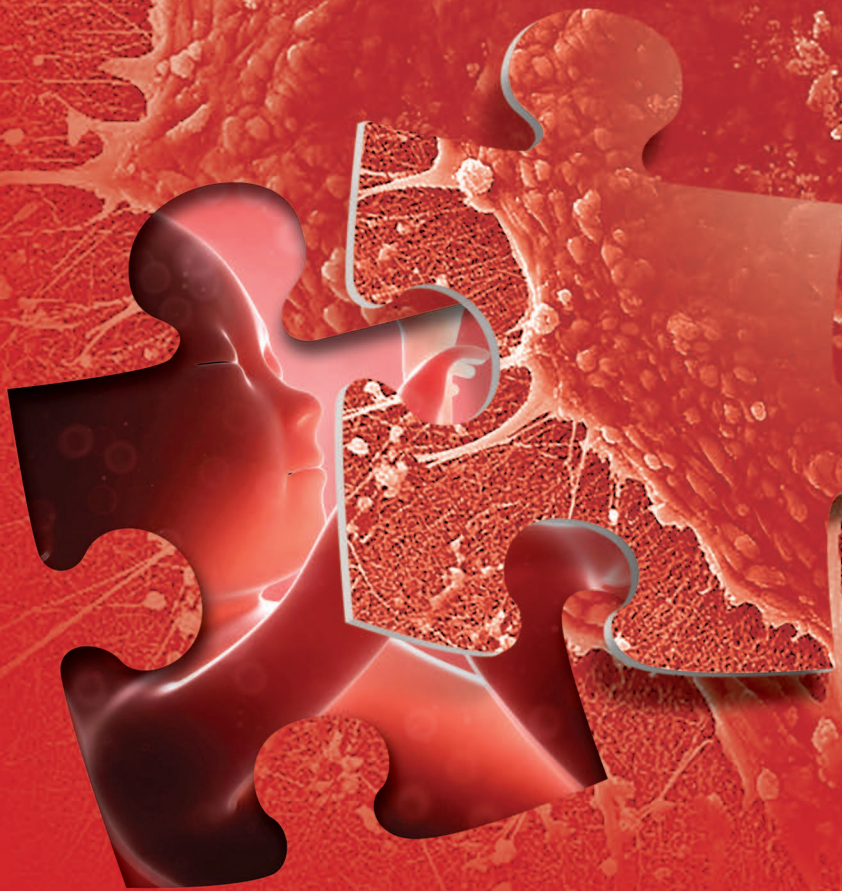


ROYAN INSTITUTE

THE SEVENTEENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD
Reproductive Biomedicine & Stem Cell



SEPTEMBER 2016
TEHRAN - IRAN

THE EIGHTEENTH
ROYAN
INTERNATIONAL RESEARCH AWARD

Deadline for Application: April, 2017



Kazemi Prize, 2017

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



SEPTEMBER, 2017

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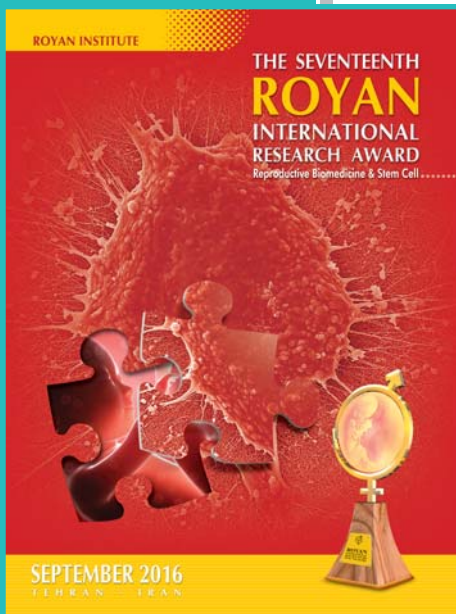
The Seventeenth

ROYAN

INTERNATIONAL RESEARCH AWARD



Dr Saeid Kazemi Ashtiani
The Late Founder of ROYAN Institute



Cover Legend:
 Colony formation of human embryonic stem cells onto synthetic nanofibers
 (Photographer: Mohammad Hossein Ghanian)

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FOREWORD



Appeasement of the pain and sufferings of patients is one of the concerns and strategic priorities of the Islamic Republic of Iran. During the recent three decades, Iranian specialists and researchers especially my colleagues in ACECR, have taken stride steps in the fields of infertility, stem cell and biotechnology with integrated and coherent programs and enormous efforts and gained significant and impressive success in these fields.

Promotion and dissemination of science in Iran, conversion of research results to specialist services, publication of scientific books and articles, presentation of research findings in scientific congresses and establishment of infertility treatment and cell therapy special service centers are examples of this scientific movement of ACECR. Royan Institute is one of the successful ACECR centers that have made valuable contributions to production and development of these sciences and establishment of infertility treatment and cell therapy centres.

Royan international congress and award is one of the effective programs in developing these sciences in Iran and promotion of collaboration with international scientific communities. Mission of Royan international award ,over 17 years of its convention, is to select and support the best researches in reproductive science and stem cell by recruiting international experienced jury team. This award has paid special attention to applied research due to the fact that ACECR especially Royan Institute believe production of science without its application does not bear valuable fruition for society.

As president of ACECR, I commemorate memory of Dr Saeid Kazemi Ashtiani, the late founder of Royan Institute and innovator of this scientific event, as well as all scientific and executive committees of Royan award especially jury board and Royan Institute faculty members. In addition, I congratulate on winners of this award and hope to hold this prestigious event gloriously in the coming years.



Tayyebi HR, PhD

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



INTRODUCTION



It is my pleasure to witness the convention of the 17th Royan International Award and the 4th Kazemi Prize, in honor of the late founder of Royan institute.

The secret of success and sustainability of this auspicious and prestigious event rests on continual efforts of Royan institute in directing information to scientific communities, selecting creative, unique and well-thought-out projects with utmost soberness and honesty by unbiased and impartial referees.

The international distinguished attendees, personal experiences from tangible realities of Iran, bereft of malicious propaganda, have changed the mindsets of these prominent scientists. Their fresh insights towards Iran contributed us to travel this meandrous and winding path with confidence and success. This achievements will be the herald of future cooperation and categorically open new horizon to launch joint projects.

This year, award secretariat has received 175 projects from 36 countries. The projects were evaluated by 209 national and international referees in eight separate scientific committee including andrology, embryology, female infertility, epidemiology, reproductive genetics, biotechnology, stem cells and regenerative medicine.

On the strength of referees' final decision, and deliberation of Royan scientific board, eight projects were selected to be awarded through ceremony.

Kazemi Prize was established in 2010 to honor the memory of the prominent scientist; Dr Saeid Kazemi Ashtiani. This prize is to be awarded to a scientist whose enormous and incessant efforts will result in the progress and improvement of biology and medicine.

The prize of this year will be awarded to a Dutch pronounced Scientist, Professor Hans Clevers, in recognition of numerous inventions made, hundreds of articles and books published.

I do voice my sincere appreciation and gratitude to those whose performances and devotions have paved the way for the realization of Royan supreme goals, my deep acknowledgement bestowed to those whose articles have enriched the scientific aspects of our award and we have enjoyed their unwavering supports. Executive committee long time endeavor as well as Kazemi Prize nomination committee and honorable referees' measured and sober evaluations is highly appreciated.

Beyond scientific sphere, Royan institute attaches too much importance to establishments and strengthening of amicable and humane relationships among those scientific elites whose mental disturbances and concerns are human's health. In alignment with this vocation and realization of such a high goal, we are opt to exchange our valuable achievements and long time acquired experiences to strengthen our cordial relations and confer with scientific think thanks and research centers. It is hoped that our efforts will lead to the appeasement (relief- mitigation) of human sufferings and result in a world imbued with peace and tranquility and abatement of brewing horrendous and grinding crises.



Gourabi H, PhD

Award Chairman and Royan Institute President

Royan Awards



Royan International Research Award was founded by the late director of Royan Institute, Dr Saeid Kazemi Ashtiani with the aim of encouraging researchers, appreciating their efforts and preparing a friendly scientific atmosphere for them to exchange their knowledge and experiences. Kazemi had wonderful ideas to bring researchers together and motivate them to increase their efforts and perform high level researches via this research award. Royan's staff lost their beloved director in January 2006 by heart attack, May he rest in peace.

This annual award is extending into a higher quality event every year, increasing the scientific level and number of the submitted papers. The research papers are evaluated through an intense jury procedure by Award's national and international Jury board to whom our special thanks goes. Each year the prominent researches with outstanding help in solving problems in reproduction and stem cell fields, are announced, appreciated and rewarded.

As comparing the researches in different fields is very difficult and finding the best researches with variations in methods, implements and results is almost impossible, from the eighth award the same prizes are distributed among winners in different fields of reproductive biomedicine and stem cell such as: female infertility, epidemiology, ethics, andrology, embryology, reproductive imaging, reproductive genetics, stem cell biology and technology, regenerative medicine, and biotechnology.

Nomination and Selection Procedure of Award

The submitted research articles are categorized according to nine scientific groups: female infertility, reproductive genetics, epidemiology, ethics, embryology, andrology, reproductive imaging, stem cell biology and technology and biotechnology. Each article is ranked according to its relevancy, impact factor, and an innovation score.

After the articles are sorted, each scientific group selects their nominees and sends them to national and international referees for evaluation.

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

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

Evaluation of the articles by the juries has been discussed in the board of juries and their decisions have been approved by scientific board of the institute. Finally, international and national winners are selected and invited to present their researches in Royan twin congress on Reproductive Biomedicine and Stem Cell Biology and Technology which is held almost in September every year and will receive their prizes in 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 | September 2000 | Received Papers: 72

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 Clomiphene Resistant PCOS
- **Mohammad Ebrahim Parsanezhad**
Section of the Cervical Septum Doesn't Impair Reproductive Outcome



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September
2000





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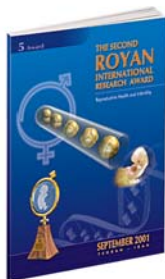
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The **Second** Royan International Research Award | September 2001 | Received Papers: 78



The
Second
ROYAN
International
Research
Award

Reproductive Biomedicine & Stem Cell



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 | September 2002 | Received Papers: 212

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-Protamine-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

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September
2002





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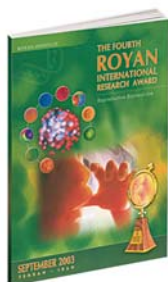
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The **Fourth** Royan International Research Award | September 2003 | Received Papers: 222



The
Fourth
ROYAN
International
Research
Award

Reproductive Biomedicine & Stem Cell



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 | September 2004 | Received Papers: 199

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



The
Fifth
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Reproductive Biomedicine & Stem Cell



September
2004





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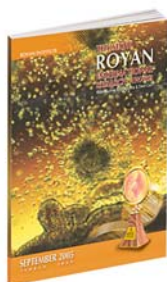
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The **Sixth** Royan International Research Award | September 2005 | Received Papers: 198



The
Sixth
ROYAN
International
Research
Award

Reproductive Biomedicine & Stem Cell



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 Calegari, 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

Finally, this year we got more papers and the jury procedure was more difficult. The papers were very close together in scientific level, so a hairsplitting jury procedure was needed to find out the best of them.



The **Seventh** Royan International Research Award | September 2006 | Received Papers: 221

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

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September
2006





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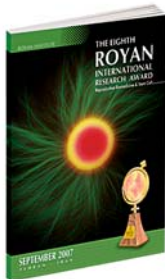
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The **Eighth** Royan International Research Award | September 2007 | Received Papers: 248



The
Eighth
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Research
Award
Reproductive Biomedicine & Stem Cell



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 genetics 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 | September 2008 | Received Papers: 202

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 genetics 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

The
Ninth
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September
2008





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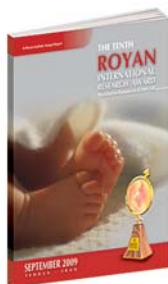
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The **Tenth** Royan International Research Award | September 2009 | Received Papers: 253



The
Tenth
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International
Research
Award
Reproductive Biomedicine & Stem Cell



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 genetics 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 | September 2010 | Received Papers: 358

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 genetics 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 Piryaei**
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



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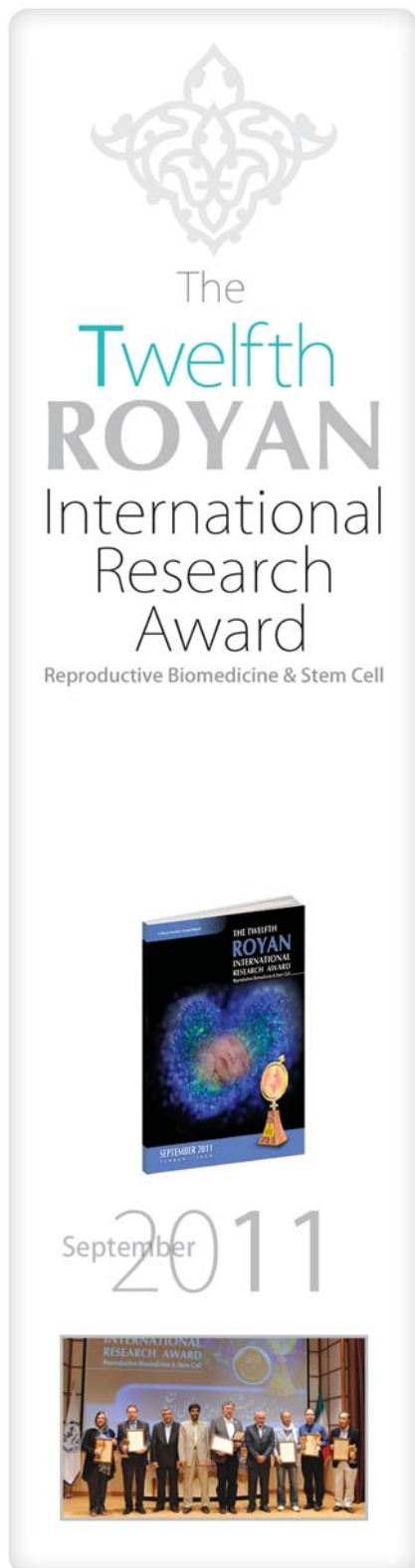
Reproductive Biomedicine & Stem Cell



September
2010



The **Twelfth** Royan International Research Award | September 2011 | Received Papers: 280



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 genetics 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 | September 2012 | Received Papers: 169

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 fertility 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 genetics 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

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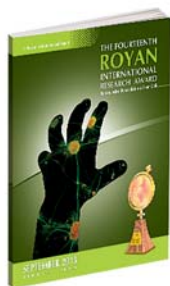
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The **Fourteenth** Royan International Research Award | September 2013 | Received Papers: 206



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Fourteenth
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International
Research
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Reproductive Biomedicine & Stem Cell



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 genetics & 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 | September 2014 | Received Papers: 222

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 genetics 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

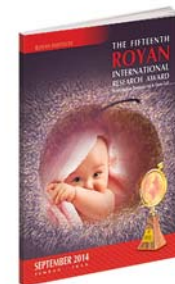
Iranian Winners:

- **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



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Reproductive Biomedicine & Stem Cell



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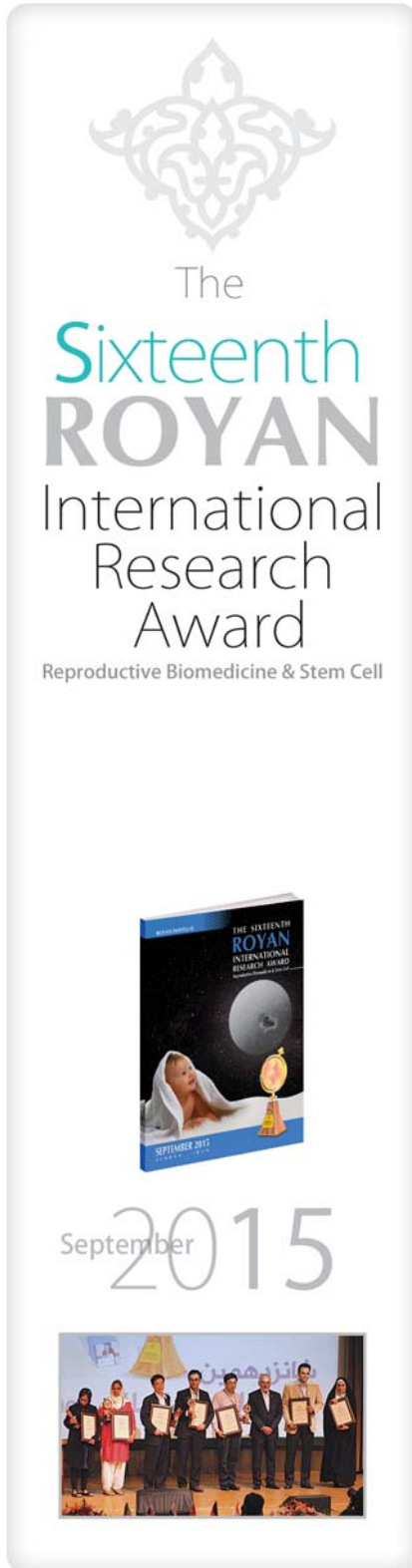


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The **Seventeenth**
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International Research Award

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The **Sixteenth** Royan International Research Award | September 2015 | Received Papers: 204



International Winners:

Best research project in female infertility field

- **Geetanjali Sachdeva**, India
Endometrial Secretome and Its Role in Uterine Functions

Best research project in embryology field

- **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 genetics 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:

- **Maryam Shahhoseini**
Expression Profile of Macrophage Migration Inhibitory Factor (MIF) Signaling Pathway as a Potential Biomarker in Pathophysiology of Endometriosis

- **Morteza Mahmoudi**
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WINNERS INTERNATIONAL WINNER

Biotechnology



 **Jianguo Zhao, PhD**

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Dr Zhao received his PhD in Animal genetics (2003) from Northeast Agricultural University and attended Institute of Medical Genetics at Shanghai Jiaotong University from 2003 to 2005. He had postdoctoral training in University of New Orleans of US with Dr Barry Bavister (2005-2007). After that he worked in University of Missouri-Columbia/ National Swine Research and Resource Center as a Research Assistant Professor from 2007 to

2010. He joined the State Key Laboratory of Stem cell and Reproductive Biology of the Institute of Zoology, CAS, as a principle investigator and group leader of "Genetic modifications in large animals", supported by CAS "100 Talents" Program in 2010. His research is mainly focus on: 1) efficient genetic modifications in pig genome for improving pig production performance; 2) establishment of optimal pig models for biomedical research.

High Efficient Genome Editing in Pigs for Making Human Disease Models

Objective:

Pigs have been extensively used in biomedical research and are an excellent models for human diseases. The efficient and precise genetic modification of pigs would facilitate the generation of tailored disease models and strains with valuable agricultural traits. The emergence of nuclease-mediated gene editing technologies, including zinc finger nucleases (ZFNs), transcription activator-like effector nucleases (TALENs), and the clustered regularly interspaced short palindromic repeat (CRISPR/Cas9 system), introduced a new era for gene targeting, especially in large animals. Thus develop a strategy independent of SCNT of making precise, high efficient, multiple gene targeting in pig genome will greatly facilitate the development of pig models.

Material and Methods:

In vitro oocyte maturation, in vitro embryo culture Cell transfection, Microinjection Somatic cell nuclear transfer RT-PCR Western et al

Results:

1. Talens mediated efficient DJ-1 deletion for making Parkinson's disease animal model In total, 5% (2/40), 2.5% (2/80), and 22% (11/50) of the obtained colonies of fibroblast cells were mutated for GGTA1, Parkin, and DJ-1, respectively. Mixed DJ-1 mutant colonies were used as donor cells for somatic cell nuclear transfer (SCNT), and three female piglets were obtained (two were bi-allelically mutated, and one was mono-allelically mutated). Western blot analysis showed that the expression of the DJ-1 protein was disrupted in KO piglets. 2. Efficient CRISPR/Cas9-mediated biallelic gene disruption for making hearing loss disease models and site-specific knockin after rapid selection of highly active sgRNAs in pigs Assessment of sgRNA mutagenesis efficiencies can be achieved within 10 days from the design of the sgRNA with a single blastocyst genotyping system. The most effective sgRNA selected by this system was successfully used to induce site-specific insertion through homology-directed repair at a frequency exceeding 13%. We further showed that direct cytoplasmic injection of Cas9 mRNA and the favorable sgRNA into zygotes could generate MITF biallelic knockout piglets with an efficiency of up to 100%. 3. One-step generation of triple genotargeted pigs using CRISPR/Cas9 system By co-injection of Cas9 mRNA and multiplexing single guide RNAs (sgRNAs) targeting parkin, DJ-1, and PINK1 genes, respectively, into in vivo derived pronuclear embryos, we simultaneously targeted three distinct genomic loci. In addition, our trio-based whole-genome sequencing analysis suggested that the incidence of off-target events is low.

Conclusion:

Combination of TALENs technology with SCNT can efficiently generate bi-allelic KO pigs without the integration of exogenous DNA. Further, we established the protocols for screening high efficient gRNA screen, which could obtain bi-allelic gene knockout, Triple gene targeting at one step with direct injection of one cell zygote. With these techniques, DJ-1 KO pigs, parkin/DJ-1/PINK1 triple targeted pigs for Parkinson's disease, MITF KO pigs for hearing loss disease models has been made.

Keywords:

Talen, CRISPR/Cas9, Pig, DJ-1 MITF



INTERNATIONAL WINNER

Embryology

Peter Koopman is Professor of Developmental Biology at the Institute for Molecular Bioscience of the University of Queensland, Brisbane, Australia. He trained with Anne McLaren and Robin Lovell-Badge at the Medical Research Council in London, where he jointly discovered the Y-chromosomal male sex-determining gene SRY and demonstrated its ability to cause sex reversal in XX transgenic mice. His team continues to study the genetic pathways that regulate sex determination

and gonadal development, applying this knowledge to diagnosing and managing human disorders of sex development. He is author of more than 250 papers, cited over 13000 times, and has given over 250 invited lectures and conference presentations. Prof Koopman is a Senior Principal Research Fellow of the National Health & Medical Research Council of Australia, Editor-in-Chief of the journal Sexual Development, and a Fellow of the Australian Academy of Science.



Peter Koopman, PhD

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Validation of Retinoic Acid as the Master Inducer of Meiosis in Fetal Germ Cells

Objective:

We previously published in Science the discovery that retinoic acid (RA) is the key molecule that drives germ cells to enter meiosis in mouse fetal ovaries, and that germ cells in fetal testes are prevented from being exposed to RA by the action of the p450 degradative enzyme CYP26B1 in fetal testes. These findings solved a long-standing mystery, and provided a completely new paradigm regarding how entry into meiosis is regulated in a sex-specific manner. Surprisingly, another group subsequently reported they were unable to detect RA in the developing ovary, and found that germ cells are able to enter meiosis normally in mice lacking ALDH1A2 and -3, two important enzymes for RA synthesis. Since that time, many researchers have questioned the importance of RA in this system. Here, we tested whether the action of ALDH1A1 could account for the anomalous findings.

Material and Methods:

ALDH1a1 represents a third potential source of RA in the developing gonads. In this study, we used RARE-LacZ reporter mice, and studied expression of RA-responsive genes by qRT-PCR. We used CYP26B1 knockout mice to experimentally increase endogenous RA levels and test the consequences for germ cell behaviour. We used in situ hybridization, immunofluorescence and Western blotting to examine where and when Aldh1a1 is expressed. We used ALDH1A1 knockout mice to test the consequences for germ cell behaviour, as measured by qRT-PCR and Western blot.

Results:

First, we confirmed that RA can indeed be visualized in the developing fetal ovaries, and up-regulates several known target genes there. In CYP26B1 knockout mice, RA was ectopically present in fetal testes, and induced meiotic markers there, but this effect was eliminated in the presence of RA receptor antagonists. Importantly, we showed that ALDH1a1 is expressed in the developing ovary – an important and previously overlooked source of RA. The importance of RA was demonstrated by showing that, in ALDH1a1 knockout mice, entry into meiosis is delayed. Finally, we found that Aldh1a1 is expressed more strongly when RA levels are low, suggesting this gene might be even more important in the absence of ALDH1A2 and -3.

Conclusion:

Despite published findings that potentially undermine the role of RA, we have clearly established that RA is present at the right time and place to act as the master inducer of germ cell meiosis in the fetal ovary. Our experiments demonstrate that meiosis induction is mediated by a molecule that is both sensitive to CYP26B1 and acting through RA receptor – only RA fits these criteria. Even though germ cells are able to enter meiosis normally in mice lacking ALDH1A2 and -3, our data clearly implicate ALDH1A1 as the “missing” piece of the puzzle in those experiments. Thus, our data re-establish that endogenous RA is the meiosis trigger in the fetal ovary - an important piece of textbook science.

Keywords:

Germ Cells, Meiosis Regulation, Ovary, Knockout Mouse

INTERNATIONAL WINNER

Regenerative Medicine



 **Mohammadsharif Tabebordbar, PhD**

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Mohammadsharif Tabebordbar received his Bachelor's and Master's degrees in Biotechnology from University of Tehran, while gaining several years of research experience in the field of Stem Cell Biology at Royan Institute. During his PhD at Harvard University, he developed culture conditions to expand healthy and diseased adult muscle stem cells in culture and provided the proof of concept for correcting the genetic mutation in these cells using gene editing technology. He also provided evidence for the feasibility of an in vivo gene editing-based approach to treat Duchenne

Muscular Dystrophy (DMD) and investigated the host immune response after delivery of gene editing components into animals. The results of his research have been published in several peer-reviewed journals including Cell, Science and Nature Methods. Dr Tabebordbar is also the recipient of Distinction in Teaching Award from Derek Bok Center for Teaching and Learning at Harvard, Albert J. Ryan Foundation Award for Outstanding Graduate Students in Biomedical Sciences and Excellence in Research Award from American Society of Gene and Cell Therapy.

In vivo DMD Gene Editing in Muscles and Muscle Stem Cells of Dystrophic Mice

Objective:

Duchenne muscular dystrophy (DMD) is a X-linked genetic disorder that arises from frame-disrupting mutations in the DMD gene, encoding DYSTROPHIN. Lack of DYSTROPHIN expression destabilizes muscle fiber membranes, increases susceptibility to contraction-induced injury and drives muscle degeneration. Removing one or more exons from the mutated transcript can produce an in-frame mRNA and a truncated but still functional protein.

Material and Methods:

In this study, we developed and tested a direct gene editing strategy to recover DYSTROPHIN expression in the mdx mouse model of DMD by coupling clustered regularly interspaced short palindromic repeats (CRISPR)-Cas9 endonucleases delivered via adeno-associated virus (AAV) with paired guide RNAs flanking the mutated Dmd exon 23.

Results:

We demonstrated precise excision of mutated exon 23 results in restoration of dystrophin reading frame and protein expression in vivo in both skeletal and cardiac muscles following local or systemic delivery. Dystrophin expression in AAV Dmd-CRISPR treated mdx mice was sufficient to partially recover functional deficiencies of dystrophic muscle. Finally, we demonstrated in vivo targeting of the mdx mutation in endogenous muscle stem cells, suggesting that AAV-CRISPR may provide a means to support ongoing repair of dystrophic fibers with corrected muscle precursors.

Conclusion:

This study provides proof-of-concept evidence supporting the feasibility and efficacy of in vivo genome editing to correct frame-disrupting mutations in DMD.

Keywords:

CRISPR, DMD, AAV

Project Application and Usage:

This study provides proof-of-concept evidence supporting the efficacy of in vivo genome editing to correct disruptive mutations in DMD in a relevant dystrophic mouse model. We show that programmable CRISPR complexes can be delivered locally and systemically to terminally differentiated skeletal muscle fibers and cardiomyocytes, as well as muscle satellite cells, in neonatal and adult mice, where they mediate targeted exon deletion, restore DYSTROPHIN expression and partially recover functional deficiencies of dystrophic muscle. As it has been estimated that more than 80% of DMD patients could benefit from skipping one or more exons, clinical translation of our approach, which employs a clinically relevant AAV delivery strategy, already in use in human trials, has the potential to transform the clinical course of disease for a significant number of DMD patients. This strategy provides the ability to permanently correct genetic mutations in dystrophic muscles and muscle stem cells and holds promise to overcome limitations related to transient effect of conventional exon skipping approaches not only for DMD, but also for a wide range of other genetic muscle diseases.



INTERNATIONAL WINNER

Reproductive Genetics

Dr Ramalho-Santos received his BS and a Masters' in Cell Biology at the University of Coimbra, Portugal, where he worked on the biochemistry of aspartic proteases. He went on to receive a PhD in Developmental and Stem Cell Biology at Harvard University, under the co-supervision of Drs Douglas Melton and Andrew McMahon. His doctoral work focused on stem cell genomics and cell signaling in the context of mouse development. He was hired as a UCSF Faculty Fellow in October of 2003, an independent research position designed as an alternative to a traditional

postdoc. He became an Assistant Professor in the Departments of Ob/Gyn and Pathology at UCSF in December of 2007, and was promoted to Associate Professor in July of 2013. His lab has made key contributions to the understanding of the chromatin landscape and transcriptional state of mouse and human pluripotent stem cells in a developmental context. His team makes use of mouse genetics and embryology, stem cell biology, cellular reprogramming, functional genomics, epigenetics and bioinformatics.



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Hira-Mediated H3.3 Incorporation Is Required for DNA Replication and Ribosomal RNA Transcription in the Mouse Zygote

Objective:

A successful fertilization event occurs when a sperm cell fuses with an oocyte to form a totipotent zygote and initiates embryogenesis. Sperm DNA is delivered to the oocyte at fertilization depleted of histones and highly packaged by protamines, and therefore needs to reacquire a nucleosomal organization to support development. Genome-wide chromatin reprogramming occurs at fertilization and is thought to center on the paternal genome, under the control of largely unknown maternal factors.

Material and Methods:

We used a genetic approach to specifically delete Hira during oogenesis using Zp3-Cre (de Vries et al., 2000) and a conditional ("floxed") allele of Hira.

Results:

We report that maternal Hira, a chaperone for the histone variant H3.3, is required for mouse development past the zygote stage. Male pronucleus formation is inhibited upon deletion of Hira due to a lack of nucleosome assembly in the sperm genome. Hira mutant oocytes are incapable of developing parthenogenetically, indicative of a role for Hira in the female genome. Both parental genomes show highly reduced levels of DNA replication and transcription in the mutants. It has long been thought that transcription is not required for zygote development. Surprisingly, we found that Hira/H3.3-dependent transcription of ribosomal RNA is required for first cleavage.

Conclusion:

Our results demonstrate that Hira-mediated H3.3 incorporation is essential for parental genome reprogramming, and reveal an unexpected role for rRNA transcription in the mouse zygote. Most studies of reprogramming in the zygote have focused on the sperm genome, and understandably so given the dramatic global chromatin changes that it undergoes. We provide here functional data to support the notion that the female genome is not a mere passenger at this stage but instead undergoes dynamic chromatin reprogramming that is critical for zygote development. Our results also overturn an idea that has stood since the 70's that transcription in the zygote is both minor and irrelevant for development, and that Zygotic Gene Activation (ZGA) only becomes functional at the 2-cell stage, when there is a major burst in mRNA synthesis (Braude et al., 1979; Johnson, 1981; Schultz, 2002; Zernicka-Goetz et al., 2009). We report a critical role for RNA Pol I transcription in the zygote, and show that this transcription is Hira-dependent. Therefore, functional ZGA can actually be considered to begin at the zygote stage, and the component of rRNA transcription is essential for progression to the 2-cell stage. The findings reported here may also be of relevance for human assisted reproduction technologies, because an abnormal 1PN phenotype similar to that found in maternal Hira mutants is often observed in cases of ICSI that fail to develop past the zygote stage (Flaherty et al., 1995).

Keywords:

Zygote, Epigenetic, Reprogramming, Transcription, RNA Polymerase I

INTERNATIONAL WINNER

Stem Cell Biology and Technology



 Xiaohua Shen, PhD

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Xiaohua Shen received her PhD in biological chemistry at the University of Michigan, did the postdoctoral training with Dr Stuart Orkin at Harvard Medical School. She was an Instructor at Harvard Medical School before joining in Tsinghua University at the end of 2010. Now she is an associate professor in the department of Basic Medical Sciences in the School of

Medicine and an investigator in the Center of Life Sciences at Tsinghua University. Her major research interest is to understand how chromatin structure and long non-coding RNAs influence gene expression and stem cell fate, and how dysregulation of the above process leads to human disease.

Cis-regulatory Roles of lncRNAs in Transcription Regulation and Stem Cell Differentiation

Objective:

Pervasive transcription in mammalian genome produces thousands of long noncoding RNA (lncRNA) transcripts whose functions are largely unknown. Identification and inference of functional lncRNAs are key challenges to understand the genome complexity and RNA-mediated gene regulation.

Material and Methods:

We have rigorously investigated lncRNA functions during embryonic stem cell (ESC) differentiation by utilization of complementary genome editing, biochemical and single-cell approaches, including knock-out versus knock-in, deletion versus overexpression, knockdown versus cDNA rescue and CRISPR/Cas9 mediated RNA-tethering methods. We have discovered two important paradigms in lncRNA-mediated regulations of gene expression.

Results:

We revealed a prevalent mode of cis-regulation of nearby transcription by divergent lncRNAs. Divergent lncRNAs transcribed oppositely from nearby protein-coding genes represent an interesting class of lncRNAs. They account for ~20% of lncRNAs in mammalian genomes, show strong correlation and coexpression with genes of essential regulatory functions in development, and have deeper evolutionary origin compared to intergenic lncRNAs. In-depth characterization of the divergent Evx1as/EVX1 locus revealed a direct role for the Evx1as lncRNA transcripts to promote EVX1 transcription in cis, and to regulate stem cell differentiation. At a single-cell level, early broad expression of Evx1as is followed by a rapid, high-level transcription of EVX1, supporting an upstream function of Evx1as. Mechanistically, Evx1as RNA binds to regulatory sites on chromatin, promotes an active chromatin state and interacts with Mediator. Remarkably, depletion of 75% divergent lncRNAs in various contexts, including pluripotency maintenance, lineage differentiation, reprogramming, human cancer and mouse zygotic development, led to downregulation of nearby genes. The effect of lncRNA-mediated cis-regulation may be more prominent but unlikely to be limited to the divergent lncRNA biotype. Previously we showed that the lncRNA Haunt binds to its own and downstream target HOXA genes on chromatin, and acts in cis to fine-tune HOXA induction during ESC differentiation. The Haunt DNA locus provides enhancers that are required for the activation of HOXA genes. Whereas Haunt RNA transcripts attenuate long-range chromatin interactions between the Haunt enhancers and the HOXA promoters, and serve as a "brake" to prevent aberrant activation of HOXA genes. The fine balance between the active and repressive functions of Haunt DNA and RNA, respectively, precisely controls the proper expression of the developmentally regulated HOXA locus, and contributes to orchestrated differentiation of ESCs.

Conclusion:

We propose that lncRNA transcripts serve as a flexible cis-regulator to convey subtle regulatory information carried in the genome DNA. Cis transcriptional regulation by lncRNAs may be a general theme of mammalian gene regulation. We further predict that lncRNAs, at least the subset of divergent lncRNAs, may participate in similar developmental or biological processes known to involve in nearby protein-coding genes through regulating their transcription. From this point of view, the functionality of thousands of uncharacterized lncRNA genes can be rapidly predicted on the basis of the knowledge of their neighboring genes. This functional inference may help to generate meaningful hypothesis to investigate lncRNA transcripts whose functions are largely unknown, and facilitate our overall understanding of non-coding portions of the genome.

Keywords:

Divergent lncRNAs, ESCs, Transcription Regulation, Evx1as, Haunt



WINNERS NATIONAL WINNER

Embryology and Biotechnology

Mohsen Sharafi obtained his PhD in Physiology of Reproduction from University of Tehran. He is currently assistant professor of Animal Science School at Tarbiat Modares University. The main research area of his laboratory is sperm biology especially in cryobiology of sperm and molecular

studies of sperm such as epigenetic modulation during ART. He has developed a novel plant-based system for cryopreservation of domestic animal sperm which had forwarding outcome for animal artificial insemination.



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Optimization of Domestic Animal Sperm Freezing Using Novel Plant-Origin Cryopreservation Media

Objective:

Cryopreservation of sperm has allowed to conservation of genetic resources in cryobanks and guarantee of constant commercially of sperm supply for animal breeding program using artificial insemination. We performed several projects for optimization of sperm freezing in bull, ram, goat and rooster. Phosphatidyl choline originated from soybean (lecithin) has been assessed in different protocols for substitution of egg yolk in animal freezing media. Demands for replacement of egg yolk in extenders have been increased in recent years due to this concerns that egg yolk contains substances that impede respiration of sperm which may lead to decrease their motility. Moreover, egg yolk increases the risk of microbial contamination that may increase the risk of disease transmission through the transportation of egg yolk-based extenders in the international exchange of stored semen. After replacement of egg yolk by soybean lecithin in extenders, various experiments for consideration of frozen-thawed sperm quality such as microscopic, cellular, biochemical, flow cytometric and epigenetic aspects were applied to evaluate the cryoprotective effects of lecithin.

Material and Methods:

Semen were collected from animal in each project (ram, goat, bull, rooster) and then each sperm sample was divided into different groups (according to experimental design in each project) for evaluation of potential effects of different concentrations of lecithin compare to traditional cryoprotectants. Moreover, various antioxidant and additives were assessed along with soybean lecithin. After freeze-thaw of sperm, various parameters such as motion characteristics, viability, membrane integrity, apoptosis, mitochondria activity, fertility potential and pregnancy rate were applied to evaluation the effects of different cryoprotectants for preserving the sperm quality and fertility after cryopreservation.

Results:

Overall results in our projects show that for ram and bull sperm freezing, the best results for quality of post-thawed sperm were obtained in extender with 1% lecithin. Moreover, the lower rate of agglutination of sperm was observed in extenders containing lecithin compare to extenders containing egg yolk. For goat sperm freezing, the higher percentages of motility, viability, mitochondria activity and fertility were produced in the extenders with 1.5% lecithin. Also, in goat sperm, lecithin reduced the acrosome damages compare to egg yolk. For rooster, 0.5 % lecithin was enough to produce the highest quality of post-thawed sperm compare to egg yolk. This discrepancy about the optimum levels of lecithin in different species, is related to different capacity of seminal plasma and different size of sperm in ram, bull, goat and rooster. Among different additives for reinforcement of extenders containing soybean lecithin, trehalose and cysteine (ram), and L-carnitine (rooster) had the best reciprocal effects with lecithin.

Conclusion:

Results of our project show that substitution of egg yolk with lecithin has beneficial effects for sperm during freezing. Higher results in fertility potential of frozen-thawed sperm in extenders with lecithin, encourages us to develop a commercial extender based on lecithin for future.

Keywords:

Sperm Freezing, Lecithin, Mitochondria, Fertility

NATIONAL WINNER

Reproductive Genetics



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Anahita Mohseni Meybodi began working at Royan Institute from 2000 when she started her MSc thesis. She worked on "Human sperm various genetic abnormalities and male infertility" and graduated in 2003 from Islamic Azad university, Science & Research branch. In a straight line, she started her PhD and was graduated in 2008 in the field of Medical Genetics from Tarbiat Modarres University, Tehran, Iran. Her PhD project was a research on Fanconi anemia patients and the

repair mechanisms of DNA damages induced by different agents.

She currently works as director of the Medical Cytogenetics Laboratory, an academic staff and medical genetics group leader at Royan institute. She also is in charge of managing the DNA bank and supervising several research projects. Her major research interest is gene alterations and their etiological role in male and female infertility.

Beneficial Application of Molecular Cytogenetics in Delineation of Chromosomal Abnormalities Involved in Male Infertility: From Rare to Care

Objective:

Chromosomal structural aberrations (deletions, duplications, translocations, inversions, and ring chromosomes) and aneuploidies (extra or missing chromosomes and marker chromosomes) are an underlying causes of infertility. Traditionally, cytogenetic analysis of Giemsa-stained metaphase chromosomes are applied to ascertain these abnormalities. However, routine karyotype analysis is not sensitive enough to detect subtle chromosome rearrangements (less than 4 Mb). Identification of submicroscopic aberrations and more detailed molecular profiling of the rearrangements require precise mapping of the breakpoints with methods such as FISH or array CGH (aCGH). In addition, aCGH detects genomic duplications that cannot be identified by metaphase or even interphase FISH analyses. Besides, it is a technique that was developed for high resolution, genome-wide screening of segmental genomic copy number variations. It allowed for a higher rate of detection of chromosomal anomalies that is especially valuable in cases in which karyotype results cannot be obtained.

Material and Methods:

In this project, we report different applications of molecular cytogenetics techniques in order to precisely detect the numerical and structural chromosomal abnormalities, which conventional cytogenetics was unable to perform a conclusive result, in infertile individuals. Some of mentioned chromosomal abnormalities which were detected and confirmed by molecular cytogenetics are 1) Y chromosome isodicentric (Idics) that are associated with male non-obstructive infertility and always occurs as a mosaic with a 45,X cell line and might be misdiagnosed with Y chromosome inversions, 2) complex chromosomal rearrangements (CCRs) in which detection of involved chromosomes and breakpoints are challenging, 3) ring chromosomes as a very rare condition with unknown size deleted segments and 4) mosaic cases in which exact definition of the cytogenetic status as mosaic or non-mosaic and also the number and pattern of cell lines are important for further clinical procedures. In all these cases FISH and aCGH were useful techniques for exact abnormality detection.

Results:

FISH was an efficient method for detecting chromosomal abnormalities, which was performed on different kinds of cells. FISH, as a useful tool for an accurate diagnosis and characterization of chromosomal sub-regions, allowed exploring chromosome rearrangements in greater details with chromosome-specific DNA probes in our cases with Idics and CCRs. Moreover, it helped conventional cytogenetics to detects low-percentage mosaicism in a case with mosaic form of Klinefelter's Syndromes and also established the number of chromosomes in each cell line. aCGH could also detect the size of deleted segment in CCRs and ring chromosomes.

Conclusion:

By combining high resolution techniques of FISH with aCGH, we have an essential tool to determine whether a complex abnormal karyotype is apparent or not, which is especially important for PGDs and PNDs in affected infertile cases.

Keywords:

FISH, Array CGH, Molecular Cytogenetics, PGD, Male Infertility

Project Application and Usage:

The introduction of molecular cytogenetics, such as, fluorescent in situ hybridization (FISH) improved the diagnostic resolution and, until recently, had been considered the methods of choice for detecting chromosomal imbalances and rearrangements. In addition, aCGH detects genomic duplications that cannot be identified by metaphase or even interphase FISH analyses. Both of these techniques are so useful firstly in diagnosis of the complex chromosomal rearrangements of infertile individuals and secondly in PGD during ART and also PND if necessary.



NATIONAL WINNER

Stem Cell Biology and Technology

Dr Kamran Ghaedi graduated in the field of Biology (BSc) from University of Isfahan (1989), and Clinical Biochemistry (MSc) from Isfahan University of Medical Sciences (1993). He pursued his studies toward getting a PhD degree from Kyushu University (Fujiki's lab.) in the field of Molecular Cell Genetics (1999). Fujiki's lab. was recognized as one of the pioneer laboratories in the world on peroxisome biogenesis. Dr Ghaedi engaged in isolation and characterization of several Chinese hamster ovary cells defect in peroxisome assembly and biogenesis. He cloned PEX3 and PEX7 genes and published several high reputed papers in this regard. After getting PhD degree, he was hired as post-doctoral researcher in the field of Molecular Biology by Japan Science and Technology (JST) in Kyushu University (Fujiki's Lab.) for two years. He conducted his

studies in the same lab. as post-doctoral fellow (Japan Society for Promotion of Science) and senior post-doctoral researcher (JST) for more 4 years. Dr Ghaedi returned home after 10 years working in the field of peroxisome biogenesis in mammals. Then he started his academic carrier as a faculty member in University of Isfahan, Biology department. He established a research group (Department of Cellular Biotechnology) working on involvement of genetic factors required for peroxisome biogenesis in neural differentiation of embryonic stem cells and the influence of PPARgamma and FNDC5 on proliferation and differentiation of embryonic stem cells. He was selected as the national distinguished researcher in 2015. He has also supervised several projects and has numerous international publications.



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Utilization of Pioglitazone as a Novel Approach to Increase the Colony Formation Efficiency of Individualized Human Pluripotent Stem Cells

Objective:

One problem in the development of human pluripotent stem cells (hPSCs) cultures is the vulnerability of these cells to undergo apoptosis or anoikis upon cellular detachment and dissociation. These cells undergo massive cell death, particularly after complete dissociation. The Rho-associated kinase (ROCK) inhibitor Y-27632 permits hPSCs survival upon dissociation. However, cloning efficiency is often still low. As, our previous studies showed that PPARgamma activation significantly enhanced the proliferation and survival rate of mouse embryonic stem cells, therefore, we hypothesized that the PPARgamma agonist, pioglitazone, might positively affect survival of dissociated single hPSCs and increase colony formation.

Material and Methods:

We evaluated the effect of PPARgamma activation on cloning efficiency of single dissociated single hPSCs using pioglitazone. Flow cytometry analysis of cell cycle and apoptosis was performed on treated cells compare with the control. Gene expression analysis in dissociated single cells and colony of hPSCs was carried out. On the other hand Positive role of pioglitazone in colony formation was assessed by Western blotting and immunostaining and co-immunoprecipitation of membranous beta-catenin. The relationship between Rho/ROCK signaling pathway and PPARgamma expression was also examined in a different cell type. Finally Pioglitazone and ROCK inhibitor Y-27632 maintenance of the pluripotency of hPSCs was examined by assessment of the respective markers in treated cells.

Results:

Our data indicated that pioglitazone, a selective peroxisome proliferative-activated receptor-gamma agonist, along with Y-27632 synergistically diminished dissociation-induced apoptosis and increased cloning efficiency (2–3-fold versus Y-27632) without affecting pluripotency of hPSCs. Pioglitazone exerted its positive effect by inhibition of glycogen synthase kinase (GSK3) activity and enhancement of membranous beta-catenin and E-cadherin proteins. These effects were reversed by GW-9662, an irreversible peroxisome proliferative-activated receptor-gamma antagonist.

Conclusion:

This novel setting provided a step toward hPSC manipulation and its biomedical applications.

Keywords:

Human Embryonic Stem Cells, Colony Formation, Pioglitazone, Y-27632

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Almadani , Seyed Navid, MD	Iran
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Ashrafi , Mahnaz, MD	Iran
Azin , Seyed Ali, MD, PhD	Iran
Baghaban Eslaminejad , Mohamadreza, PhD	Iran
Bagheri Lankarani , Narges, PhD	Iran
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Bazrgar , Masood, PhD	Iran
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Ebrahimi , Marzieh, PhD	Iran
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Evans , John, PhD	New Zealand
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Fathi , Ali, PhD	Iran
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Ghaderian , Sayyed Mohammad Hossein, MD, PhD, Post doc fellow	Iran
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Gourabi , Hamid, PhD	Iran
Hamidieh , Amir Ali, MD	Iran
Hassani , Seyedeh Nafiseh, PhD	Iran
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Hosseini , Roya, MD	Iran
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Kallen , Bengt, MD, PhD	Sweden
Kamali , Mohammad, PhD	Iran
Kamali , Koorosh, MD, MPH, PhD	Iran
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Nasr-Esfahani , Mohammad Hossein, PhD	Iran
Nasu , Kaei, MD, PhD	Japan
Nematollahi-mahani , Seyed Nouredin, PhD	Iran
Newgreen , Don, PhD	Australia
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Nielsen , Hans Ingolf, PhD, MEd	Denmark
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Nouri , Mohammad, PhD	Iran
Nowroozi , Mohammad Reza, MD	Iran
Nussler , Andreas, PhD	Germany
Oback , Björn, PhD	New Zealand
Omani Samani , Reza, MD	Iran
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Rashidi , Batool, MD	Iran

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Sawamoto , Kazunobu, PhD	Japan
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Shahpasand , Koorosh, PhD	Iran
Shahverdi , Abdolhossein, PhD	Iran
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Merghati , Seyed Taha, PhD	Iran



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Nematollahi-mahani , Seyed Nouredin, PhD	Iran
Nielsen , Hans Ingolf, PhD, MEd	Denmark
Niemann , Heiner, PhD	Germany
Niknejadi , Maryam, MD	Iran
Nowroozi , Mohammad Reza, MD	Iran
Nussler , Andreas, PhD	Germany
Oback , Björn, PhD	New Zealand
Omani Samani , Reza, MD	Iran
Ott , Michael, MD	Germany
Pandit , Abhay, PHD, MPH	Ireland
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Parsapour , Alireza, MD, PhD Student	Iran
Paul , Mozdziaik, PhD	United States
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Pourquie , Olivier, PhD	France
Raffaella , Fabbri, PhD	Italy
Ramezanzadeh , Fatemeh, MD	Iran
Rashidi , Batool, MD	Iran
Redi , CarloAlberto, PhD	Italy
Repping , Sjoerd, PhD	Netherlands
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Safdarian , Leila, MD	Iran
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Salari , Pooneh, PhD	Iran
Salehnia , Mojdeh, PhD	Iran

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Salman Yazdi , Reza, DCLS	Iran
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Semb , Henrik, PhD	Denmark
SepidarKish , Mahdi, PhD	Iran
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Shahverdi , Abdolhossein, PhD	Iran
Shahzadeh Fazeli , Seyed Abolhassan, MD, PhD	Iran
Shamsi Gooshki , Ehsan, MD, PhD	Iran
Shamsi pour , Mansur, PhD	Iran
Shariatinasab , Sadegh, PhD Student	Iran
Shirazi , Abolfazl, PhD	Iran
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Sipp , Douglas, BSC	Japan
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Sodeifi , Niloofer, MD, AP, CP	Iran
Solter , Davor, MD, PhD	Singapore
Spadafora , Corrado, PhD	Italy
Strom , Stephen C., PhD	Sweden
Surani , Azim, PhD	United Kingdom
Tahamtani , Yaser, PhD	Iran
Taheri Panah , Robabeh, MD	Iran
Tardif , Steve, PhD	United States
Tehraninejad , Ensieh, MD	Iran
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Tian , Xiuchun Cindy, PhD	United States
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Vermeesch , Joris, PhD	Belgium
Vesali , Samira, MSc	Iran
Voet , Thierry, PhD	Belgium
Vosough Taghi Dizaj , Ahmad, MD	Iran
Weichert , Alexander, MD	Germany
Yazdani , Kamran, MD, PhD	Iran
Zafarani , Fatemeh, MSc	Iran
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Kazemi Prize 2016

About Kazemi Prize

Dr Saeid Kazemi Ashtiani was born in March 1961 in Tehran. Upon completion of his high school at the age of 18, he was admitted to Iran Medical University to pursue his studies in the field of Physiotherapy. He graduated in 1991 and subsequently in 1993 he started his postgraduate education in the field of Anatomy (Embryology branch) in Tarbiat Modares University. He received his Doctorate Degree with Distinction in 1998.

Dr Kazemi established Royan Research Institute in 1991. This institute renders advanced medical services to infertile couples. The center is also one of the most important and active research centers in the Middle East.

Dr Kazemi and his colleagues at Royan Infertility Research Center could achieve a tremendous success in 2003 by establishing human embryonic stem cell line. This great scientific achievement has earned a high position for Iran among the other top 10 countries having access to this advanced technology at that time.

He was not only a scientist who led a lot of principle research projects in the field of stem cell and cloning but a great manager as well. He was the head of ACECR, Iran Medical University branch, head of Royan Research Institute, guest instructor and lecturer of many Iranian medical universities, manager and chief of quarterly scientific and research journal of Yakhteh, head of ethical research committee in Royan Institute, and an active member of Iranian society for reproductive biomedicine as well as Iran Anatomical Science Society. Dr Saeid Kazemi also presided Royan International Award, which was held six times from 2000-2005. His short fruitful life was ended in 2006 when he died of a sudden heart attack.

To respect his efforts and revive his memories amongst national and international scientists as well as non-scientists, Iran supreme leader, Ayatollah Khamenei recommended establishing a yearly prize in biology entitled "Kazemi Prize" which will be awarded to a scientist who made an extraordinary progress in the biological sciences. Kazemi Research Award is for appreciation of extreme effort of the scientist who dedicates his/her life to make progress in human life and relieve people's pain.

A nomination committee consisting of prominent national and international scientists is the working body that evaluates the nominees and presents its recommendations to the scientific board of the institute. The scientific board is responsible for the final selection of the prize laureates. In 2010 the first Kazemi Prize was awarded to Prof Rudolf Jaenisch one of the most innovative and creative scientists in the field of developmental biology, gene regulation, stem cell biology and stem cell-mediated therapies. In 2011 the second Kazemi Prize was awarded to Prof Hans Robert Schöler a world-renowned researcher who has made significant contributions to the field of stem cell biology over the past 35 years. In 2015 the third Kazemi Prize was awarded to Prof Robert S. Langer; one of the most important individuals in biotechnology in the world and one of the best innovators worldwide who will reinvent our future 2015. This year this prize will be awarded to Professor Hans Clevers.



Kazemi Prize 2016

Professor Johannes Carolus (Hans) Clevers
Geneticist, Physician and Medical Researcher



Hans Clevers

Johannes Carolus (Hans) Clevers is a professor in molecular genetics, a geneticist, physician, medical researcher who was the first to identify stem cells in the intestine and is one of the world's leading researchers on normal stem cells and their potential for regenerative therapy.

To summarize his scientific highlights, Hans Clevers identified the crucial downstream component of the Wnt signaling cascade, TCF, and the mechanism by which Wnt signals activate specific TCF target genes. He was the first to link Wnt signaling with adult stem cell biology, when he showed that TCF4 gene disruption leads to the abolition of crypt stem cell compartments of the gut. Clevers's team worked on the intestine and on the physiology of the intestine, which was essentially an unstudied field as well.

Clevers has been recognized on a number of occasions for his research; he was elected as an EMBO member in 1999 and also elected as a Royal Netherlands Academy of Arts and Sciences member in 2000 and won the Catharijne-prize for medical science. He received the Spinoza Prize (Netherlands) from the European Society for Clinical Investigation in 2001 and the Louis-Jeantet Prize for Medicine (Switzerland) in 2004 and he was also named Chevalier of the Légion d'honneur (France). In 2005 he got the Science and Society Prize from Memorial Sloan-Kettering Katharine Berkan Judd Award (U.S.). He had Josephine Nefkens Prize for Cancer Research from Erasmus MC Rotterdam (Netherlands) and Meyenburg Cancer Research Award (Germany) in 2008. He received the Dutch Cancer Society Award in 2009, the United European Gastroenterology Federation (UEGF) Research Prize in 2010, and the Ernst Jung Prize for Medicine from the Jung Foundation for Science and Research (Germany) in 2011. Léopold Griffuel Prize from Association pour la Recherche sur le Cancer (France), Kolff Prize, Knight of the Order of the Netherlands Lion (Netherlands), William Beaumont Prize of the American Gastroenterology Association and Dr A.H. Heineken Prize for Medicine (Netherlands) went to him in 2012 and the Breakthrough Prize in Life Sciences in 2013. In 2014 he received Massachusetts General Hospital Award in Cancer Research, had the TEFAF Oncology Chair, became a fellow of the AACR Academy and got Struyvenberg European Society for Clinical Investigation (ESCI) medal. In 2015 he received ISSCR-McEwen Award for Innovation and the Royal Netherlands Academy of Arts and Sciences Professor Prize in 2016.



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 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

1. Gharib M, Neisani Samani L, Panah ZE, Naseri M, Bahrani N, Kiani K. **The Effect of Valeric on Anxiety Severity in Women Undergoing Hysterosalpingography.** Global Journal of Health Science. 2015; 7(3):358-63.
2. Zarezade N, Saboori Darabi S, Ramezanalil F, Amirchaghmaghi E, Khalili GR, Moini A, Aflatoonian R. **mRNA Expression of VEGF and Its Receptors in Fallopian Tubes of Women with Ectopic Pregnancies.** International Journal of Fertility and Sterility (IJFS). 2015; 9(1):55-64.
3. Artimani T, Saidijam M, Aflatoonian R, Amiri I, Ashrafi M, Shabab N, Mohammadpour N, Mehdizadeh M. **Estrogen and Progesterone Receptor Subtype Expression in Granulosa Cells from Women with Polycystic Ovary Syndrome.** Gynecological Endocrinology. 2015; 31(5):379-83.
4. Shahrokh Tehraninejad E, Azimi Nekoo E, Ghaffari F, Hafezi M, Karimian L, Arabipoor A. **Zygote Intrafallopian Tube Transfer Versus Intrauterine Cleavage or Blastocyst Stage Transfer After Intracytoplasmic Sperm Injection Cycles in Patients with Repeated Implantation Failure: A Prospective Follow-up Study.** Obstetrics and Gynecology research. 2015; 41(11):1779-84.
5. Moini A, Ahmadi F, Jahangiri N, Ahmadi J, Akhond MR. **A Randomized Controlled Trial Evaluating the Effect of Ethinyl Estradiol During Clomiphene Citrate Cycles Among Women with Polycystic Ovary Syndrome.** International Journal of Gynecology and Obstetrics. 2015; 131(2):129-32.
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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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10. Nasiri N, Moini A, Eftekhari Yazdi P, Karimian L, Salman Yazdi R, Zolfaghari Z, Arabipour A. **Abdominal Obesity Can Induce Both Systemic and Follicular Fluid Oxidative Stress Independent from Polycystic Ovary Syndrome.** *Eur J Obstet Gynecol Reprod Biol.* 2015; 184:112-6.

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.

Articles

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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.

Articles

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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 hysteroscopy, 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 multicenter 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.

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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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International Invited Speakers



Prof. Sherman J. Silber, MD
Director of Infertility Center of St. Louis and IVF Program, St. Lukes's Hospital, USA



Prof. Martin Johnson
Professor of Reproductive Sciences in the Department of Physiology, ReproSoc Project Consultant, University of Cambridge, UK



Prof. Norah Spears
Centre for Integrative Physiology, University of Edinburgh, UK



Prof. Marcus Meseguer
Clinical Embryology Laboratory ivi Valencia, Spain



Prof. Robert Klitzman
Professor of Psychiatry (in Sociomedical Sciences), Columbia University Medical center, USA



Prof. Salim Daya
Professor of Department of Obstetrics and Gynecology, Clinical Epidemiology and Biostatistics at McMaster University, Canada



Prof. Dr. Harald Zeisler
Department of Obstetrics and fetomatal medicine, General hospital of vienna, Austria



Prof. Mustafa Numan Bucak
Veterinary Medicine Clinic of Science, Department of Reproduction and Artificial Insemination Unit, Reproduction and Artificial Insemination, Selcuk University, Turkey



Prof. Christian Egarter
Universitätsklinik für Frauenheilkunde Medical University of Vienna Vienna General Hospital – AKH, Austria



Prof. Kazem Nouri
Assoc. Professor Department for Gynecological Endocrinology and Reproductive Medicine University Hospital Vienna, Währinger Gürtel, Austria



Prof. Robert Fischer
Medical director, Specialist in Gynecology and Obstetrics, Fertility Center Hamburg, Germany



Prof. David Gregory Mottershead
Lecturer in Biochemistry and Cell Biology, School of Pharmacy, Keele University, UK



Prof. Daniela Toniolo
Head of Unit-Genetics of Common Disorders DIBIT1-San Raffaele Scientific Institute, Italy



Prof. Diarmaid Douglas-Hamilton
Chief Technology Officer Hamilton Thorne Inc. USA



Prof. Antonio Capalbo
Head of Preimplantation Diagnosis, Program of the GENERATE Reproductive Medicine Centers, Scientific director of the center and laboratory of molecular genetics, Laboratorio Genety, Italy



Prof. Rita Singh
Professor and Chair Division of Molecular Endocrinology and Reproduction Department of Zoology University of Delhi, India



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International Invited Speakers



Prof. Juergen Knoblich
Senior Scientist & Deputy, Scientific Director of IMBA-Institute of Molecular Biotechnology, Austria



Prof. Ali Khademhosseini
Professor at Harvard Medical School, faculty at the Harvard-MIT's Division of Health Sciences and Technology, Brigham and Women's Hospital (BWH), USA



Prof. Kun Ping Lu
Professor of Medicine in Harvard Medical School, Director of Translational Therapeutics The Cancer Center, USA



Prof. Ralf Sanzenbacher
Deputy Head of Section, Engineering & Cell Therapeutics, Paul-Ehrlich-Institut; Federal Institute for Vaccines and Biomedicines Section 6/3, Germany



Prof. Henrik Semb
Professor of Human Stem Cell Biology, DanStem Managing Director, University of Copenhagen, Denmark



Prof. Pedro L. Herrera
Professor of Department of Genetic Medicine and Development, University of Geneva Medical Center, Switzerland



Prof. Jeong Beom Kim
Professor of Ulsan National Institute of Science and Technology, Ulsan, Republic of Korea



Prof. Su-Chun Zhang
Professor of Neuroscience and Neurology Steenbock of Behavioral & Neural Sciences, Waisman Center, University of Wisconsin/Madison, USA



Dr. Nasim Annabi
Assistant Professor of Department of Chemical Engineering, College of Engineering, Northeastern University, USA



Prof. Stephan Grupp
Novotny Professor of Pediatrics University of Pennsylvania Perelman School of Medicine, Director of Cancer Immunotherapy Frontier Program Director of Translational Research, USA



Prof. Zaal Kokaia
Professor of Experimental Medical Research, Director of Lund Stem Cell Center, Head of the Laboratory of Stem Cells & Restorative Neurology, Lund University, Sweden



Prof. Agnete Kirkeby
Group Leader at Lund University, Department of Human Neural Development, Wallenberg Neuroscience Center Lund University, Sweden



Prof. Andreas Serra
Professor and Head of Department of Internal Medicine and Nephrology, Medical Faculty, University of Zurich Hirslanden Klinik, European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB), Switzerland



Prof. Paulus de Vos
Full Professor Immunoenocrinology, University Medical Center, Groningen (UMCG), Pathology and Medical Biology, section Immunoenocrinology, The Netherlands



Prof. Jackie Ying
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Prof. Michele De Luca
Professor of Biochemistry, Director of Centre for Regenerative Medicine "Stefano Ferrari", University of Modena and Reggio Emilia, Italy



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