

ROYAN INSTITUTE

THE EIGHTEENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

Reproductive Biomedicine & Stem Cell



SEPTEMBER 2017
TEHRAN - IRAN



THE NINETEENTH
ROYAN

INTERNATIONAL RESEARCH AWARD

Deadline for Application: April, 2018

ROYAN 2018



SEPTEMBER, 2018
TEHRAN - IRAN

P.O.Box: 16635-148 / Tehran-Iran
Phone: +98 21 22 33 99 36
E-mail: info@royaninstitute.org



2018
KAZEMI PRIZE

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

www.royanaward.com



In the Name of

GOD



The Eighteenth

ROYAN

INTERNATIONAL RESEARCH AWARD



Dr Saeid Kazemi Ashtiani
The Late Founder of ROYAN Institute





- **Organizer:**
 Royan Institute
 Street Address:
 East Hafez Alley, Banihashem
 Square, Tehran, Iran
 Post Address:
 P. O. Box: 16635-148, Tehran,
 IRAN
 Phone: +98 (21) 22 33 99 36
 Fax: +98 (21) 22 33 99 58
 E-mail: info@royaninstitute.org
- **Coordinator:**
 Rahim Tavassolian
- **Editor:**
 Sima Farrokh
- **Technical-Artwork Editor:**
 Hassan Moghimi
- **Graphic Designer:**
 Mohammad Abarghouei
- **Design & Print:**
 DOT Design Co.
 +98 (21) 88 70 93 48-50

COOPERATORS

ACECR Iranian Academic Center for Education, Culture and Research (ACECR)



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Tayyebi HR, PhD

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

FOREWORD

The scientific ever increasing and perpetual progress of Islamic Republic of Iran, has drawn the attention of the entire world in recent years. The Academic Centre of Education, Culture and Research (ACECR) has paid special care to science production and technology since its establishment, so that Iranian people and whole the humanity can enjoy the benefits of the scientists' endeavors throughout their life. During almost four decades of its activity, ACECR has figured on Reproductive Biomedicine, Stem Cell Biology and Technology, Regenerative Medicine, Biotechnology, Cancer Biology, and Herbal Medicine and has turned them into public health services. In this regard, Royan Institute is one of the successful centers which has gained a national and international top rank for its unparalleled achievements.

Coming along with the innovative, hardworking scientists, one of the most important successful factors of Royan Institute is establishing effective relationships via International Awards and Congresses. Some of the previous participants have described these events by releasing essays in the journals, and some have written articles on their collaborative projects with Royan Institute. I hope the 18th Research Award can draw joint scientific outlines towards human health.

As the president of ACECR, I want to revive the memory of The Late founder of Royan Institute; Dr Saeid Kazemi Ashtiani who established Royan International Research Award, and express my appreciation to my colleagues in Royan Institute for their tremendous efforts in holding this prestigious award as well as all scientists from all around the world who reviewed the projects. I express my sincere congratulation to Award winners and hope them success in all aspects of life. I also wish we could witness such a scientific and social event to be continued in the years to come.



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Gourabi H, PhD

Award Chairman and Royan Institute President

INTRODUCTION



In our great sense of elation, the Royan Institute, in its 27th year of foundation holds the 18th International Research Award with the purpose of commemoration of science and scientists and augmentation of International relations. Through the recent years, a vast variety of scientific fields have got improved on the cutting edge of science among which we can refer to Reproductive Biomedicine, Stem Cell Biology and Technology, Regenerative Medicine and Biotechnology. The results of these scientific endeavors have come into existence as new methods in overcoming human diseases, which are the sweetest encouragement for scientists. However, we must cherish these scientific endeavors and persuade them for scientific competition which leads to speeding up achieving new methods. The founder of Royan Institute, the late Dr Saeid Kazemi Ashtiani, who was one of the pioneers in scientific progress of the country, established Royan International Research Award to achieve these goals and put them into effect.

Comparing to previous years, more researchers participated in the 18th International Research Award. Totally 239 research projects from 45 countries including 131 Reproductive Biomedicine projects and 108 Stem Cell and Regenerative Medicine projects were submitted this year. According to the predetermined scoring criteria, each research group selected almost 10 projects and finally 107 projects were evaluated by national and international referees. Each scientific research group reviewed the highly ranked projects and introduced two candidates to Royan Institute's scientific committee for final decision. Conforming to individual competencies and the scores received, the scientific committee selected five winners from the Embryology, Female Infertility, Genetics, Stem Cell Biology and Regenerative Medicine research fields. It was also decided to invite other highly ranked researchers to make their presence as the invited speakers of 18th International Reproductive Biomedicine Congress and 13th International Stem Cell Biology and Technology Congress. Five research projects from Iranian scientists, who achieved high ranks in international level, are also selected to be applauded in national level.

I voice my gratitude to all researches whose articles enriched the scientific aspect of this competition. I do express my appreciation to all referees for their accurate, impartial evaluation, and the scientific research groups and scientific committee who made a fair, justly decision on projects with very close rate. The endeavor and high effort of executive committee to attract the scientific attention to this event is highly appreciated as well.

The supreme goal of such these scientific events which should be emphasized is to improve international friendships and develop everlasting peace among countries to achieve felicity for humanity. I hope we have paved a step ahead toward this ideal and glorious intention.



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 prize award ceremony.

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

The First Royan International Research Award



Received Papers: 72



September 2000

International Winners:

- **First Place: Mohamed Mitwally, Canada**
Comparison of an Aromatase Inhibitor with Clomiphene Citrate for Induction of Ovulation
- **Second Place: Ali Ahmady, Canada**
Cell and Molecular Investigation of the Fertilizing Ability of Dead Sperm
- **Third Place: Weihau Wang, USA**
Spindle Observation in Living Human Eggs with Pollaries Microscope and Its Use in Assisted Human Reproduction
- **Fourth Place: Simon Marina Avendano, Spain**
HIV-Seropositive Can Be Fathers without Infecting the Women or Child
- **Fifth Place: Jaffar Ali, Qatar**
Formulation of a Protein-Free Medium for Human Assisted Reproduction

Iranian Winners:

- **Mohammad Hossein Nasr-Esfahani**
Sperm Chromatin Status and Male Infertility
- **Mahnaz Ashrafi**
Effect of Metformin on Ovulation and Pregnancy Rate in Women with Clomiphen Resistant PCOS
- **Mohammad Ebrahim Parsanezhad**
Section of the Cervical Septum Doesn't Impair Reproductive Outcome

September

2000

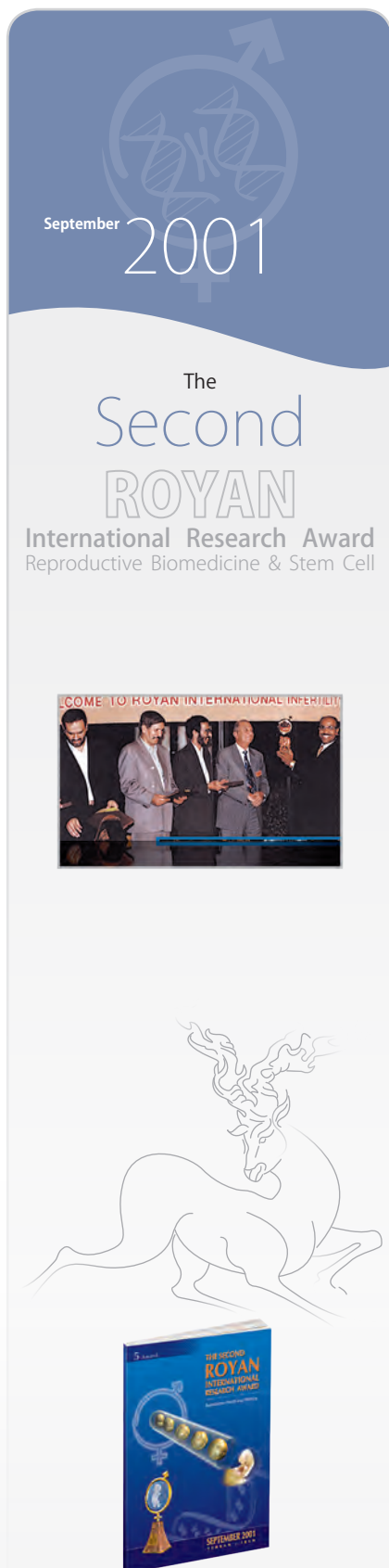
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The Second Royan International Research Award



Received Papers: 78



September 2001

International Winners:

- **First Place: Ri-Cheng Chian, Canada**
A New Treatment for Women with Infertility Due to Polycystic Ovarian Syndrome: Immature Oocyte Retrieval Followed in-vitro Maturation
- **Second Place: Ma'asouma Makhseed, Kuwait**
The Possible Immunological Basis of Repeated Pregnancy Loss
- **Third Place: Esmail Behboodi, USA**
Production of Goats by Somatic Cell Nuclear Transfer
- **Fourth Place: Sayeed Unisa, India**
Reproductive, Demographic and Behavioral Causes of Infertility in India
- **Fifth Place: Ahmed Mohammed Saleh, Saudi Arabia**
Effect of Laparoscopic Ovarian Drilling on Serum Vascular Endothelial Growth Factor (VEGF), and on Insulin Response to Oral Glucose Tolerance Test in Women with PCOS

Iranian Winners:

- **Hossein Baharvand**
Improvement of Blastocyst Development in-vitro and Overcoming the Blastocyst Collapse and Its Effective Factor(s) in Sequential Culture Media
- **Marzieh Nojomi**
Epidemiology of Infertility in the West of Tehran 2000-2001
- **Gholamreza Pourmand**
Effect of Renal Transplantation on Sperm Quality and Sex Hormones Level

The Third Royan International Research Award



Received Papers: 212



September 2002

International Winners:

- **First Place: Marco Filicori, Italy**
Novel Approaches to Ovulation Induction: The Critical Role of Luteinizing Hormone Activity in Regulating Folliculogenesis
- **Second Place: Klaus G. Steger, Canada**
Influence of Histone-Prothymine-Exchange on Male Infertility
- **Third Place: Franck Pellestor, France**
Chromosomal Investigations in Human Gametes: Study of the Interchromosomal Effect in Sperm of Chromosomal Rearrangement Carriers and Mechanisms of Non Disjunction in Oocytes
- **Fourth Place: Ghazala S. Basir, Hong Kong**
The Effect of High Estradiol Levels on Endometrial Development in Assisted Reproduction Technology: Evaluation of Sonographic Doppler Haemodynamic and Morphometric Parameters
- **Fifth Place: Mohamed Ali Bedaiwy, USA**
Transplantation of Intact Frozen-Thawed Mammalian Ovary with Vascular Anastomosis: A Novel Approach

Iranian Winners:

- **Saeed Alborzi**
Laparoscopic Salpingoovulysis. Is There Any Place for Second Look Laparoscopy?
- **Saeed Rahbar**
Laser Assisted Hatching in Young Women Significantly Increases Pregnancy and Implantation Rates
- **Shir Ahmad Sarani**
Morphological Evidence for the Implantation Window in Human Luminal Endometrium
Special Winner in Reproductive Health
- **V. I. Sodestrom- Anttila, Finland**
Embryo Donation-Outcome & Attitude Among Embryo Donors & Recipient

September 2002

The
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The Fourth Royan International Research Award



Received Papers: 222



Sep. September 2003

International Winners:

- **First Place: Yong-Mahn Han**, South Korea
Abnormal Structural Integrity and Reprogramming in the Cloned Embryos
- **Second Place: Lucille E. Voullaire**, Australia
Chromosome Abnormality In Human Embryos Diagnosed Using Comparative Genomic Hybridization: Its Relationship to Infertility
- **Third Place: Mauro Maccarrone**, Italy
Low Fatty Acid Amide Hyrolase and Anandamide Levels Are Associated with Failure to Achieve an Ongoing Pregnancy after IVF and Embryo Transfer
- **Fourth Place: Ali Honaramooz**, USA
Sperm from Neonatal Mammalian Testes Grafted in Mice
- **Fifth Place: Jan M.R. Gerris**, Belgium
Elective Single Embryo Transfer Halves the Twinning Rate without Decrease in the Total Ongoing Pregnancy Rate of an AVF/ICSI Program

Iranian Winners:

- **Mohammad Ebrahim Parsanezhad**
Ovarian Stromal Blood Flow Changes After Laparoscopic Ovarian Cauterization in Women with Polycystic Ovary Syndrome
- **Mojdeh Salehnia**
Vitrification of Ovarian Tissue
- **Jaleh Zolghadri**
Successful Pregnancy Outcome with IUI in Patients with Unexplained Recurrent Miscarriage, Whose Male Partners Have Low Score Hypo-Osmotic Swelling Test

The Fifth Royan International Research Award



Received Papers: 199



September 2004

International Winners:

- **Second Place: Alfonso Guterrez-Adan, Spain**
Long Term Effect of in vitro Culture of Mouse Embryos with Serum on mRNA Expression of Imprinting Genes, Development and Behavior
- **Second Place: Maciej K. Kurpisz, Poland**
Reactive Oxygen Species and "Male Factor" of Infertility
- **Third Place: Michel von Wolf, Germany**
Glucose Transporter Proteins (GLUT) in Human Endometrial-Expression, Regulation and Function through out the Menstrual Cycle and in Early Pregnancy
- **Fourth Place: Sophie Lambard, France**
Human Male Gamete Quality: Place of Aromatase and Estrogens
- **Fifth Place: Naojiro Minami, Japan**
A Novel Maternal Effect Gene, Oogenesis: Involvement in Zygotic Gene Activation and Early Embryonic Development in the Mouse

Iranian Winners:

- **Seyed Javad Mowla**
Catsper Gene Expression in Postnatal Development of Mouse Testis and in Subfertile Men with Deficient Sperm Motility
- **Mohammad A. Khalili**
Restoration of Spermatogenesis by Adenoviral Gene Transfer into Injured Spinal Cords of Rats
- **Mojdeh Salehnia**
Ultrastructural, Histochemical and Morphometric Studies of Mouse Reproductive Tract after Ovarian Induction

September

2004

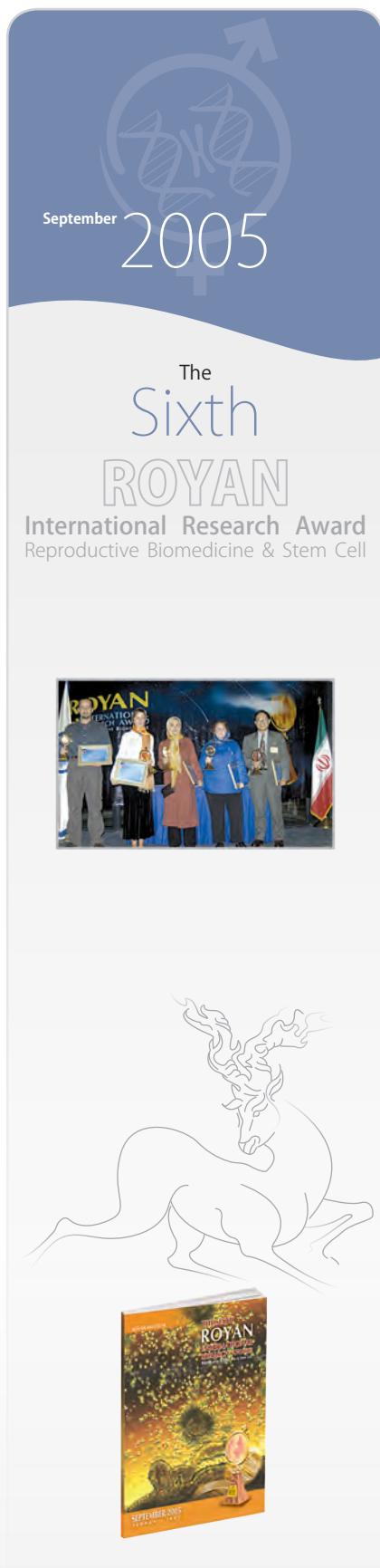
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Reproductive Biomedicine & Stem Cell





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The Sixth Royan International Research Award



Received Papers: 198



September 2005

International Winners:

- **First Place: Kathyjo Ann Jackson, USA**
Therapeutic potential of stem cells
- **Second Place: Carmen Belen Martinez-Madrid, Belgium**
Ficoll Density Gradient Method for Recovery of Isolated Human Ovarian Primordial Follicles
- **Third Place: Federico Alejandra Calejari, Germany**
Tissue-Specific Manipulating of Gene Expression of Mouse Embryos Using in Utero Electroporation
- **Fourth Place: Maryam Kabir-salmani, Japan**
Different Roles of $\alpha_5\beta_1$ and $\alpha_v\beta_3$ Integrins in the IGF-I-Induced Migration of the Human Extravillous Trophoblast Cells
- **Fifth Place: Zhenmin Lei, USA**
Testicular Phenotype in Luteinizing Hormone Knockout Animals and the Effect of Testosterone Replacement Therapy

Iranian Winners:

- **Seyed Javad Mowla**
The Profile of Gene Expression Changes During the Neural Differentiation of Bone Marrow Stromal Cells (BMSCs)
- **Jaleh Zolghadr**
Pregnancy Outcome Following Laparoscopic Tubal Ligation of Hydrosalpinx Tube in Patients with Early Recurrent Abortion

The Seventh Royan International Research Award



Received Papers: 221



September 2006

International Winners:

- **First Place: James Affram Adjaye, Germany**
A) Whole-Genome Approaches for Large-Scale Gene Identification and Expression Analysis in Mammalian Preimplantation Embryos & B) Primary Differentiation in the Human Blastocyst: Comparative Molecular Portraits of Inner Cell Mass and Trophectoderm Cells
- **Second Place: Tian-hua Huang, China**
Detection and Expression of Hepatitis B Virus X Gene in One and Two-Cell Embryos from Golden Hamster Oocytes in-vitro Fertilized with Human Spermatozoa Carrying HBV DNA
- **Third Place: Adrian Richard Eley, UK**
Ooptosis of Ejaculated Human Sperm Is Induced by Co-Incubation with Chlamydia Trachomatis Lipopolysaccharide
- **Fourth Place: Lone Schmidt, Denmark**
Does Infertility Cause Marital Benefit? An Epidemiological Study of 2250 Women and Men in Fertility Treatment
- **Fifth Place: Louis Chukwuemeka Ajonuma, Hong Kong**
Molecular and Cellular Mechanisms Underlying Abnormal Fluid Formation in the Female Reproductive Tract: The Critical Role of Cystic Fibrosis Transmembrane Conductance Regulators

Iranian Winners:

- **Mohammadreza Baghban Eslaminejad**
Polarized Culture Systems and Their Effects on Embryo Development
- **Mansoureh Movahedin**
New Approaches to Assess the Success and Enhance the Efficiency of Male Germ Cell Transplantation in the Mouse
- **Ashraf Alleyassin**
Comparison of Unilateral and Bilateral Transfer of Injected Oocytes into Fallopian Tubes: A Prospective Randomized Clinical Trial

September

2006

The
Seventh
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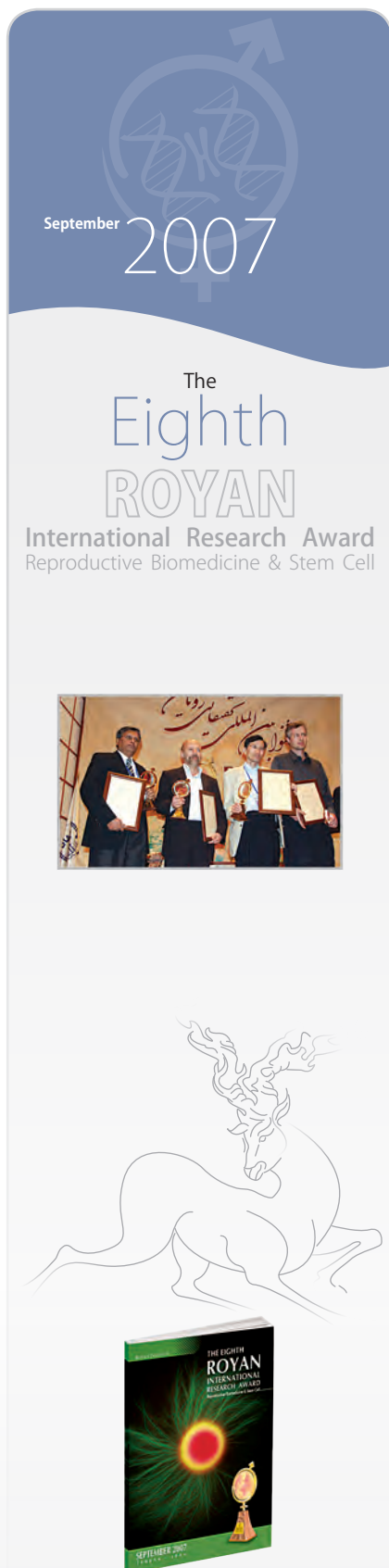
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The Eighth Royan International Research Award



Received Papers: 248



September 2007

International Winners:

Best research project in stem cell field

- **Chiba Shigeru**, Japan
Role of Notch Signaling in Normal and Neoplastic Hematopoietic Stem Cells and Clinical Application of Notch Signal Modifiers

Best research project in reproductive genetic field

- **Françoise Dantzer**, France
Poly (ADP-Ribose) Polymerase-2 Contributes to the Fidelity of Male Meiosis I and Spermiogenesis

Best research project in female infertility field

- **Seyed Mohammad Moazzeni**, Iran
Dendritic Cells and Pregnancy: A Bidirectional Relationship to Protect the Semiallogenic Fetus

Best research project in embryology field

- **Bjorn Johannes Oback**, New Zealand
Nuclear Donor Choice, Sperm Mediated Activation and Embryo Aggregation: A Multi-Pronged Approach to Sequentially Improve Cattle Cloning Efficacy

Best research project in andrology field

- **Reddanna Pallu**, India
Role of Cyclooxygenases in Male Reproduction

Iranian Winners:

- **Ramin Radpour**
Novel Mutations and (TG)(M)(T)N Polymorphism in Iranian Males with Congenital Bilateral Absence of the Vas Deferens
- **Mohammad Ebrahim Parsanezhad**
Hysteroscopic Metroplasty of the Complete Uterine Septum, Duplicate Cervix, and Vaginal Septum
- **Mehri Azadbakht**
Apoptosis in Mouse Embryos Co-Cultured with Polarized or Non-Polarized Uterine Epithelial Cells Using Sequential Culture Media

The Ninth Royan International Research Award



Received Papers: 202



Sep. September 2008

International Winners:

Best research project in stem cell field

- **Su-Chun Zhang**, USA
Human Embryonic Stem Cells As a Tool of Discovery

Best research project in reproductive genetic field

- **Smita Mahale**, India
Structural, Functional and Molecular Aspects of Follicle Stimulating Hormone Receptor: Applications in Designing Receptor Targets and Management of Female Infertility

Best research projects in female infertility field (share)

- **Federico Prefumo**, Italy
Uterine Doppler Investigations and Trophoblast Biology in Early Pregnancy
- **Saeed Alborzi**, Iran
Laparoscopic Metroplasty in Bicornuate and Didelphic Uterus

Best research project in embryology field

- **Leen.Vanhoutte**, Belgium
Nuclear and Cytoplasmic Maturation of in vitro Matured Human Oocytes After Temporary Nuclear Arrest by Phosphodiesterase 3-Inhibitor

Best research project in andrology field

- **T.O.Ogata**, Japan
Haplotype Analysis of the Estrogen Receptor Alpha Gene in Male Genital and Reproductive Abnormalities

Iranian Winners:

- **Ali Fathi**
The Molecular Mechanisms Controlling Embryonic Stem Cells (Escs) Proliferation and Differentiation
- **Fardin Fathi**
Characterizing Endothelial Cells Derived from the Murine Embryonic Stem Cell Line CCE

September

2008

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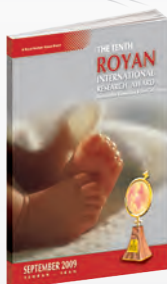


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The
Tenth
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International Research Award
Reproductive Biomedicine & Stem Cell



The Tenth Royan International Research Award



Received Papers: 253



Sep. September 2009

International Winners:

Best research project in stem cell field

- **Yi Liu, China**
Dental Stem Cells-Based Tissue Regeneration in a Large Animal Model

Best research project in reproductive genetic field

- **Wai-sum OO, China**
Adrenomedullin in Male and Female Reproduction

Best research projects in female infertility field (share)

- **Sherman Silber, USA**
A Series of Monozygotic Twins Discordant for Ovarian Failure: Ovary Transplantation (Cortical versus Microvascular) and Cryopreservation
- **Melinda Halasz, Hungary**
What Harbours the Cradle of Life? The Progesterone-Dependent Immunomodulation

Best research project in embryology field

- **Geetanjali Sachdeva, India**
Molecular Assessment of the Uterine Milieu during Implantation Window in Humans and Non-human Primates

Best research project in andrology field

- **Paolo Chieffi, Italy**
PATZ1 Gene Has a Critical Role in the Spermatogenesis and Testicular Tumours

Iranian Winners:

- **Hossein Mozdarani**
Reduction of Induced Transgenerational Genomic Instability in Gametes Using Vitamins E and C, Observed As Chromosomal Aneuploidy and Micronuclei in Preimplantation Embryos
- **Seyed Javad Mowla**
OCT4 Spliced Variants Are Differentially Expressed in Human Pluripotent and Nonpluripotent Cells
- **Mohammad Reza Safarinejad**
Evidence Based Medicine on the Pharmacologic Management of Premature Ejaculation

The Eleventh Royan International Research Award



Received Papers: 358



September 2010

International Winners:

Best research project in regenerative medicine field

- **Stefano Pluchino**, Italy
Human Neural Stem Cells Ameliorate Autoimmune Encephalomyelitis in Non-human Primates

Best research project in stem cell biology & technology field

- **Hooman Sadri-Ardekani**, Iran-The Netherlands
Propagation of Human Spermatogonial Stem Cells in vitro

Best research project in female infertility field

- **Louis Chukwuemeka Ajonuma**, Nigeria
New Insights into the Mechanisms Underlying Chlamydia Trachomatis Infection Induced Female Infertility

Best research project in reproductive genetic field

- **Anu Bashamboo**, France
Mutations in NR5A1 Associated with Ovarian Insufficiency

Best research project in embryology field

- **Mohammad Hossein Nasr-Esfahani**, Iran
New Era in Sperm Selection for ICSI Procedure

Iranian Winners:

- **Serajoddin Vahidi**
Prevalence of Primary Infertility in the Islamic Republic of Iran in 2004-2005
- **Tahereh Ma'dani**
Improvement of Pregnancy Rate in ART Cycles
- **Mehrdad Noruzinia**
MTHFR Promoter Hypermethylation in Testicular Biopsies of Patients with Non-obstructive Azoospermia: The Role of Epigenetics in Male Infertility
- **Abbas Piryaee**
Differentiation Capability of Mouse Bone Marrow-Derived Mesenchymal Stem Cells into Hepatocyte-Like Cells on Artificial Basement Membrane Containing Ultraweb Nanofibers and Their Transplantation into Carbon Tetrachloride Injured Liver Model

September

2010

The
Eleventh
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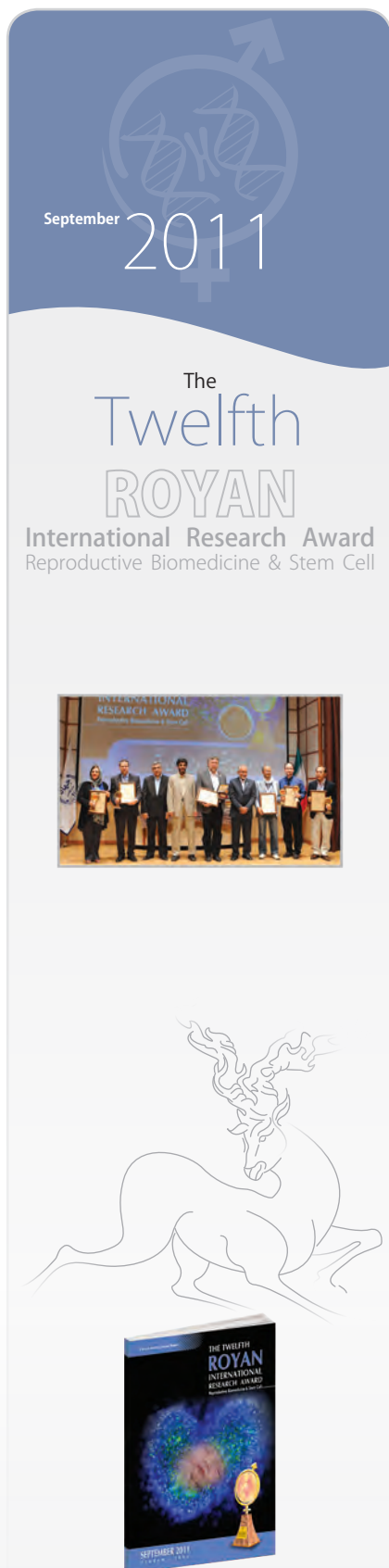
International Research Award
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The Twelfth Royan International Research Award



Received Papers: 280



Sep. September 2011

International Winners:

Best research project in regenerative medicine field

- **Lorenzo Piemonti**, Italy
Bone Marrow as Ideal Microenvironment for Human Islet Transplantation to Treat Type 1 Diabetes (ClinicalTrials.gov Identifier: NCT01345227)

Best research project in stem cell biology & technology field

- **Hiromitsu Nakauchi**, Japan
Heterogeneity and Hierarchy Within the Most Primitive Hematopoietic Stem Cell Compartment

Best research project in female infertility field

- **Elizabeth Stewart**, USA
Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies

Best research project in reproductive genetic field

- **Paul Thomas**, Australia
Identification of SOX3 As an XX Male Sex Reversal Gene in Mice and Humans

Best research project in embryology field

- **Steve Tardif**, UK
Infertility with Impaired Zona Pellucida Adhesion of Spermatozoa from Mice Lacking TauCstF-64

Best research project in epidemiology & ethics fields

- **Heping Zhang**, USA
Decision Trees for Identifying Predictors of Treatment Effectiveness in Clinical Trials and Its Application to Ovulation in a Study of Women with Polycystic Ovary Syndrome

Iranian Winners:

- **Morteza S. Hosseini**
Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat

- **Jaleh Zolghadri**
Relationship Between Abnormal Glucose Tolerance Test and History of Previous Recurrent Miscarriages, and Beneficial Effect of Metformin in These Patients: A Prospective Clinical Study

- **Batool Rashidi**
Simvastatin Effects on Androgens, Inflammatory Mediators, and Endogenous Pituitary Gonadotropins Among Patients with PCOS Undergoing IVF: Results from a Prospective Randomized Placebo-Controlled Clinical Trial

The Thirteenth Royan International Research Award



Received Papers: 169



September 2012

International Winners:

Best research project in stem cell biology & technology field

- **Chengcheng (Alec) Zhang, USA**
Ex Vivo Expanded Hematopoietic Stem Cells Overcome the MHC Barrier in Allogeneic Transplantation

Best research project in andrology field

- **Kristian Almstrup, Denmark**
Screening of Subfertile Men for Testicular Carcinoma in Situ by an Automated Image Analysis-based Cytological Test of the Ejaculate

Best research projects in female infertility field (share)

- **Wenjie Zhu, China**
Transvaginal Ultrasound-guided Ovarian Interstitial Laser Treatment in Anovulatory Women with Polycystic Ovary Syndrome: A Randomized Clinical Trial on the Effect of Laser Dose Used on the Outcome
- **Kaei Nasu, Japan**
Role of Mevalonate-Ras Homology (Rho)/Rho-associated Coiled-Coil-Forming Protein Kinase-mediated Signaling Pathway in the Pathogenesis of Endometriosis-associated Fibrosis

Best research project in reproductive genetic field

- **Signe Atlmäe, Sweden**
Interactome of Human Embryo Implantation: Identification of Gene Expression Pathways, Regulation, and Integrated Regulatory Networks

Best research project in embryology field

- **Laura Cecilia Giojalas, Argentina**
Sperm Chemotaxis towards Progesterone, a Guiding Mechanism That May Be Used to Select the Best Spermatozoa for Assisted Reproduction

Iranian Winner:

- **Alireza Pouya**
Human Induced Pluripotent Stem Cells Differentiation into Oligodendrocyte Progenitors and Transplantation in a Rat Model of Optic Chiasm Demyelination

September

2012

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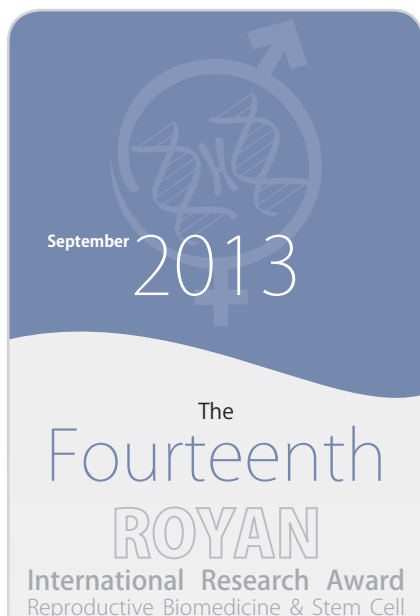
International Research Award
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The Fourteenth Royan International Research Award



Received Papers: 206



Sep. September 2013

International Winners:

Best research project in stem cell biology & technology field

- **Antonio Uccelli**, Italy
Mesenchymal Stem Cells Shape Microglia Effector Functions Through the Release of CX3CL1

Best research project in reproductive genetic & andrology fields

- **Pierre F Ray**, France
Search for Genetic Causes of Male Infertility

Best research project in female infertility field

- **Paola Panina Bordignon**, Italy
The Selective Vitamin D Receptor Agonist Elocalcitol Reduces Development of Endometriosis and Formation of Peritoneal Adhesion in a Mouse Model

Best research project in embryology field

- **Mariano Buffone**, USA
Role of Actin Cytoskeleton During Mouse Sperm Acrosomal Exocytosis

Iranian Winners:

- **Ashraf Moini**
Risk Factors Associated with Endometriosis Among Iranian Infertile Women

- **Malek Hossein Asadi**
OCT4B1, A Novel Spliced Variant of OCT4, Is Highly Expressed in Gastric Cancer and Acts as an Antiapoptotic Factor

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

- **Armin Towhidi**
Omega-3 Fatty Acids Accompanied with A-Tocopherol Improved Fresh and Post-thaw Sperm Quality in Ruminants

The Fifteenth Royan International Research Award



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International Winners:

Best research project in regenerative medicine field

- **Anne S. Baron-Van Evercooren**, France
Role of Endogenous Neural Precursor Cells in Multiple Sclerosis

Best research project in stem cell biology & technology field

- **Milena Bellin**, Netherlands
Human Pluripotent Stem Cells for Modelling and Correcting Long-QT Syndrome

Best research project in andrology & reproductive genetic fields

- **Sophie Rousseaux**, France
Male Genome Programming, Infertility and Cancer

Best research project in female infertility field

- **Christiani Andrade Amorim**, Belgium
New Steps Towards the Artificial Ovary

Best research project in embryology & biotechnology fields

- **Guoping Fan**, USA
Transcriptome Dynamics of Human and Mouse Preimplantation Embryos Revealed by Single Cell RNA-sequencing

Best research project in ethics field

- **Kristien Hens**, Netherlands
Towards the Transparent Embryo? Dynamics and Ethics of Comprehensive Pre-implantation Genetic Screening

Iranian Winners:

- **Seyedeh Nafiseh Hassani**
The Augmented BMP Pluripotency Pathway via TGF- β Suppression Maintains the Ground State of Embryonic Stem Cells Self-Renewal
- **Rouhollah Fathi**
Optimal Strategy Toward Fertility Preservation: In vivo and in vitro Post-thaw Options in Gamete, Embryo and Ovarian Tissue Cryostorage

September

2014

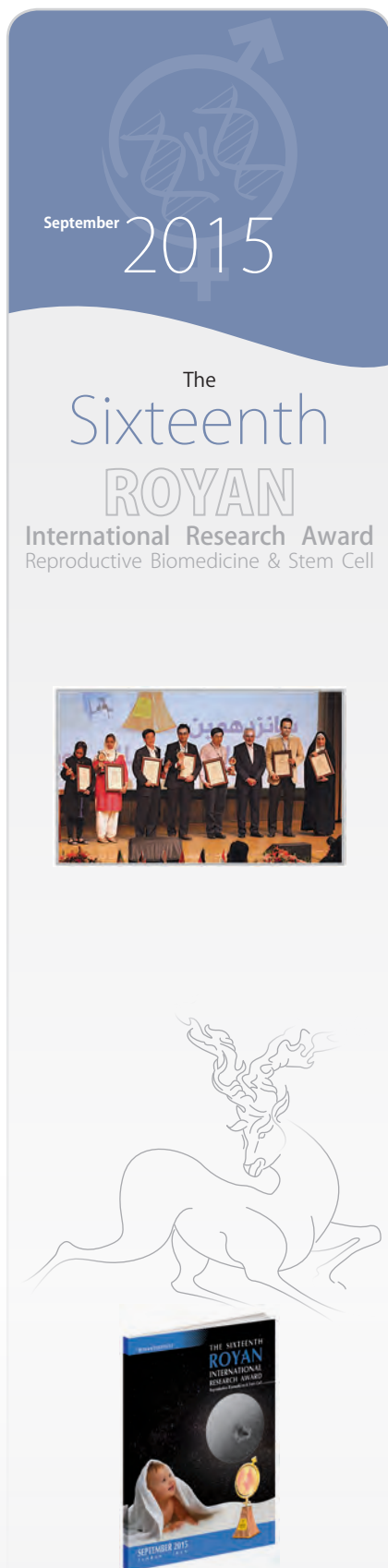
The
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The Sixteenth Royan International Research Award



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- **Priyanka Parte**, India
Tubulin Reversible Acetylation – Driving the Moves and the Moves Behind the Drive

Best research project in biotechnology field

- **Zhang**, USA
Identifying and Overcoming an Epigenetic Barrier for SCNT Reprogramming

Best research project in reproductive genetic field

- **Masoud Zamani Esteki**, Belgium
Concurrent Whole-Genome Haplotyping and Copy Number Profiling of Single Cells

Best research project in stem cell biology and technology field

- **Guoliang Xu**, China
DNA Oxidation Towards Totipotency in Mammalian Development

Iranian Winners:

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Expression Profile of Macrophage Migration Inhibitory Factor (MIF) Signaling Pathway as a Potential Biomarker in Pathophysiology of Endometriosis
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Bioinspired Substrates Direct the Fate of Stem Cells

The Seventeenth Royan International Research Award



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Best research project in embryology field

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Best research project in stem cell biology and technology field

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- **Anahita Mohseni Meybodi**
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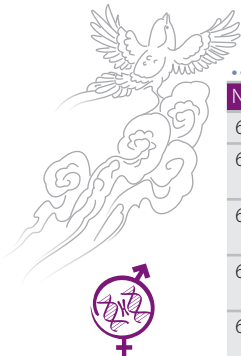
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Dr Khan is an associate professor at the Department Of Obstetrics and Gynecology; chief research advisor and project coordinator at the Center for Quality Research and Development (CQARD) and International Academic Exchange Center (IAEC), all belongs to the Kyoto Prefectural University of Medicine, Kyoto, Japan. He obtained his MD from Dhaka University and did advanced clinical training at the King's College Hospital, London. Dr Khan obtained his PhD in tumor and non-tumor markers at the Nagasaki University in Japan. He is the guest professor at the Dhaka University in Bangladesh and Mahidol University in Thailand. His laboratory is working on female reproductive endocrinology and immunology. Dr Khan is currently working as Managing Editor of Frontiers in Bioscience (FBS) and as Associate Editor of Journal of Obstetrics and Gynecological Research (JOGR). He is also an editorial board member of Journal of Endometriosis and Pelvic Pain Disorders (JEPPD).



Female Infertility

Khaleque Khan, MD, PhD Japan
nemokhan@koto.kpu-m.ac.jp

Molecular Detection of Intrauterine Microbial Colonization in Women with Endometriosis

Objective:

Increased intrauterine microbial colonization by bacteria culture method has been reported in women with endometriosis. Here we investigated microbial colonization in intrauterine environment and cystic fluid of women with and without endometriosis by molecular approach.

Material and Methods:

This study was conducted under an approved protocol (No. 26011). With informed consent, a total of 32 women each with and without endometriosis were enrolled. Among them, 16 in each group received treatment with GnRHa. Pattern of microbial colonization in endometrial swabs and endometrioma/non-endometrioma cystic fluid was examined using broad-range polymerase-chain reaction (PCR) amplification of bacteria targeting 16S rRNA gene (rDNA). After quantification of index PCR product, 16S rDNA metagenome sequence analysis was done by Illumina Miseq system.

Results:

A wide proportion (0.01-97.8%) of multiple bacteria was detected in both endometrial swabs and cystic fluid. 16S metagenome assay indicated that proportion of Lactobacillaceae was significantly decreased ($P < 0.01$) and of Streptococcaceae, Staphylococaceae, Enterobacteriaceae was significantly increased ($P < 0.05$ for each) in GnRHa-treated women with endometriosis than in GnRHa-untreated women. While bacteria culture method failed to detect a single colony, 16S metagenome assay could detect significantly higher percentage of Streptococcaceae ($P < 0.01$) and Staphylococaceae ($P < 0.05$) in the cystic fluid derived from women with ovarian endometrioma comparing to that in cystic fluid collected from non-endometrioma cysts.

Conclusion:

These findings indicate the occurrence of sub-clinical infection in intrauterine environment and in the cystic fluid of ovarian endometrioma. Additional side effect of GnRHa treatment in promoting silent intrauterine and/or ovarian infection should be considered. Our current findings may target future therapeutic potential in women with endometriosis and in improving fertility status in these women.

Keywords:

Endometriosis, Endometrial Sample, Cystic Fluid, Infection, 16S rDNA Metagenome Assay



INTERNATIONAL WINNER



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Embryology

David Greening, PhD | Australia
d.greening@latrobe.edu.au

Dr David Greening is an Early Career Fellow in Biochemistry and Genetics at the La Trobe Institute for Molecular Science, the inaugural LIMS Molecular Biology Bruce Stone Fellow and co-group leader in the field of exosome biology, proteomics, cell signalling, cancer biology, and implantation biology. Dr Greening completed his PhD at the Ludwig Institute for Cancer Research (LICR) on cancer signalling and proteomics and further training at LICR/Walter and Eliza Hall Institute of Medical Research, and The Institute for Systems Biology (USA) for development of quantitative discovery/targeted proteomics. He has investigated the functional characterisation of the cancer secretome, defining mechanisms promoting tumorigenesis, regulating angiogenesis, lymphogenesis and tissue repair. He has facilitated the role of exosomes as functionally important mediators of embryo implantation - important implications for research into novel interventions designed to reduce infertility and successful pregnancy. Dr Greening has received numerous research awards including Ludwig Institute for Cancer Research (LICR), Research Excellence Medal for post-graduate research excellence (2011), International Hans Neurath Outstanding Promise Award (International Protein Society) (2016), and Protein Science International Young Investigator Award (2016).

Exosomes: A New Paradigm in Embryo-Maternal Cross-Talk for Successful Implantation

Objective:

Embryo implantation into receptive endometrium requires synergistic endometrial-blastocyst interactions within the uterine cavity and is essential for establishing pregnancy. Importantly, the point-of-first-contact between the embryo and the maternal-endometrium occurs at the endometrial luminal epithelium. We highlight for the first time a unique insight into the developmental biology of embryo implantation – investigating cellular and secreted changes important for receptivity and implantation, and the contribution of exosomes in regulating this microenvironment.

Material and Methods:

Utilising a combination of cell models, targeted physiologically relevant treatments, quantitative proteomics, and functional real-time assays, we demonstrate endometrial epithelial cellular and secreted protein changes in response to ovarian steroid hormones that drive development of the endometrium to become 'receptive' to an embryo, and to the blastocyst-derived hormone, human chorionic gonadotrophin, which enhances endometrial changes essential for receptivity and implantation. In this study we have defined the proteome of purified endometrial epithelial-derived exosomes (Exos) influenced by menstrual cycle hormones; estrogen (E; proliferative-phase) and estrogen+progesterone (EP; receptive-phase) and examined their potential to modify trophoblast function.

Results:

We identified cellular changes associated with metabolism, basement membrane and cell connectivity, proliferation and differentiation, while the secretome analysis identified proteins differentially regulated in associated with cellular adhesion, extracellular-matrix organization, developmental growth, growth factor regulation, and cell signalling. Further, we demonstrate that exosomes (40-150nm nanovesicles) released from endometrial epithelial cells are an important component of these interactions during receptivity and implantation. Utilizing quantitative proteomics we defined the proteome of purified endometrial epithelial-derived exosomes influenced by menstrual cycle hormones estrogen and progesterone, revealing significant reprogramming associated with cell adhesion, migration, invasion, and extracellular matrix remodeling. In addition to hormonally-treated endometrial cell/secreted and exosomal proteins changes, all findings were validated in human primary uterine epithelial cell-derived material (cells/secretome/exosomes). Functionally, exosomes were internalized by human trophoblast cells and enhanced their adhesive capacity; a response mediated partially through active focal adhesion kinase signaling.

Conclusion:

Our results illustrate the dynamic intracellular and secreted protein changes in the endometrium and responses to the pre-implantation embryo, and an active contribution of exosomes to regulating the human uterine environment, that together ensure successful establishment of pregnancy.

Keywords:

Embryo Implantation, Exosomes, Pregnancy, Endometrium, Microenvironment

Riccardo Fodde studied biology and molecular genetics at the University of Pavia, Italy. His PhD work on hemoglobins and haptoglobins (1990) has been carried out at the Dept. of Human Genetics of the University of Leiden, and has led to the characterization of the spectrum of mutations leading to thalassemia's worldwide. In the same year, he started his post-doctoral work on the molecular genetic basis of colorectal cancer. As a fellow of the Royal Dutch Academy of Science (KNAW) in 1992 he visited the laboratory of prof. Raju Kucherlapati at the A. Einstein College of Medicine in New York, where he developed the first targeted mouse model for intestinal tumorigenesis.

In 2001, he became full professor of Cancer Genetics at the Center for Human & Clinical Genetics of the Leiden University Medical Center (LUMC). In 2002 he became full member of EMBO and since 2003 he is professor of Experimental Pathology at the Erasmus MC Cancer Institute, as part of the Erasmus University Medical Centre in Rotterdam. His group has contributed to the elucidation of the molecular basis of hereditary colorectal cancer in man, developed a large number of pre-clinical mouse models for intestinal carcinogenesis, and characterized novel functional aspects of the APC tumor suppressor gene. Most recently, the focus of his research has been centered around the role of Wnt/ β -catenin signaling in the regulation of the intestinal stem cell niche in homeostasis and disease. Also, based on the recent identification of the hitherto elusive quiescent stem cell of the intestinal epithelium, his research is now focusing on the role of Paneth cells in inflammation and cancer.

INTERNATIONAL WINNER



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Regenerative Medicine

Riccardo Fodde, PhD | Netherlands
r.fodde@erasmusmc.nl

Diet, Inflammation, and Stem Cells: Trading Off Regenerative Response with Cancer Risk

Objective:

The recent debate on the relative importance of environmental vs. intrinsic factors in cancer onset raised many concerns because of fears that the general public might conclude that cancer prevention programs are not worthwhile the effort. It was proposed that most cancer cases can be explained by the high number of stem cell divisions in the tissues where they arise and by the consequentially increased chance of accumulating mutations in cancer-related genes. Independent studies, however, reached radically different conclusions: exposure to environmental risk factors represents an essential requirement for cancer. Of note, the intrinsic rate of stem cell division and the environmental factors cannot be regarded as independent variables as it is plausible that extrinsic factors do affect stem cell homeostasis. Colon cancer, arising in one of the most proliferative and self-renewing tissue in our body was indisputably shown to have a strong environmental component with western style dietary habits and inflammation among the major risk factors. According to our main hypothesis, dietary and inflammatory colon cancer risk factors act primarily on the stem cell niche by introducing alterations of both of quantitative and qualitative nature as they not only expand subpopulations of stem and progenitor cell targets for tumor initiation, but also induce de-differentiation and activate novel stem cell types in response to stress signals.

Material and Methods:

To test our main hypotheses, we take advantage of two distinct mouse models of colon cancer due to the exposure to 1. a "western-style" diet (NWD1); and 2. to DSS-supplemented drinking water. The latter result in the chronic inflammation in of the murine GI tract, reminiscent of inflammatory bowel disease in man. Monitoring and lineage tracing analysis of stem and niche cells is performed throughout the intestinal tract on different Cre-Lox models for stem and niche cells, fed with the experimental diets, and with the inflammation inducer DSS. Global and more functional analyses will be employed.

Results:

1. Lgr5+ stem cell function is abrogated by a sporadic colon cancer-inducing western-style diet. Both the proliferative capacity and stem function of Lgr5+ cells were abrogated in NWD1-fed animals. 2. The overall intestinal stem cell function is enhanced in mice fed with a Western-style diet, an effect mediated by Paneth cells. 3. Secreted phospholipases are key intestinal stem cell factors in homeostasis, inflammation and cancer. 4. A metabolic dichotomy earmarks the intestinal stem cell niche. Whereas Lgr5+ cells display high mitochondrial activity, Paneth cells are earmarked by glycolysis as the main metabolic activity. Inhibition of mitochondrial activity or of glycolysis

Conclusion:

Our adult tissues react to specific factors as dietary nutrients or inflammation through a regenerative response that involves different cellular identities including stem and fully differentiated niche cells. Activation of these distinct cellular lineages is beneficial for the repair of the damaged tissue though at the cost of an increase of cancer risk due to the expansion of specific subpopulations of cell targets for tumor initiation and progression, but also to de-differentiation and reprogramming of other.

Keywords:

Colon Cancer, Western-Style Diet, Inflammatory Bowel Disease, Stem Cell, Niche Cell



INTERNATIONAL WINNER



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Reproductive Genetics

Kaei Nasu, MD, PhD Japan
nasu@oita-u.ac.jp

Dr Nasu earned his MD degree in 1990 and his PhD in pathology in 1995 at Oita Medical University, Yufu-shi, Japan. From 1996 to 2001 he was an instructor at department of Obstetrics and Gynecology in Oita University, and took his post-doctoral training at Department of Stomatology, School of Dentistry, University of California, San Francisco. From 1997 to 1998 he was a professor at department of Obstetrics and Gynecology, faculty of Medicine, Oita University. He is now a professor at Division of Obstetrics and Gynecology, Support System for Community Medicine, Oita University, Faculty of Medicine since 2012.

Roles of Aberrantly Expressed microRNAs in Endometriosis

Objective:

Accumulating evidence suggests that epigenetic aberrations play definite roles in the pathogenesis of endometriosis. MicroRNAs (miRNAs) are a recently defined class of epigenetic mechanism, which is characterized as endogenous, small size, single stranded, non-coding RNA. The purpose of this study is to identify the panel of miRNAs that were aberrantly expressed in primary cultured human endometriotic cyst stromal cells (ECSCs) in comparison with primary cultured normal endometrial stromal cells (NESC), and evaluate the roles of aberrantly expressed miRNAs in the pathogenesis of endometriosis.

Material and Methods:

ECSCs and NESC were isolated from ovarian endometriotic tissues and the eutopic endometrial tissues, respectively. Aberrantly expressed miRNAs in ECSCs were identified by a global miRNA microarray analysis. Thereafter, the roles of aberrantly expressed miRNAs regarding the pathogenesis of endometriosis were evaluated by compulsory miRNA expression techniques.

Results:

miRNA microarray analysis identified 8 downregulated miRNAs (miR-29b, miR-196b, miR-199a-3p, miR-199b-5p, miR-214, miR-424, miR-455-3p, and miR-503) and 4 upregulated miRNAs (miR-100, miR-132*, miR-181a, and miR-210) in ECSCs. Compulsory expression of miR-196b directed the inhibition of cell proliferation and the induction of apoptosis in ECSCs. miR-503 transfection into ECSCs also induced the cell-cycle arrest at G0/G1 phase and apoptosis, inhibited the cell proliferation, vascular endothelial cell growth factor (VEGF)-A expression and ECM contractility. miR-196b was found to suppress the mRNA expression of c-myc and B-cell lymphoma/leukemia-2 (Bcl-2) in ECSCs. Cyclin D1, Bcl-2, VEGF-A, Ras homology (Rho) A, and Rho-associated coiled-coil-forming protein kinases were considered as the downstream target molecules of miR-503. Both miR-196b and miR-503 genes were hypermethylated in ECSCs and the treatment with a DNA demethylating agent restored the expression of these miRNAs in ECSCs. The compulsory expression of miR-210 resulted in the induction of cell proliferation, the production of VEGF-A, and the inhibition of apoptosis through signal transducer and activator of transcription 3 (STAT3) activation in NESC.

Conclusion:

We have identified aberrantly expressed miRNAs which may play important roles in the pathogenesis of endometriosis as a part of epigenetic mechanisms. It is suggested that dysregulated miRNA expressions in ECSCs are involved in the creation of cellular dysfunctions that are disease-specific features of endometriosis.

Keywords:

Endometriosis, microRNA, Epigenetics, Pathogenesis



Thomas Braun is director at the Max Planck Institute for Heart and Lung Research (MPI-HLR) in Bad Nauheim, Germany and Professor of Medicine at the University of Giessen. Prof. Braun is a molecular biologist, physician, medical researcher who works on skeletal muscle stem cells and repair processes in the cardiopulmonary system. After obtaining MD and PhD degrees at the universities of Hamburg and Braunschweig, Germany, he discovered and characterized new myogenic determination factors, which allow reprogramming of different cell types into muscle cells. Thomas Braun made numerous seminal contributions to the understanding of molecular processes driving skeletal muscle development, regulation of muscle of stem cells, skeletal muscle regeneration as well as repair and remodeling processes in the heart. He is founding director of the MPI-HLR, now one of the leading cardiopulmonary research institutes, and member of the German National Academy of Science, Leopoldina.



Stem Cell Biology and Technology

Thomas Braun, MD, PhD | Germany
thomas.braun@mpi-bn.mpg.de

Compaction of Chromatin Seals Quiescence of Muscle Stem Cells

Objective:

Skeletal muscle stem cells are indispensable for postnatal muscle growth, homeostasis and regeneration. Reduced activity or loss of muscle stem cells results in loss of skeletal muscle mass. Impaired muscle function has multiple adverse effects on the metabolism and restricts mobility often leading to life-threatening conditions. Muscle stem cells persist mostly in a quiescent state, which is associated with a strong accumulation of transcriptionally silent heterochromatin. So far relatively little was known about the potential link between heterochromatin formation and MuSC quiescence nor about the genes regulating this state.

Material and Methods:

Immunofluorescence staining of chromatin marks and electron microscopy was used to determine the extent of heterochromatin formation in muscle stem cells and to characterize changes in histone tail modification during activation of muscle stem cells after induction of muscle regeneration. Targeted inactivation of the histone methyltransferase Suv4-20h1 in mice was applied to determine the effects of a loss of H4K20me2 modifications on muscle stem cell quiescence and muscle regeneration followed by generation of compound mouse mutants to investigate genetic interactions. Fluorescence in situ hybridization demonstrated repositioning of the MyoD gene locus during muscle stem cell activation. Chromatin immunoprecipitation was utilized to analyze heterochromatin formation at the MyoD gene locus. The effect of loss of stem cell quiescence on skeletal muscle generation was assessed after short-term and long-term cardiotoxin-induced muscle injury.

Results:

Analysis of chromatin organization in quiescent/activated muscle stem cells and myotubes revealed that quiescent muscle stem cells possess abundant amount of facultative heterochromatin. Activation of muscle stem cells leads to massive reduction of facultative heterochromatin resulting in a relative increase of constitutive heterochromatin in myonuclei. Quiescent muscle stem cells specifically express the histone methyltransferases Suv4-20h1 and Ezh1 while activated muscle stem cells are characterized by the expression of Suv4-20h2 and Ezh2. Genetic inactivation of Suv4-20h1 reduces facultative heterochromatin in adult muscle stem and leads to activation and repositioning of the MyoD locus to the nuclear core, which results in persistent activation of muscle stem cells eventually causing stem cell depletion and impaired long-term muscle regeneration. Genetic reduction of MyoD expression rescues facultative heterochromatin formation and loss of muscle stem quiescence thereby restoring muscle regeneration in Suv4-20h1 mutants.

Conclusion:

The study demonstrates that the histone H4K20 dimethyltransferase Suv4-20h1 controls quiescence of MuSC formation by promoting formation of facultative heterochromatin. Our findings reveal an epigenetic axis consisting of Suv4-20h1-MyoD, which actively regulates the quiescent state of MuSC by formation of fHC thereby guarding the stem cell pool over a lifetime. The work provides strong evidence for the concept that satellite cell quiescent state is not a default cellular state but is instead a cellular state that must be actively maintained and re-established.

Keywords:

Adult Stem Cells, Tissue Regeneration, Skeletal Muscle Regeneration, Epigenetic Control, Stem Cell Quiescence



Winners

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Female Infertility

Mahnaz Ashrafi, MD

ashrafim@royaninstitute.org

Dr Mahnaz Ashrafi obtained her medical degree in 1984 from Tehran University of Medical Science and received her obstetrics and gynecology specialty in 1989 from Iran University of Medical Science. She then became assistant Professor and associate Professor in faculty of Medicine, Iran University of Medical Science. Her current positions are: Head of Endocrinology and Female Infertility Department of Royan Institute and head of ART Clinic of Akbar abadi Hospital, Tehran, Iran. She is expert in medical and surgical treatment of infertility, recurrent miscarriage and all assisted reproductive treatments. Her fields of interest are: ovarian stimulation, clinical protocols, endometriosis, implantation, repeated implantation failure, PCO and endocrinology, endometrial receptivity, ART outcome and basic science. She has been project manager in lots of research projects. She has been author or co-author in more than 150 national and international articles, abstracts, books and chapter books.

Assisted Reproductive Outcomes in Women with Different Polycystic Ovary Syndrome Phenotypes: The Predictive Value of Anti-Müllerian Hormone

Objective:

The present study was designed to evaluate: 1) ART outcomes in different polycystic ovary syndrome (PCOS) phenotypes compared to control group, 2) the predictive values of serum anti-Müllerian hormone (AMH) and follicle-stimulating hormone (LH/FSH) ratio in PCOS phenotypes for ART outcomes.

Material and Methods:

This cross-sectional study was performed in Royan Institute from June 2012 to January 2014. All infertile women diagnosed with PCOS who underwent the first IVF/ICSI cycle were enrolled during the study period. Other causes of infertility including severe endometriosis, hydrosalpinx, uterine factor, severe male factor (oligo-tetrato-asthenozoospermia), and age factor (≥ 40) or diminished ovarian reserve ($AMH < 1$ ng/ml, $FSH > 12$ IU/l) were excluded. Only patients with mild/moderate male factor and/or tubal factor infertility were included. Meanwhile smokers and diabetic patients were excluded from study. PCOS cases were diagnosed based on the Rotterdam criteria. PCOS patients were categorized to four phenotype groups according to the Rotterdam criteria: phenotype A: the coexistence of hyperandrogenism, chronic anovulation, and polycystic ovaries (HA+AO+PCO); phenotype B: chronic anovulation and hyperandrogenism without the polycystic ovaries (AO+ HA); phenotype C: hyperandrogenism and polycystic ovaries (HA+PCO); and phenotype D: polycystic ovaries coexisting with anovulatory cycles (AO+PCO). In-vitro fertilization/ intracytoplasmic sperm injection (IVF/ICSI) outcomes in different PCOS phenotypes (A, B, C, and D) compared to control group and the predictive values of serum anti-Müllerian hormone (AMH) in PCOS phenotypes for main outcomes.

Results:

In total, 386 cases with a PCOS diagnosis and 350 male factor patients were enrolled during the study period. The women with phenotypes A and C had significantly higher levels of AMH than those with phenotype B. Clinical pregnancy rate (CPR) in the phenotype D group (53.3%) was higher than the other groups (32.5%, 26.4%, and 36.8%, respectively in phenotypes A, B, and C), but it did not reach a significance level. Multivariable regression analysis after adjusting for women's age and body mass index revealed that PCOS phenotypes A and B were associated with a decreased CPR compared to control group (Odds ratio [OR]: 0.46, confidence interval [CI]: 0.26-0.8, $P=0.007$ and OR: 0.34, CI: 0.18-0.62, $P=0.001$, respectively).

Conclusion:

It seems that a combination of hyperandrogenism and chronic anovulation is associated with a negative impact on the CPR in these patients. Our results demonstrated that the AMH level is related to PCO morphology but is not predictive for CPR and live birth rate.

Keywords:

Polycystic Ovary Syndrome, Phenotypes, Anti-müllerian Hormone, ART Outcome, Luteinizing Hormone/Follicle-Stimulating Hormone Ratio



Mahdi Sheikh has got his MD degree from Tehran University of Medical Sciences and is a PhD candidate in Epidemiology. He has attended different medical and research training Programs in Harvard Medical School, World Health Organization (WHO), and Digestive Disease Research Institute (DDRI). Dr Sheikh worked as a researcher, lecturer and educator in Maternal, Fetal and Neonatal, and also Breastfeeding Research Centers for more than 6 years and received the Distinguished Researcher Award from these research centers. He has also received Appreciation Awards from the Ministry of Health and Medical Education of Iran as well as Tehran University of Medical Sciences for his contribution in designing, performing and monitoring nationwide research projects in Iran. He has performed and contributed in more than 40 research projects in the fields of Obstetrics and Reproduction and is a member of the Editorial and Reviewer Boards of many highly recognized international Journals in Obstetrics and Gynecology. Currently, Dr Sheikh serves as a Researcher in the International Agency for Research of Cancer (IARC), The World Health Organization (WHO), in France, and is contributing in worldwide research projects for promoting global health and science.



Female Infertility

Mahdi Sheikh, MD
mahdisheikh@gmail.com

Granulocyte Colony Stimulating Factor in Repeated IVF Failure: A Randomized Trial

Objective:

Recent studies have revealed key roles for granulocyte colony stimulating factor (GCSF) in embryo implantation process and maintenance of pregnancy, and some showed promising results by using local intrauterine infusion of GCSF in patients undergoing In Vitro Fertilization (IVF).

Material and Methods:

This multi-centric, randomized, controlled trial included 112 infertile women with repeated IVF failure to evaluate the efficacy of systemic single-dose subcutaneous GCSF administration on IVF success in these women. In this study the Long Protocol of ovarian stimulation was used for all participants. Sealed, numbered, envelopes assigned 56 patients to receive subcutaneous 300µg GCSF before implantation and 56 in the control group. The implantation (number of gestational sacs on the total number of transferred embryos), chemical pregnancy (positive serum β -HCG), and clinical pregnancy (gestational sac and fetal heart) rates were compared between the two groups.

Results:

The successful implantation (18% vs. 7.2%, $p=0.007$), chemical pregnancy (44.6% vs. 19.6%, $p=0.005$), and clinical pregnancy (37.5% vs. 14.3%, $p=0.005$) rates were significantly higher in the intervention group than the control group. After adjustment for participants age, endometrial thickness, good quality oocyte counts, number of transferred embryos, and Anti Mullerian Hormone levels, GCSF treatment remained significantly associated with successful implantation (OR=2.63, 95%CI = 1.09 – 6.96), having chemical pregnancy (OR=2.74, 95%CI = 1.11 – 7.38), and clinical pregnancy (OR=2.94, 95%CI = 1.23 – 8.33).

Conclusion:

administration of single-dose systemic subcutaneous GCSF before implantation significantly increases the IVF success, implantation and pregnancy rates in infertile women with repeated IVF failure.

Keywords:

GCSF, Implantation, Infertility, in-vitro Fertilization, Pregnancy



NATIONAL WINNER



Stem Cell Biology and Technology

Hossein Ghanbarian, PhD
hghanbarian@sbbmu.ac.ir

Dr Ghanbarian received his BSc degree in laboratory sciences from Iran University of Medical Sciences in 2000, and his MSc degree in medical biotechnology from Tarbiat Modarres University in 2003. He had his PhD in molecular medicine from the Sophia Antipolis University, Nice, France, in 2010 under supervision of Prof. Minoo Rassoulzadegan. In 2010, he joined the Department of Biotechnology, Shahid Behashti University of Medical Sciences, as an Assistant Professor.

Their research aims include understanding the role of non-coding RNAs (ncRNAs) in cell reprogramming, establishing the distinct epigenetic states of adult and embryonic stem cells and the misregulation of ncRNAs in diseases such as cancer, diabetes and obesity. To further explore on how ncRNAs may define and or drive cell fate decisions in normal development and disease they developed a new RNA injection method.

RNA-Directed Programming of Embryonic Stem Cell

Objective:

We reported earlier that microinjection of small non-coding RNAs is associated with epigenetic modifications and results in transcriptional activation of specific target genes. Whether epigenetic mechanisms are involved in the initial determination of gene expression in the early embryo is an important question. Differentiation of cardiomyocytes is an early event during embryogenesis in vivo, which can be monitored by the appearance of beating cells in cultures in vitro. To promote cardiac differentiation of ES cells, we attempted to modulate expression of *Cdk9*, one of the main actors of cardiac differentiation in vivo. To determine the molecular mechanisms involved and to explore whether such epigenetic regulations could play a role in early development, we used a cell culture system as close as possible to the embryonic state. We report efficient cardiac differentiation of embryonic stem (ES) cells induced by small non-coding RNAs with sequences of *Cdk9*, a key player in cardiomyocyte differentiation.

Material and Methods:

Mouse AB1 ES cells were grown on mouse embryonic fibroblast (MEFs) feeders in standard ES culture medium. RNA was extracted using the Trizol Reagent (Invitrogen). 0.5 µg RNA samples were reverse transcribed to cDNA using random hexamer primers and MLV reverse transcriptase (Invitrogen). q-PCR was performed using the 'Platinum® SYBR® Green qPCR SuperMix-UDG' kit (Invitrogen). Run-on Assay was performed as described in the manufacturer instructions. Total lysates from cell cultures were prepared, electrophoresed, and blotted as described. Northern blot analysis was performed according to standard methods. Chromatin immunoprecipitation (CHIP) assay was carried out according to the protocol of the CHIP Assay Kit (Millipore cat. 17-295). According to standard methods, ES cells were injected in 3.5 days blastocysts after electroporation of *Cdk9* sense transcript fragment (*Cdk9*-f: 5'-GAUUUUCUCCUCCAGUACAUAU-3'), or microRNA-1 (miR-1: 5'-UGGAAUGUAAAGAAGUAUGUAU-3'), or a pIRESneo-EGFP DNA/miR-1 construct. As controls, blastocysts were microinjected with mock-electroporated ESCs.

Results:

To investigate whether *Cdk9* target mRNAs induce transcriptional variation in cell types, mouse embryonic stem cells were analysed after electroporation of a 22-nt oligoribonucleotide with a nucleotide sequence identical to that of the *Cdk9* mRNA. Extracts prepared 48 hours after electroporation showed an increase in *Cdk9* expression. Strand-specific RT-PCR assays confirmed the presence of transcripts complementary to the most 3' region of the mRNA. oligonucleotides with either an intronic sequence of *Cdk9* or the exonic sequence in the 3' region induced the transcriptional activation of *Cdk9*. Both correspond to regions in which antisense transcripts are detected. Conversely, when electroporated into Ago-deficient ES cells, the transcript fragment did not induce an increase in *Cdk9* expression. Interestingly, *Cdk9*-f-electroporated ES cells differentiated faster and more efficiently into cardiac muscle cells than the original ES line. Moreover, injection of miR-1 or *Cdk9*-f-electroporated ES cells into blastocysts resulted in increased expression of *Cdk9* in embryonic hearts at E18.5.

Conclusion:

Cdk9 transcript-derived oligoribonucleotides are capable to induce *Cdk9* expression in different cell systems. Requirements for Argonaute proteins and for endogenous antisense transcripts at the locus indicate that the inducer oligoribonucleotides are processed by the RNAi machinery. Induction of *Cdk9* resulted in efficient cardiac differentiation of ES cells in vitro. Injection of *Cdk9*-f-electroporated ES cells into blastocysts induced cardiac growth indicating that RNA-programmed ES cells contribute specifically to the heart in vivo.

Keywords:

Antisense Non-coding RNA, Embryonic Stem Cells, Locus Specific Induction, Cdk9, Cardiac Differentiation



Fereshteh Esfandiari received her BSc in Biology from Shiraz University in 2008. She was accepted as gifted student to study Cell-Developmental Biology in Royan Institute in 2008 for master degree. In a straight line, she was accepted as first one in the PhD entrance exam and won Dr.Kazemi scholarship for continue her education in Cell-Developmental Biology at Royan Institute. During her PhD, she worked in the field of germ cells and focused on producing germ cells from pluripotent stem cells by engineering technologies. She received her PhD in 2016. Currently, she is assistant professor in stem cells and developmental biology and group leader for germ cell program at Royan Institute. Her research interest is applying engineering technologies for efficient differentiation of pluripotent stem cells into germ cells and germ line stem cells for advanced therapies in infertility.



Stem Cell Biology and Technology

Fereshteh Esfandiari, PhD
esfandiari65f@gmail.com

in vitro Generation of Meiosis-Competent Germ Cells from Embryonic Stem Cells by Engineering the Delivery of BMP4

Objective:

Germ cells (GCs) are responsible for fertility in multicellular organisms. Disruptions in GC development or function cause infertility which is a major medical problem that affects 10–15% of couples worldwide. Current therapies for infertility are limited to in vitro fertilization and intracytoplasmic sperm injection techniques which are not applicable to infertile cases with no gametes. In this regard, new therapeutic approaches should be explored for infertility treatment, which necessitates an in-depth understanding of GC development and function. In recent years, embryonic stem cells (ESCs) have shown their capability to differentiate along tissue-specific lineages. Of particular interest, derivation of GCs from ESCs provides an unlimited source with which to generate functional gametes for infertile couples as well as exploring principles that underlie reproduction. During embryonic development primordial germ cells (PGCs), the founders of GCs, are specified from the proximal epiblast by receiving bone morphogenetic protein 4 (BMP4) from extra-embryonic ectoderm. Accordingly, mouse ESC-derived epiblast-like cells (EpiLCs) have been induced to primordial GC-like cells (PGCLCs) by addition of soluble BMP4. The resultant PGCLCs had the capability to restore spermatogenesis in infertile mice and contributed to healthy offspring. However, inability of PGCLCs to go through meiosis in vitro has remained a major challenge. In this study, a novel approach is presented for generation of GCs from ESCs. In the present study, we hypothesized that MP delivery of BMP4 inside the EpiLCs aggregates may lead to a more homogenous differentiation and produce PGCLCs that are more prone to go through meiosis in vitro.

Material and Methods:

To address our hypothesis, we have produced alginate sulfate MPs which provided affinity sites for loading and sustained release of BMP4. The BMP4-laden MPs were mixed with mESC-derived EpiLCs to form MP-incorporated aggregates. We analyzed gene and protein expression in PGCLCs which are produced by our engineering approach in order to investigate the efficiency of PGCLC formation. In order to investigate the potential of PGCLCs for go through meiosis, we generated and established a transgenic ESC line that express Stra8 (express when germ cells enter meiosis) upstream to red fluorescent protein (RFP). Then we treated the in vitro produced PGCLC with retinoic acid for 5 days both in PGCLCs that were produced in our system and in conventional system.

Results:

The results here show that BMP4 release from alginate sulfate MPs is significantly retarded by the sulfated groups compared to neat alginate. Then, BMP4-laden MPs are incorporated within the aggregates during differentiation of GCs from ESCs. It is observed that BMP4-laden MPs increase GC differentiation from ESCs at least twofold compared to the conventional soluble delivery method. Interestingly, following meiosis induction, Dazl, an intrinsic factor that enables GCs to enter meiosis, and two essential meiosis genes (Stra8 and Smc1b) are upregulated significantly in MP-induced aggregates compared to aggregates, which are formed by the conventional method.

Conclusion:

In summary, we used BMP4-delivering MPs as an innovative strategy in producing PGCLCs from ESCs. Together, our data show that controlled delivery of BMP4 during ESC differentiation into GC establish meiosis-competent GCs which can serve as an attractive GC source for reproductive medicine.

Keywords:

Meiosis, Tissue Engineering, Infertility, Germ Cells



NATIONAL WINNER



Andrology

Kambiz Gilani, PhD
k.gilany@ari.ir

Kambiz Gilani, PhD, obtained his MSc from University of Southern Denmark (Odense) in Applied Mathematics and Molecular and Cell Biology in 2003. He then moved to Belgium (Antwerp) to obtain his PhD in Biomedicine in 2008. His interest of research was mass spectrometry-based proteomics during those years. He came back to Iran in 2009. He was hired at Avicenna Research Institute (ACECR) first as a postdoc, then as an Assistant Professor and recently promoted to an Associate Professor. He focused on male infertility disorders by applying proteomics and metabolomics technology during the last 8 years. He has successfully developed metabolomics technology in Avicenna Research Institute by using human seminal plasma as a novel and unexplored biological material in infertile men. He and his colleagues have shown the potential application of metabolomics techniques in diagnosis of infertile men specifically using human seminal plasma.

Untargeted Metabolomic Profiling of Seminal Plasma in Non-obstructive Azoospermia Men: A Non-invasive Detection of Spermatogenesis

Objective:

Male factor infertility affects approximately half of the infertile couples, in spite of many years of research on male infertility treatment and diagnosis; several outstanding questions remain to be addressed. In this regard, metabolomics as a novel field of omics has been suggested to be applied for male infertility problems. A variety of terms associated with metabolite quantity and quality have been established to demonstrate mixtures of metabolites. Despite metabolomics and metabolite analyses have been around more than decades, a limited number of studies concerning male infertility have been carried out. Lack of the ejaculated sperm owing to testicular malfunction has been reported in 6–10% of infertile men, a condition named non-obstructive azoospermia (NOA). In this study, we investigated untargeted metabolomic profiling of the seminal plasma in NOA men using gas chromatography–mass spectrometry (GCMS) and advance chemometrics.

Material and Methods:

Seminal Plasma of fertile men and NOA from positive TESE and negative TESE were collected. The metabolome of were extracted. The metabolome were derivatized and analyzed by GCMS. The spectra were process and analyzed by advance chemometrics.

Results:

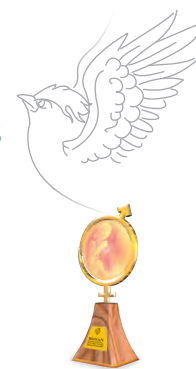
We were able to show based on total ion chromatography (TIC) of different studies groups can be classified by chemometrics analysis. Furthermore, we could identify 36 discriminatory metabolites. These metabolites may be considered discriminatory biomarkers for different groups in NOA.

Conclusion:

We have shown in the discovery phase that metabolic profiling can be used to separate the NOA patients. Additionally, we have found 36 potential biomarker to discriminate the different groups in NOA. Furthermore, we have shown metabolic profiling can be use an alternative method to the invasive method TESE to detect spermatogenesis in NOA.

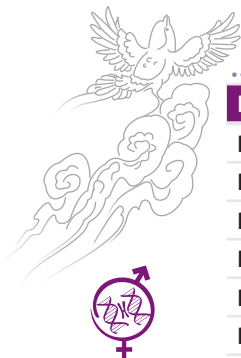
Keywords:

Metabolomics, Seminal Plasma, Non-obstructive, Spermatogenesis, Biomarker



Last Name, First Name, Degree	Country
Abroun , Saeid, PhD, Post Doct	Iran
Aflatoonian , Abbas, MD	Iran
Aflatoonian , Reza, MD, PhD	Iran
Afsharian , Parvaneh, PhD	Iran
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Hosseini far , Hani, MSc	Iran
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Moini , Ashraf, MD	Iran
Monsees , TK, PhD	South Africa
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Last Name, First Name, Degree	Country
Movaghar , Bahar, PhD	Iran
Movahedin , Mansoureh, PhD	Iran
Movassagh , Hooman, LLB, LLM, PhD	United States
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ROYAN
Institute

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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 (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 6 Research Programs
5 Core Facilities

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 was initially established in 2004 as the first research branch of Royan Institute. It is located in Isfahan Province.

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.

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.

- Cellular Biotechnology- Genetic Laboratory
- Cellular Biotechnology- Stem Cell Laboratory
- Molecular Biotechnology- Recombinant Protein Laboratory
- Reproductive Biotechnology- Andrology Laboratory
- Reproductive Biotechnology- Embryology Laboratory

- 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)
- Birth of the first cloned wild ram as an endangered species in Iran (2015)

Royan Institute for Reproductive Biomedicine (RI-RB)

Endocrinology and Female Infertility Department of RI-RB

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

- 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



Articles

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10. Nasiri N, Moini A, Eftekhari-Yazdi P, Karimian L, Salman-Yazdi R, Arabipour A. **Oxidative Stress Statues in Serum and Follicular Fluid of Women with Endometriosis.** Cell J. 2017; 18(4): 582-587.
11. Madani T, Hosseini R, Ramezanali F, Khalili G, Jahangiri N, Ahmadi J, Rastegar F, Zolfaghari Z. **Metabolic Syndrome in Infertile Women with Polycystic Ovarian Syndrome.** Arch Endocrinol Metab. 2016; 60(3): 199-204.
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Andrology Department of RI-RB

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

- 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

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



Articles

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Embryology Department of RI-RB

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

- 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

- 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 to perform multiple research activities 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 them a promising future.



Articles

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Reproductive Genetic Department of RI-RB

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

- 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.



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Epidemiology Department of RI-RB

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 which 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.

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Reproductive Imaging Department of RI-RB

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 hysonostography, 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.





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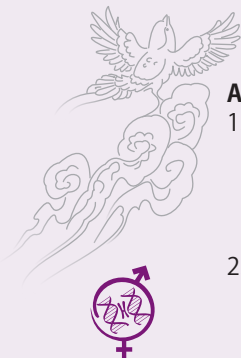
Royan Institute for Stem Cell Biology and Technology

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.





Articles

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Royan Institute for Biotechnology

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 PPAR γ in neurogenesis and finally role of biotechnology in production of biological products.

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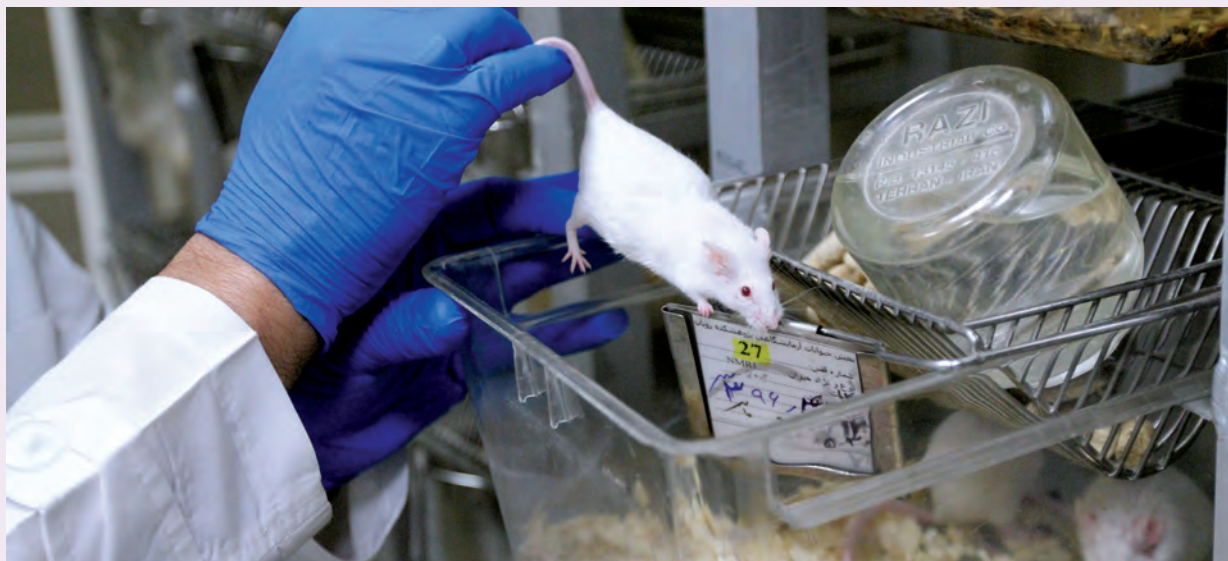
Animal Core Facility

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

- 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





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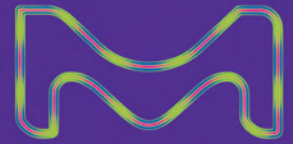
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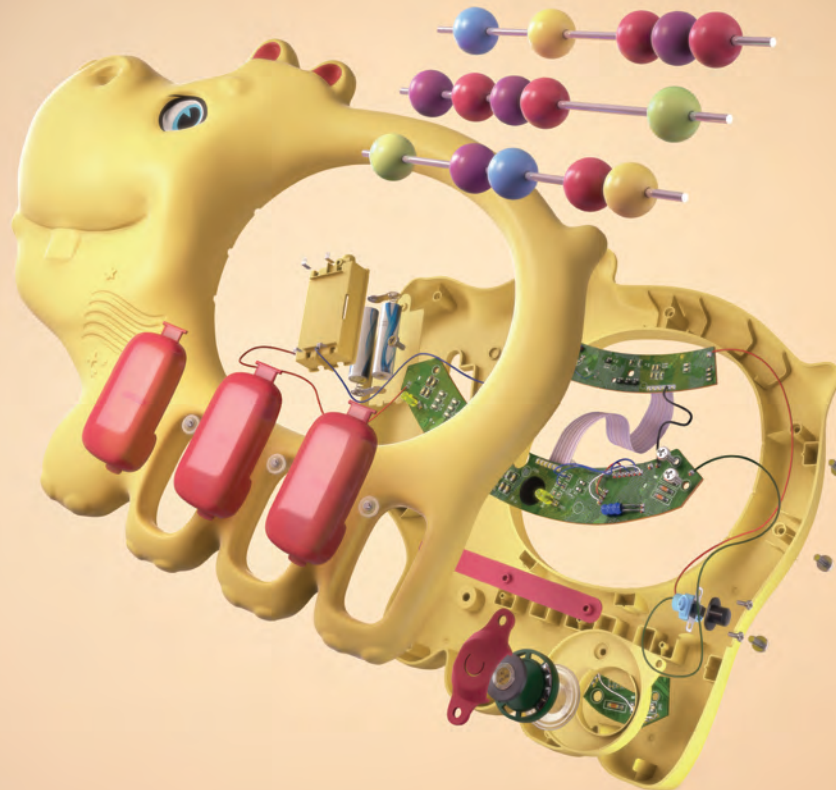


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