeili A, Valian-Borujeni S, Hashemi M, Nasr-Esfahani MH, Baharvand H. **The influence of peroxisome proliferator-activated receptor γ (1) during differentiation of mouse embryonic stem cells to neural cells.** Differentiation. 2012; 83(1): 60-7.

Mohamadynejad P, Ghaedi K, Shafeghati Y, Salamian A, Tanhaie S, Karamali F, Rabiee F, Parivar K, Baharvand H, Nasr-Esfahani MH. **Identification of a novel missense mutation of PEX7 gene in an Iranian patient with rhizomelic chondrodysplasia punctata type 1.** Gene. 2013 Apr 15; 518(2): 461-6.

Tolouei S, Ghaedi K, Khamesipour A, Akbari M, Baghaei M, Hasheminia S, Narimani M, Hejazi Sh. **IL-23 and IL-27 Levels in Macrophages Collected from Peripheral Blood of Patients with Healing Vs Non-Healing Form of Cutaneous Leishmaniasis.** Iran J Parasitol. 2012; 7(1): 18-25.

Peymani M, Ghoochani A, Ghaedi K, Karamali F, Karbalaie K, Kiani-Esfahani A, Rabiee F, Nasr-Esfahani MH, Baharvand H. **Dual effects of peroxisome proliferator-activated receptor γ on embryonic stem cell self-renewal in presence and absence of leukemia inhibitory factor.** Eur J Cell Biol. 2013; 92(4-5): 160-8.

Lachinani L, Ghaedi K, Tanhaei S, Salamian A, Karamali F, Kiani-Esfahani A, Rabiee F, Yaghmaei P, Baharvand H, Nasr-Esfahani MH. **Characterization and Functional Assessment of Mouse PPAR γ 1 Promoter.** Avicenna J Med Biotechnol. 2012; 4(4): 160-9.

Molecular Biotechnology- Recombinant Protein

Principal Investigator
Kianoush Dormiani, PhD Student

k_dormiani@royaninstitute.org

Biography
Dr Dormiani received his doctorate in Pharmacy (Pharm.D) in 2000 from the faculty of Pharmacy and Pharmaceutical Sciences, at Isfahan University of Medical Sciences. His interest in molecular biology and biotechnology led him to become a member of the involved department in recombinant protein production projects. He has been also involved in the project of transgenic animal production. Currently he is working on vector design for genome engineering with application in genetic manipulations of the isolated cells from patients with monogenic diseases.

Introduction

Following the production of insulin as the first recombinant protein in 1978, extensive research has been undertaken for the purpose of producing other recombinant proteins. Different strategies can be utilized for the production of recombinant proteins, which include proteins produced via bacteria, plants, cell culture and through milk production in transgenic animals. Although the production of recombinant proteins through the former methods might be the easiest and most straight forward procedures, however, research has shown that the production of recombinant proteins through the latter methods might be more functional due to post-translational modifications, which are very similar to the native proteins. Therefore, one of the main missions of this department is to master and establish efficient methods for producing recombinant proteins through cell culture and animal transgenesis.

Main Goals

- Construction of efficient vectors for producing recombinant proteins with therapeutic or laboratory applications
- Cloning of appropriate genes
- Genetic manipulation of the genes for pharmaceutical purposes
- Increasing gene transfection efficiency through non-viral procedures
- Isolation and maintenance of the stable transformants of mammalian cells
- Homologous or site directed recombination of genes into a target genome

Chief Researcher

Khazaei, Yahya, PhD Student
Biography
After graduation of pharmacy, he started working in some pharmaceutical companies (Labs and production units) as a PharmD. Then, he started to work on production of recombinant proteins in Isfahan Faculty of Pharmacy as a member of a research department in Pharmaceutical Biotechnology Department. Afterwards, he joined Royan Institute to work on production of recombinant proteins and related genetic constructs. He is also working on designing and characterization of some non-viral vectors for transfection of genetic and nucleotide materials into mammalian cells in collaboration with Pharmaceutics Department of Utrecht University, the Netherlands.

Staff

Mirahmadi_Zare, Zohreh, PhD
Lachinani, Liyana, MSc
Shojaei, Pendar, MSc
Forouzanfar, Mahboubeh, MSc

Publications

Sekhavati M.H , Dormiani K, Ghaedi K, Khazaie M, Hosseini M, Tahmoorespur, Nassiri Z, Foruzanfar M , Nasr Esfahani M.H. **Identification of a Specific Pseudo attP Site for Phage phiC3 Integrase in the Genome of Chinese Hamster in CHO-K1 Cell Line.** Iranian Journal of Biotechnology. 2013; 11(1): 54-8.

Ghorbani R, Emamzadeh A, Khazaie Y, Dormiani K, Ghaedi K, Rabbani M, Foruzanfar M, Karbalaie K, Karamali F, Lachinani L, Kiani-Esfahani A, Nematollahi M, Esfahani MH. **Constructing a Mouse Oct4 Promoter/EGFP Vector, as a Whole-Cellular Reporter to Monitor the Pluripotent State of Cells.** Avicenna J Med Biotechnol. 2013; 5(1): 2-9.

Lachinani L, Ghaedi K, Tanhaei S, Salamian A, Karamali F, Kiani-Esfahani A, Rabiee F, Yaghmaei P, Baharvand H, Nasr-Esfahani MH. **Characterization and Functional Assessment of Mouse PPAR *γ* 1 Promoter.** Avicenna J Med Biotechnol. 2012 Oct; 4(4): 160-9.

Sekhavati MH, Tahmoorespur M, Ghaedi K, Dormiani K, Nassiri MR, Khazaie Y, Foruzanfar M, Hosseini M, Nasr Esfahani MH. **Cloning, Expression, and in vitro Functional Activity Assay of phiC31 Integrase cDNA in Escherichia coli.** Cell J. 2013; 14(4): 264-9.

LABORATORY ANIMAL CORE FACILITY

Introduction

The Laboratory Animal Science Core Facility of Royan Institute plays a national role in education of scholars performing ground researches on experimental animals, by organizing proficient gadget in all categories within the animal research fields. Each center has three major activities:

- Maintenance and breeding the animals
- Creating animal models with surgical manipulations or chemical interactions
- Research and develop animal modeling

Scientists of this service unit facility who are responsible for the design of animal experiments have to be graduated in Veterinary Medicine or one of biomedical science fields and must have taken a course on laboratory animal science which concentrates on humane and gentle handling of animals. They also should be aware of knowledge of alternative routes and ethical aspects of animal experimentation.
Modern laboratory animal science builds on the three Rs of Russell & Burch:

- **Replacement:** Replace animal experiments with alternatives whenever possible.
- **Reduction:** Reduce the number of experiments and number of animals in each experiment to an absolute minimum.
- **Refinement:** Refine experiments so that the animals undergo a minimum of discomfort.

The primary aim of the Laboratory Animal Facility is to ensure that the three Rs are followed in practice.

Goals of the Core Facility

- Providing quality care for all animals used at Royan Institute
- Assisting researchers in their mission of quality research with respect to humane use of laboratory animals
- Providing researchers with a relevant education to enable them achieve scientific eminences in selected areas
- Producing, supporting and maintaining laboratory animals required for research
- Managing the animal care and having commitment to them
- Managing a preventive medicine program for disease control
- Advising research departments on all aspects of experimental use of animals, including experimental design, surgical, pre and post-operative care, oocyte and embryo harvesting, and experimental animal modeling establishment

Research Assistants

Asghari Vostikolaee, Mohammad Hassan, DVM
Kheimeh, Abolfazl, MSc

Technical Staff

Bagherpour, Reza, BSc
Khaksar, Mojtaba, BSc
Mostafaei, Farhad, BSc
Nemati, Alireza, BSc

General Staff

Akhavan, Rasoul
Behrouzi, Bahram
Dodmandoust, Farshid
Javadi, Yadolah
Karimpour, Mojtaba
Mirmasoumi, Seyd Jalal
Naderi, Asghar
Sattari, Hossein
Zabetian, Abbas

Core Facility Head:
Mostafa Hajinasrollah, DVM, DVSc Student
(Animal Surgery)

m.hajinasrollah@royaninstitute.org

Biography
Dr Mostafa Hajinasrollah was born in 1982 in Tehran. He achieved his DVM from Azad University of Karaj in 2007. He is now a DVSc student of Animal Surgery. He has worked in Primate Research center since 2005. In 2008 he started to design the new Primate Research Center in Kamard, Iran. His main research interests are Animal Modeling and Experimental Surgery. He currently works as the head of Animal Core Facility of Royan Institute.

Centers

- Rodent Research Center
- Non-Human Primate Research Center
- Farm Animal Research Center

News and Events

Workshops

- **Application of Laboratory Animal in Biomedical Research**

Scientific Manager: Mostafa Hajinasrollah, Executive Manager: Abolfazl Kheimeh. Dec, 2012.

- **Principles of Application of Laboratory Animal Science**

Scientific Manager: Mohammad Hassan Asghari, Executive Manager: Abolfazl Kheimeh. June, 2013.

Books

The Basis of Laboratory Animal Science (With emphasis on common laboratory rodent and rabbit), Mohammad Hassan Asghari Vosta Kalaee, ISBN: 978-600-92587-8-9

Publications

Peirovi H, Rezvani N, Hajinasrollah M, Mohammadi SS, Niknejad H. **Implantation of amniotic membrane as a vascular substitute in the external jugular vein of juvenile sheep.** Journal of Vascular Surgery. 2012; 56(4): 1098-104.

Abbasihormozi SH, Shahverdi AH , Cheraghi J, Akhlaghi A, Kheime A. **Effect of administration exogenous leptin on reactive oxygen species level in Seminal plasma male Sprague-Dawley rats.** Journal of Iranian Anatomical Sciences. 2012; l 9 (37): 306-316.

Abbasihormozi Sh, Shahverdi AH, Kouhkan A, Cheraghi J, Akhlaghi AA, Kheimeh A. **Relationship of leptin administration with production of reactive oxygen species, sperm DNA fragmentation, sperm parameters and hormone profile in the adult rat.** Arch Gynecol Obstet. 2013 Jun; 287(6): 1241-9.

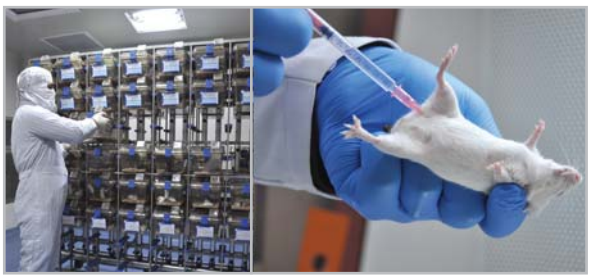
Alikhani M, Sharifi Tabar M, Mirshahvaladi Sh, Kheimeh A, Sadighi Gilani MA and Sabbaghian M. **Expression Analysis of RNA-Binding Motif Gene on Y Chromosome (RBMY) Protein Isoforms in Testis Tissue and a Testicular Germ Cell Cancer-Derived Cell Line (NT2).** Iranian Biomedical Journal. 2013; 17(2): 54-61.

Nemati Sh, Jabari R, Hajinasrollah M, Hatami M, Hemmesi K, Mohitmafi M, Kiani S, Sharifi G, Rezaee O, Baharvand H. **Therapeutic Potential of long term Self-Renewable induced pluripotent Stem Cells Derived Neural progenitors for spinal cord injury in primates.** Cell Journal. Summer 2011; 13, supp3.

RODENT RESEARCH CENTER

This center provides the laboratory animal service, as a service organization, which supports Royan Institute in order to work with animals in research and training. Animals are being under surveillance in veterinary clinic where the available technical services for researchers include blood collection, breeding colony management, anesthesia and surgery. The animal facilities are managed in compliance with regulations, laws, and policies regarding animal care and health as well as safety issues relating to use of animal.

A team of administrative, managerial, technical, and professional staff committed to the advancement of science in collaboration with the research community by promoting the humane care and applying animals in biomedical research and training.



NON-HUMAN PRIMATE RESEARCH CENTER

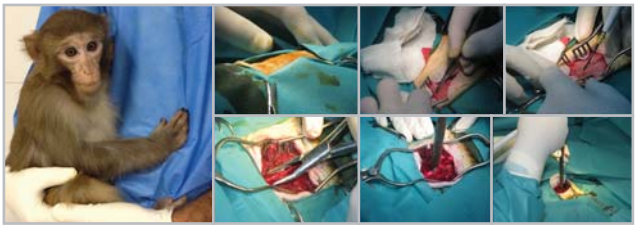
Royan Primate Research Center was established in 2006 in conjunction with Loghman Hospital. In 2010, another new primate research center was also established in Jajroud, Tehran, Iran that consists of the different sites; individual and public maintenance rooms, laboratory and operation rooms. These unique sites are to study human health and diseases, which offer the opportunity for quarantining, keeping, breeding and assessing the origin of diseases in order to find new treatment approaches in non-human primate models that closely resemble humans.

Specific Objectives

- Evaluating modern animal husbandry techniques in order to ensure optimal care of rhesus monkeys involved in the breeding and research projects
- Maintenance a healthy and productive non-human primate colony in order to facilitate psychological studies at Royan Institute
- Developing animal models with refractory diseases which are required for further research and advance treatment protocols such as stem cell therapy or severe transplantations
- Providing unique facilities for researchers who wish to work on non-human primates

Ongoing Programs

- Establishment of spinal cord injury models through contusion method
- Establishment of acute tubular necrotic model
- Establishing kidney transplantation models
- Maintaining 50 rhesus macaques (RM)
- Veterinary care of monkeys
- Breeding of rhesus monkeys



FARM ANIMAL RESEARCH CENTER

Research Farm at Royan Institute initiated their activities on animals (especially sheep and goat) at the Jihad Research Complex in 2006. This center is equipped with laboratory and operating rooms for embryo transfer and some other specific operations.

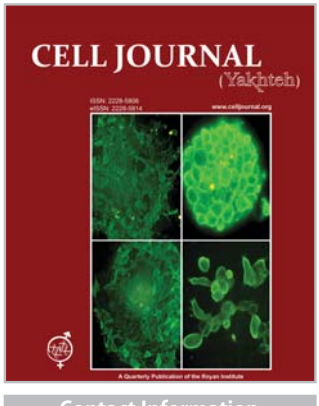
The main accomplishments of this center are as follows:

- Producing transgenic goats, carrying human factor IX gene, by nuclear transfer in January 2010
- Giving birth to the first IVM-IVF goat in Iran
- Giving birth to the first IVM-IVF lamb in Iran

This center is also trying to boost the technologies and equipment to meet the research needs of the institute.

JOURNALS

Cell Journal (Yakhteh)



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Abbreviation: Cell J
ISSN: 2228-5806, eISSN: 2228-5814

The "Cell Journal (Yakhteh)", formerly published as "Yakhteh Medical Journal", is a quarterly English publication of Royan Institute. This journal focuses on topics relevant to cellular and molecular scientific areas, besides other related fields. The Cell Journal (Yakhteh) has been certified by Ministry of Culture and Islamic Guidance in 1999, and was accredited as a scientific and research journal by HBI (Health and Biomedical Information) Journal Accreditation Commission in 2000 which is an open access journal.

This Journal has been indexed in

1. PubMed
2. National Library of Medicine (NLM)
3. Thomson Reuters (ISI) -- Impact Factor : 0.364
4. Biosis Preview
5. Index Medicus for the Eastern Mediterranean Region (IMEMR)
6. Index Copernicus International
7. Cambridge Scientific Abstracts (CSA)
8. EMBASE
9. Scopus
10. CINAHL Database
11. Google Scholar
12. Chemical Abstracts Service (CAS)
13. Proquest
14. Directory of Open Access Journals (DOAJ)
15. Scientific Information Database (SID)
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17. Regional Information Center for Sciences and Technology (RICeST)
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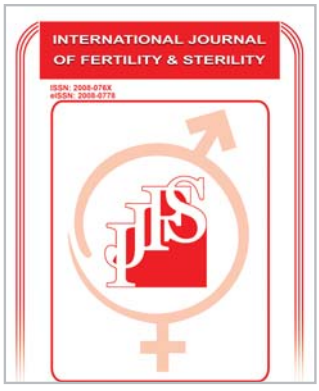
19. Magiran

International Journal of Fertility & Sterility



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Abbreviation: Int J Fertil Steril
ISSN: 2008-076x , **eISSN:** 2008-0778

International Journal of Fertility & Sterility is a quarterly English publication of Royan Institute. The aim of the journal is to disseminate information through publishing the most recent scientific research studies on fertility, sterility and other related topics. This journal has been certified by Ministry of Culture and Islamic Guidance in 2007, and was accredited as a scientific and research journal by HBI (Health and Biomedical Information) Journal Accreditation Commission in 2008. This journal is a member of the open access Committee on Publication Ethics (COPE).

This Journal has been indexed in

1. Thomson Reuters (ISI)--Impact Factor: 0.439
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4. Index Copernicus International
5. Cinahl Database
6. Google Scholar
7. Scopus
8. National Library of Medicine (NLM)
9. Proquest
10. Regional Information Center for Science and Technology (RICeST)
11. Islamic World Science Citation Center (ISC)
12. Directory of Open Access Journals (DOAJ)
13. Scientific Information Database (SID)
14. Magiran
15. Iran Medex

Fertility treatment injections at home[1,2]?

We've made it child's play.

Ref.: **1.** Abbotts et al. Patient Preference and Adherence 2011.
2. Christen et al. Expert Opinion on Drug Delivery 2011.

Merck Serono | *You. Us. We're the parents of fertility.*

GONAL-f[RS], Pre-filled pen 300 IU/0.5 ml , 450 IU/0.75ml ,900 IU/1.5 ml **Composition:** The active substance is follitropin alfa. Follitropin alfa is a recombinant human follicle stimulating hormone (FSH) produced by recombinant DNA technology in Chinese Hamster Ovary (CHO) cell line, belonging to the pharmacotherapeutic group gonadotrophins. The quantity of follitropin alfa per ml is 600 IU (equivalent to 44 micrograms). Each cartridge delivers either 300 IU (equivalent to 22 micrograms) in 0.5 ml , 450 IU (equivalent to 33 micrograms) in 0.75 ml or 900 IU (equivalent to 66 microgram) in 1.5 ml **Indications:** • GONAL-f can be used to cause ovulation in women who are not ovulating and who have not responded to treatment with clomiphene citrate. • GONAL-f is used to bring about the development of several follicles (and therefore several eggs) for women undergoing assisted reproductive technologies such as in vitro fertilisation, gamete intra-fallopian transfer or zygote intra-fallopian transfer. • GONAL-F is used together with another hormone called lutropin alfa (recombinant human luteinising hormone) to cause ovulation in women who are not ovulating due to very low production of the fertility hormones (FSH and LH) by their pituitary gland. • GONAL-f is used in combination with another medicine, human chorionic gonadotrophin (hCG), to produce sperm in men who are infertile due to hormonal deficiency. **Contraindication:** • hypersensitivity to follicle stimulating hormone or to any of the other ingredients of GONAL-f • tumours of the hypothalamus and pituitary gland • ovarian enlargement or cyst not due to polycystic ovarian disease • gynaecological bleeding of unknown cause • ovarian, uterine or breast cancer • if you have irreversible testicular damage. The medicine should not be used when a condition exists which would make a normal pregnancy impossible, such as premature menopause, malformation of sexual organs or specific tumours of the womb. **Dosage & administration:** GONAL-f is administered by injection just under the skin (subcutaneous use). Women who are not ovulating and are having irregular periods or no periods at all. GONAL-f is usually given every day. The treatment should start within the first 7 days of the menstrual cycle. A commonly used dose starts at 75-150 IU FSH every day (0.12-0.24 ml). This may be increased by 37.5-75 IU at 7 or preferably 14 day intervals if necessary to obtain an adequate, but not excessive, response. The maximal daily dose is usually lower than 225 IU FSH (0.36 ml). If your doctor cannot see a response after 4 weeks of treatment, that treatment cycle should be abandoned. For the following cycle, your doctor will prescribe a treatment at a higher starting dose than in the abandoned cycle. When an optimal response is obtained, a single injection of another medicine (hCG) is administered 24-48 hours after the last GONAL-f injection. You are recommended to have sexual intercourse on the day of the administration of this second medicine and the following day. If an excessive response is obtained, treatment should be stopped and hCG withheld (see Possible side effects). For the following cycle, your doctor will prescribe a dosage lower than that of the previous cycle. Women undergoing ovarian stimulation for multiple follicular development prior to in vitro fertilisation or other assisted reproductive technologies. A commonly used dose for superovulation involves the administration of 150-225 IU (0.24-0.36 ml) of GONAL-f daily, commencing on days 2 or 3 of the treatment cycle. Treatment is continued until adequate follicular development has been achieved (as assessed by blood monitoring and/or ultrasound examination), with the dose adjusted according to your response, to usually not higher than 450 IU (0.72 ml) daily. Adequate follicular development is usually achieved on average by the tenth day of treatment (range 5 to 20 days). Then a single injection of a medicine used to induce final follicular maturation and containing 250 micrograms r-hCG or 5000 IU up to 10 000 IU human chorionic gonadotrophin (hCG) is administered 24-48 hours after the last GONAL-f injection. Women who are not ovulating, having no periods at all and have been diagnosed as FSH and LH deficient. GONAL-f is usually taken every day for up to five weeks simultaneously with injections of lutropin alfa. A commonly used dose starts with 75-150 IU (0.12-0.24 ml) of GONAL-f together with 75 IU of lutropin alfa. According to your response, your doctor may increase your dose of GONAL-f by preferably 37.5-75 IU at 7 to 14-day intervals. If your doctor does not observe a response of your ovaries after 5 weeks of treatment, that cycle should be abandoned. For the following cycle, your doctor may prescribe treatment at a higher starting dose of GONAL-f than in the abandoned cycle. When the desired response has been obtained, a single injection of 250 micrograms r-hCG or 5000 IU up to 10 000 IU hCG is given 24-48 hours after the last injections of GONAL-f and lutropin alfa. Infertile men with hormonal deficiency GONAL-f is usually prescribed at a dose of 150 IU (0.24 ml) three times a week in combination with another medicine (hCG) for at least 4 months. If you have not responded to treatment after this period, your treatment may carry on for at least 18 months. **Possible side effects:** The most commonly reported side effects are ovarian cysts, headache and local reactions at the injection site (pain, redness, bruising, swelling and/or irritation). Following treatment with GONAL-f when human chorionic gonadotrophin is administered, a condition called ovarian hyperstimulation syndrome This syndrome is characterised by large ovarian cysts. First symptoms of ovarian hyperstimulation are pain in the lower abdominal region, possibly in combination with nausea, vomiting and weight gain. Isolated cases of non-serious allergic reactions to GONAL-f have been reported. This occurs in less than 1 patient for each 10000 treated. Ectopic pregnancy (embryo implanted outside the womb) may occur especially in women with a history of prior tubal disease. Men may experience some breast development, acne or weight gain due to treatment with hCG (between 1 and 10% of the patients). **Stability and storage:** Store at 2°C - 8°C (in a refrigerator). Do not freeze. Within its shelf-life, the product may be stored at or below 25°C for up to 28 days and must be discarded if not used. **Packaging:** GONAL-f is presented as a clear, colourless solution for injection in a pre-filled pen. - Gonal-f 300 IU pen: Each cartridge delivers 300 IU (equivalent 22 micrograms) in 0.5 ml , it is supplied in packs of 1 pre-filled pen and 5 needles for administration - Gonal-f 450 IU pen: Each cartridge delivers 450 IU (equivalent 33 micrograms) in 0.75 ml. It is supplied in packs of 1 pre-filled pen and 7 needles for administration. - Gonal-f 900 IU pen: Each cartridge delivers 900 IU (equivalent 66 micrograms) in 1.5 ml. It is supplied in packs of 1 pre-filled pen and 14 needles for administration. For further information, kindly contact: Merck Serono Middle & Near East, P.O. Box 22730, Dubai, United Arab Emirates, Phone +971 4 375 2700, Fax +971 4 429 1390, www.merckserono.com

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