

Course Catalogues

Royan Educational Deputy

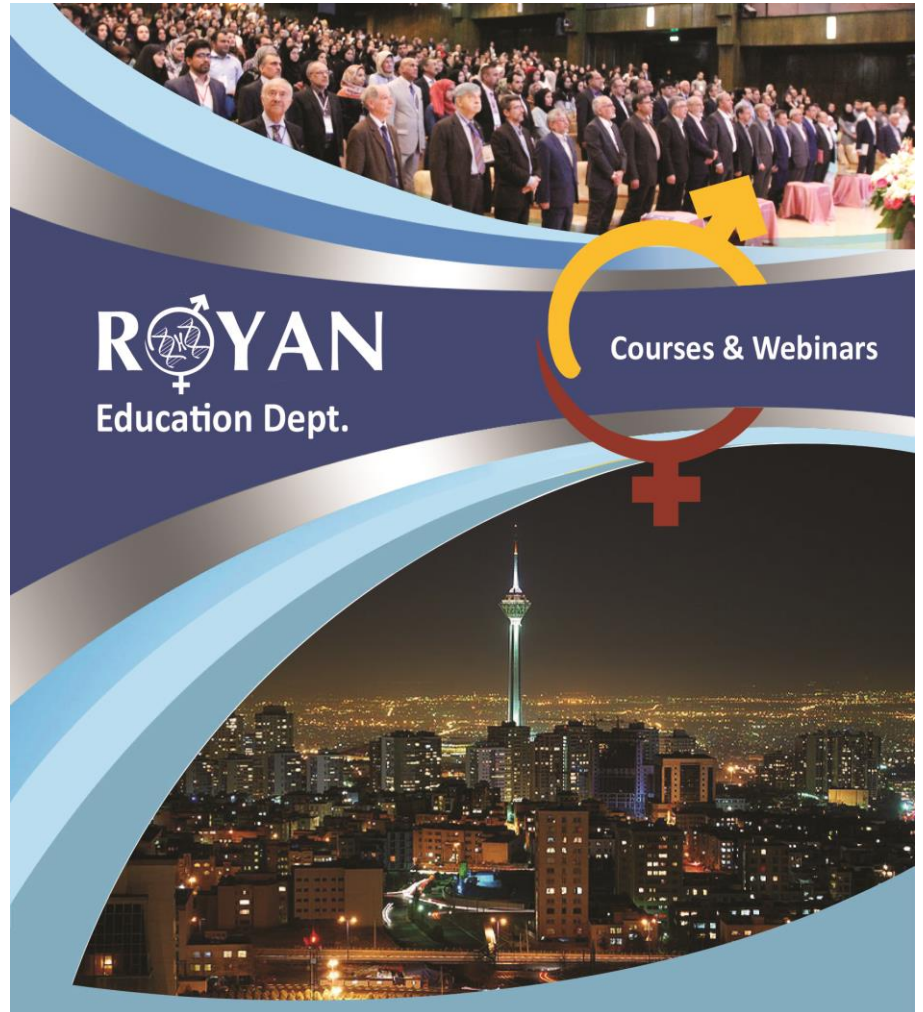


Table of Content

- 1. Workshop on basic methods in molecular biology**
- 2. Workshop on Gene cloning and DNA analysis**
- 3. Gene manipulation course**
- 4. Principles for the cultivation of animal cells**
- 5. Principles for the cultivation of animal cells**
- 6. Principles for the Cultivation of Human Pluripotent Stem Cell**
- 7. Differentiation of Human Pluripotent Stem Cells to Cardiomyocytes (hPSC-CM)**
- 8. Differentiation of Human Pluripotent Stem Cells to Hepatocytes (hPSC-Hep)**
- 9. Neural stem cell isolation and culture from adult rat brain**
- 10. Neural stem cell line generation from pluripotent stem cells**
- 11. Cultivation and maintenance of neural stem cell line and differentiation toward specific neural subtype**
- 12. Cell Culture and Cryopreservation**
- 13. Ovarian tissue cryopreservation by slow freezing and vitrification**
- 14. Differentiation of pluripotent stem cells to Germ cells**
- 15. Isolation and culture of mouse spermatogonial stem cell**
- 16. An introduction to Tissue engineering**
- 17. Advanced Genetic Engineering**
- 18. Genome Editing**
- 19. Real Time PCR**
- 20. Principle of cell culture in clinic grade condition, cGMP**
- 21. Introduction to molecular dynamic simulation**
- 22. Workshop of mouse embryonic stem cells culture, proliferation and maintenance**
- 23. Workshop of human pluripotent stem cells culture, proliferation and maintenance**
- 24. Comprehensive in vitro pro-arrhythmia analysis using human pluripotent stem cells-derived cardiomyocytes and multielectrode array system**
- 25. Isolation of Neonatal Mouse/Rat Cardiomyocytes for in vitro studies**
- 26. Cryopreservation Techniques and Analysis of**
- 27. Sperm Parameters**
- 28. Production Technology of Transgenic Mouse**
- 29. New Therapeutic Approaches for Metabolic Disease**
- 30. Molecular Medicine Training Course**

❖ Course Title	Workshop on Basic Methods in Molecular Biology
❖ About this course	The course would discuss the basics of molecular biology; the tools of the molecular biologist; and general preparations, and procedures.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Genetic Dr. Amiri Yekta
❖ Modules/Resources	<ul style="list-style-type: none"> • Molecular laboratory basics • Primer Designing • PCR • qPCR
❖ Course Requirements	- Previous knowledge about DNA, RNA and Protein structure.
❖ Registration Costs	150 \$
❖ Duration:	2 days

❖ Course Title	Workshop on Gene Cloning and DNA Analysis
❖ About this course	<p>Participants will learn more about:</p> <ul style="list-style-type: none"> • To impart the knowledge of basic principles of gene cloning • To perform the constituent tasks for gene cloning in the laboratory • To understand the experimental planning and execution pertaining to gene cloning
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Genetic Dr. Amiri Yekta
❖ Modules/Resources	<ul style="list-style-type: none"> • Extraction of Plasmid • Extraction of DNA from Bacterial/Plant system and its quantification • Electrophoresis of Extracted DNA • DNA Ligation • Preparation of Competent Cells • Bacterial Genetic Transformation
❖ Course Requirements	<ul style="list-style-type: none"> • qPCR • Primer Designing
❖ Registration Costs	150 \$
❖ Duration:	2 days

❖ Course Title	Gene Manipulation Course
❖ About this course	In this course we are going to train students who are interested in application of molecular technique in biotechnology or other related fields. In this way they will be introduced to cloning of foreign DNA in the different host.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Genetic Dr. Amiri Yekta
❖ Modules/Resources	<ul style="list-style-type: none"> • Isolation of the DNA of interest (or target DNA) • Ligation • Transfection (or transformation) • A screening/selection procedure.
❖ Course Requirements	<ul style="list-style-type: none"> • qPCR • Primer Designing
❖ Registration Costs	800 \$
❖ Duration:	30 days

❖ Course Title	Principles for the Cultivation of Animal Cells
❖ About this course	The course would be applicable for those in industry aiming to work on stem research and bioprocessing. It will also provide managers with insights into the intricacies of cell culture and the necessary laboratory infrastructure requirements.
❖ Audience: Level (BSc, MSc., PhD, etc.)	BSc, MSc and PhD
❖ Department ❖ Instructor	Department of Stem Cells and developmental biology Dr. Zahra Farzaneh (PhD) Hassan Ansari (PhD student) Javad firuzi (PhD student)
❖ Modules/Resources	<ul style="list-style-type: none"> ❖ Introduce cell culture and history ❖ Introducing the tools for cell culture and sterilization technics ❖ Introducing a variety of cell culture media ❖ Familiarity with various types of contaminations and their diagnostic methods ❖ Principles of work in cell culture laboratories ❖ Principles of storage, passage, count and freezing of animal cells
❖ Course Requirements	- Previous knowledge about Cell Biology
❖ Registration Costs	100 \$
❖ Duration	3 Days

❖ Course Title	Principles for the Cultivation of Human Pluripotent Stem Cell
❖ About this course	The course is designed for life science and engineering graduates new to stem cell culture or for more experienced individuals new to working with iPSC or hES cell lines.
❖ Audience: Level (BSc, MSc., PhD, etc.)	BSc, MSc and PhD
❖ Department ❖ Instructor	Department of Stem Cells and Developmental biology Dr. Zahra Farzaneh (PhD) Hassan Ansari (PhD student) Mehran Rezaei (PhD student)
❖ Modules/Resources	<ul style="list-style-type: none"> • The introduction of stem cell types and history • The introduction of various methods for the isolation of human pluripotent stem cells • Principles of storage, passage, and freezing of human pluripotent stem cells
❖ Course Requirements	Principles for the cultivation of animal cells
❖ Registration Costs	200 \$ / Student
❖ Duration:	2 Days

❖ Course Title	Differentiation of Human Pluripotent Stem Cells to Cardiomyocytes (hPSC-CM)
❖ About this course	<ul style="list-style-type: none"> – Participants would be introduced to the principles of the current method of inducing hPSCs to differentiate into CMs in vitro.
❖ Audience: Level (BSc, MSc., PhD, etc.)	BSc, MSc and PhD
❖ Department ❖ Instructor	Department of Stem Cells and Developmental biology
Modules/Resources	<ul style="list-style-type: none"> – History and applications – Introducing the difference between heart and heart cells with other organs of the body – Cellular composition and signaling pathways of the heart – The introduction of various methods for differentiation of hPSC-CM - Principles for differentiation of hPSC-CM Hassan Ansari (PhD student)
❖ Course Requirements	Principles for the cultivation of animal cells Principles for the Cultivation of Human Pluripotent Stem Cell
❖ Registration Costs	200 \$
❖ Duration:	2 Days

Course Title	Differentiation of Human Pluripotent Stem Cells to Hepatocytes (hPSC-Hep)
About this course	Participants would be introduced to the principles of the current method of inducing hPSCs to differentiate into hPSC-Hep in vitro.
Audience: Level: (BSc, MSc and PhD)	BSc, MSc and PhD
Department	Department of Stem Cells and Developmental biology
Instructor	Dr. Zahra Farzaneh (PhD)
Modules	<ul style="list-style-type: none"> - History and applications - Introducing the liver and hepatocyte - Endoderm development - Liver development - The introduction of various methods for differentiation of hPSCs to hepatocyte - Principles for differentiation of hPSC-Hep
Prerequisite	<ul style="list-style-type: none"> • Principles for the cultivation of animal cells • Principles for the Cultivation of Human Pluripotent Stem Cell
Registration Costs	250 \$ / 7 Student
Duration	3 Days

Course Title	<ol style="list-style-type: none"> 1. Neural stem cell isolation and culture from adult rat brain 2. Neural stem cell line generation from pluripotent stem cells 3. Cultivation and maintenance of neural stem cell line and differentiation toward specific neural subtype
About this course	<ul style="list-style-type: none"> – Participants would be introduced to basics and applications of NSCs from different sources, NSCs lines cultivation, proliferation and cryopreservation of NSCs.
Audience: Level: (BSc, MSc and PhD)	BSc, MSc and PhD
Department	Department of Stem Cells and developmental biology
Instructor	Dr. Shiva Nemati (PhD) Dr. Ebrahim Shahbazi (PhD)
Modules	<ul style="list-style-type: none"> – Introduction and application of NSCs from different sources. – Introduction of signaling pathways which are responsible for neuroectoderm specification and various neuronal subtype commitments. – Culture media introduction for different NSCs lines cultivation. – Introduction of different methods for Proliferation and freeze & Thaw for various NSCs. – Adult neural stem cell isolation from adult brain and cultivation methods. – Introduction of NSCs derived pluripotent stem cells specification and cell line generation methods.
Prerequisite	<ul style="list-style-type: none"> • Principles for the cultivation of animal cells • Principles for the Cultivation of Human Embryonic Stem Cell
Registration Costs	90 \$ / Course / 7 Student
Duration	All title 3 Days. If accepted just 1 or 2 titles, we need 2 days.

❖ Course Title	Cell Culture and Cryopreservation
❖ About this course	The objective of this program is to provide practical hands-on training on basic cell culture techniques and intended for beginners to teach them and train them in cell culture
❖ Audience: Level (BSc. MSc., PhD, etc.)	This workshop is suitable for undergraduate, postgraduate and PhD in biology, biotechnology, laboratory sciences as well as students and graduates of medical sciences.
❖ Department ❖ Instructor	Reproduction and stem cell department, Royan institute Dr. Azam Dalman, Hasan Ansari
❖ Modules/Resources	<ol style="list-style-type: none"> 1. lecture about introduction and historical background, equipment, Aseptic technique and identification of contamination) 2. sterile media preparation subculture, Passaging of adherent cell lines 3. cryopreservation and thawing and resuspension of cell stocks 4. Cell separation and isolation using density centrifugation techniques. 5. Analysis of morphology and cell number 6. Cell viability assay using trypan blue <p>Freshney Cell Culture 2016</p>
❖ Course Requirements	Students should have basic laboratory skills and be confident in a laboratory environment before attending this course
❖ Registration Costs	150 €
❖ Duration:	2 days

❖ Course Title	Ovarian Tissue Cryopreservation by Slow Freezing and Vitrification
❖ About this course	In this course, first histology of the ovarian tissue and necessities of ovary preservation will be taught then audiences learn how to manipulate ovarian tissue for cryopreservation. Then two different routine methods of ovarian tissue cryopreservation will be taught. Also, banking principles and the usage of these cryopreserved tissues will be taught.
❖ Audience: Level (BSc. MSc., PhD, etc.)	MSc. and PhD in reproductive biomedicine, anatomical sciences and developmental biology.
❖ Department ❖ Instructor	Embryology Department, Human ovarian Tissue Bank Dr. Bita Ebrahimi/ Naeimeh Sadat Abtahi
❖ Modules/Resources	<ul style="list-style-type: none"> - Histology of the ovarian tissue - Different routine methods of ovarian tissue cryopreservation - Banking principles
❖ Course Requirements	-
❖ Registration Costs	5,000,000 Rials
❖ Duration:	1 days

❖ Course Title	Differentiation of Pluripotent Stem Cells to Germ Cells
❖ About this course	<p>This course includes theoretical and practical session. In this course we try to explain the theoretical aspect of course including:</p> <ol style="list-style-type: none"> 1. Biology of Pluripotent stem cells 2. Development of Primordial Germ Cells <p>In the practical session we aim to educate</p> <ol style="list-style-type: none"> 1. Culture of mouse Embryonic Stem Cells. 2. Differentiation of mESC to Epiblast like cells 3. Differentiation of Epiblast like cells to Primordial Germ Cells
❖ Audience: Level (BSc. MSc., PhD, etc.)	BSc. MSc., PhD, MD
❖ Department ❖ Instructor	Stem Cells (Germ cells) Dr. Esfandiari, Faezeh Moraveji
❖ Modules/Resources	Esfandiari et al., Macromol Biosci, 2017
❖ Course Requirements	Mesc line. Culture medium, Growth Factors
❖ Registration Costs	250 \$
❖ Duration:	1 day

❖ Course Title	Isolation and Culture of Mouse Spermatogonial Stem Cell
❖ About this course	<p>This course has held one year ago in the international congress and based on participant' comments was succeeded.</p> <p>This course includes theoretical and practical session.</p> <p>In this course we try to explain the theoretical aspect of course including:</p> <ol style="list-style-type: none"> 1. Development of Primordial Germ cells 2. Development of Spermatogonial Stem Cells <p>In the practical session we aim to educate</p> <ol style="list-style-type: none"> 1. isolation of mouse spermatogonial stem cells (SSCs) from mouse testis. 2. culture of mouse SSCs 3. Passage of mouse SSCs
❖ Audience: Level (BSc. MSc., PhD, etc.)	BSc. MSc., PhD, MD
❖ Department	Stem Cells (Germ cells)
❖ Instructor	Dr. Esfandiari, Faezeh Moraveji
❖ Modules/Resources	Moraveji et al., JCB, 2018
❖ Course Requirements	Mouse, culture medium, Enzymes for isolation
❖ Registration Costs	200 \$
❖ Duration:	1 day

❖ Course Title	An introduction to Tissue Engineering
❖ About this course	The interdisciplinary of tissue engineering includes engineering, biologists, and physicians that collaborate with a variety of tools for regeneration of tissue/ organ. The workshop is focused on engineering approaches. In fabrication of constructs which is used in tissue engineering.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Stem Cells (Germ cells)
❖ Modules/Resources	The workshop main topics include: 1- basics of the cell culture 2- Decellularization of native tissue. 3- Electrospinning for nanofiber fabrication. 4- Hydrogel in TE. 5- Bio printing & rapid prototypal. 6- Drug delivery system. 7- Biological characterization in TE.
❖ Course Requirements	-
❖ Registration Costs	250\$
❖ Duration:	2 days

❖ Course Title	Advanced Genetic Engineering
❖ About this course	Altering organism according to our wishes and purpose was one of the most fantastic goals of human. Now genetic engineering is the solution and pave the way for creating any organism with any characteristic we want.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Stem Cell
❖ Modules/Resources	The development of genetic engineering and synthetic biology Uses for genetic engineered systems DNA cloning techniques and plasmid design DNA modification enzymes (DNA polymerases, restriction enzymes, nucleases, phosphatases/kinases, recombinases, and more)
❖ Course Requirements	minimum education requirement would be a bachelor's degree in biochemistry, biophysics, molecular biology, or molecular genetics.
❖ Registration Costs	100\$
❖ Duration:	2 days

❖ Course Title	Genome Editing (CRISPR/Cas9)
❖ About this course	CRISPR technology, a gene editing tool that can be used to splice and alter the DNA inside a cell, has for years been hailed as the future of genetic disease medicine. CRISPR-edited cells could also be used to test new therapies and discover which work at the molecular level. Researchers are also now modeling patient cancers more efficiently by editing specific genes using CRISPR-Cas9 in vitro, providing large-scale biomass whereby functional and drug studies can be performed.
❖ Audience: Level (BSc, MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Genetics
❖ Modules/Resources	<ul style="list-style-type: none"> -Comprehend the concepts of CRISPR/Cas9, its component and mechanism. -Explain the way in which CRISPR can be used to edit the genomes. -Understand and interpret appropriate "Cas nuclease" for lab Crispr experiment. -Demonstrate the strategies of designing sgRNA and it's in vitro target validation. -Comprehend the skill of designing sgRNA through Bencheling tool. -Explain the different viral and non-viral Crispr gene delivery methods. -Understand & interpret the best Crispr delivery method for Crispr lab experiment.
❖ Course Requirements	<ul style="list-style-type: none"> -A desire to learn about CRISPR/Cas9 - Background knowledge about RNA, DNA, and protein
❖ Registration Costs	200 \$
❖ Duration:	1 days

❖ Course Title	Real Time PCR
❖ About this course	Gene expression and regulation is the one of most important ways of controlling differentiation or cells response to the environment change. Real time PCR is a very simple and fast but efficient tools.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All Levels
❖ Department ❖ Instructor	Stem Cell
❖ Modules/Resources	In the Real-time PCR course, participants would be introduced to the basics, applications, implementation, analysis and troubleshooting of this technology, and will gain mastery and skills in the operation of this technique in their research and scientific direction.
❖ Course Requirements	- Background knowledge about RNA, DNA, and protein
❖ Registration Costs	100\$
❖ Duration:	2 days

❖ Course Title	Principle of Cell Culture in Clinic Grade Condition, cGMP
❖ About this course	Basic & applied science in producing cell & cell derived in clinic grade for any possible clinic application.
❖ Audience: Level (BSc. MSc., PhD, etc.)	All level
❖ Department ❖ Instructor	Department of stem cell & development biology Royan institute Dr. Massoud Vosough
❖ Modules/Resources	Removal of cells from an animal or plant and their subsequent Primary and secondary cell culture Cell line Growth in a favorable artificial environment Components of culture media Prepare media for cell culture
❖ Course Requirements	Basics in cell culture
❖ Registration Costs	1500\$
❖ Duration:	One week

❖ Course Title	Introduction to Molecular Dynamic Simulation
❖ About this course	<p>This course is suitable for students and graduates of biological science who are familiar with bioinformatics concepts.</p> <p>In this course we start from installing Linux operating system and requirements and initialization of GROMACS molecular dynamic simulation package is followed in continue.</p> <p>Then basic concepts are introduced and a basic simulation is set up and run by audience.</p>
❖ Audience: Level (BSc, MSc., PhD, etc.)	Graduate students (MSc and PhD) and above
❖ Department ❖ Instructor	<p>Department of stem cell & development biology</p> <p>Dr. Amirreza Ariamoghadam, Mrs. Nasim Ahmadian</p>
❖ Modules/Resources	<p>Linux operating system, GROMACS</p> <p>Laptop, USB 32 Gb flash drive, internet</p>
❖ Course Requirements	Basic experience of work with computer
❖ Registration Costs	600000 Toman
❖ Duration:	Two days and each day 5 hours

❖ Course Title	Workshop of Mouse Embryonic Stem Cells Culture, Proliferation and Maintenance
❖ About this course	<p>Participant learn in this workshop:</p> <ol style="list-style-type: none"> 1- Preparation of feeder layer (mouse embryonic fibroblast) for mouse embryonic stem cells culture 2- Culture of mouse embryonic stem cells on mouse embryonic fibroblast 3- Culture of mouse embryonic stem cells on gelatin 4- Freezing and thawing of mouse embryonic stem cells 5- Stemness assay of mouse pluripotent stem cells by spontaneous differentiation
❖ Audience: Level (BSc. MSc., PhD, etc.)	MSc., PhD and MD
❖ Department ❖ Instructor	Stem cell and developmental biology Dr. Seyed Nafiseh Hassani
❖ Modules/Resources	<p>Participant: 10 people</p> <p>Instructor: 1 person</p> <p>Executive: 3 people</p>
❖ Course Requirements	Basic biology science
❖ Registration Costs	100 \$ Each person
❖ Duration:	1 day (8 hours)

❖ Course Title	Workshop of Human Pluripotent Stem Cells Culture, Proliferation and Maintenance
❖ About this course	Participant learn in this workshop: <ul style="list-style-type: none"> – Preparation of feeder layer (mouse embryonic fibroblast) for human pluripotent stem cells culture – Culture of human pluripotent stem cells on plate surface – Suspension culture of human pluripotent stem cells – Freezing and thawing of human pluripotent stem cells – Stemness assay of human pluripotent stem cells by alkaline phosphatase kit
❖ Audience: Level (BSc. MSc., PhD, etc.)	MSc., PhD and MD
❖ Department ❖ Instructor	Stem cell and developmental biology Dr. Seyed Nafiseh Hassani
❖ Modules/Resources	Participant: 10 persons Instructor: 1 person Executive: 3 persons
❖ Course Requirements	Basic biology science
❖ Registration Costs	120 \$ Each person
❖ Duration:	1 day (8 hours)

❖ Course Title	Comprehensive In Vitro Pro-Arrhythmia Analysis Using Human Pluripotent Stem Cells-Derived Cardiomyocytes and Multielectrode Array System
❖ About this course	From Golgooni et al paper: “Cardiotoxicity is one of the major reasons for drug attrition from market which may impose tremendous costs to pharmaceutical companies ¹ . Drugs may impose side effects on structure or electrophysiology of cardiac myocytes. Comprehensive <i>in vitro</i> proarrhythmia assay (CiPA) using the hPSC-CM/MEA system have been proposed as a robust, efficient, and sensitive platform for electrophysiological cardiotoxicity screenings ²⁻¹³ . While industry standard assays are based on using immortalized cell lines or animal models, CiPA takes the advantage of cardiomyocytes obtained from cardiogenic differentiation of hPSC, literally representing the most similar physiology to human heart ¹⁴ . Therefore, this high throughput physiologically relevant platform for cardiotoxicity ⁶ may provide an advanced complementary method with great potential for reducing the costs of drug development and cardiotoxicity-related drug attrition.” ¹⁵
❖ Audience: Level (BSc. MSc., PhD, etc.)	Undergrad and graduate students of all branches of Biology, Medicine, and Pharmacology
❖ Department	Stem Cells and Developmental Biology
❖ Instructor	Sara Pahlavan
❖ Modules/Resources	S7B Nonclinical Evaluation of the Potential for Delayed Ventricular Repolarization (QT Interval Prolongation) by Human Pharmaceuticals
❖ Course Requirements	A minimum knowledge of drug development, membrane physiology, stem cells and their differentiation into cardiomyocytes
❖ Registration Costs	250 \$
❖ Duration:	1 full day

❖ Course Title	Isolation of Neonatal Mouse/Rat Cardiomyocytes for <i>in vitro</i> studies
❖ About this course	Neonatal Rat/Mouse Cardiomyocytes are one of the most commonly used primary culture of cardiomyocytes <i>in vitro</i> which are applied for physiological-, cellular, and molecular studies. They can be cultured for a good period of time that is sufficient for genetic manipulation as well as tissue engineering and other cardiovascular research purposes. These cells are spontaneously beating and are very helpful for physiological studies on cardiomyocytes.
❖ Audience: Level (BSc. MSc., PhD, etc.)	Undergrad and graduate students of all branches of Biology, Medicine, and Pharmacology
❖ Department ❖ Instructor	Stem Cells and Developmental Biology Sara Pahlavan
❖ Modules/Resources	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4541493/
❖ Course Requirements	No special requirements
❖ Registration Costs	250 \$
❖ Duration:	1 full day and a half day

❖ Course Title	Cryopreservation Techniques and Analysis of Sperm Parameters
❖ About this course	The course is offered to teach methods in semen cryopreservation in different species. Several methods of cryopreservation will be taught and a variety of approach in freeze-thaw process for sperm will be evaluated. The course is designed primarily as a hand-made method in which participants learn techniques for the cryopreservation of spermatozoa. Techniques include: slow freezing, rapid freezing, vitrification and novel approached in semen cryopreservation. In addition, general principles of cryobiology, development of inventory databases for individual programs, and adaptation of long-term storage systems and cryogenic equipment for different species will be discussed.
❖ Audience: Level (BSc, MSc., PhD, etc)	The target audience for this course includes PhD, MSC and BSC students in Biology, Andrology, Reproduction and Embryology related fields as well as student in physicians, fellows, physician assistants, nurse practitioners, embryologists and other allied health professionals in the semen biology.
❖ Department ❖ Instructor	Department of Embryology, Unit of sperm biology
❖ Modules/Resources	This course provides the educational and training space for 15 participants.
❖ Course Requirements	-
❖ Registration Costs	50\$
❖ Duration:	1 day

Course Title	Production Technology of Transgenic Mouse
About this course	<p>To provide all knowledge and experience necessary to perform injection of mouse blastocysts with embryonic stem cells for the production of transgenic mouse.</p> <ol style="list-style-type: none"> 1. Preparation of glass instruments used in transgenic mouse production. 2. Harvesting of mouse blastocyst 3. Preparation of pseudo-pregnant recipient mice 4. Gene Isolation and cloning 5. Preparation of transgenic mESCs by insert DNA construct into ESCs with electroporation 6. Preparation of transgenic mESCs for microinjection 7. Microinjection of blastocyst 8. Embryo transfer 9. Genotyping and analysis of transgene expression in founder mice
Audience: Level (BSc. MSc., PhD, etc.)	BSc. MSc., PhD
Department Instructor	Stem Cell Biology & Technology Department Dr. Yaser Tahamtani, Dr. Totonchi, Behrouz Asgari
Modules/Resources	6
Course Requirements	Micromanipulator system, Centrifuge, Microscope, Laminar flow, Incubator, Micro warm plate
Registration Costs	500 \$
Duration:	5 day

Course Title	New Therapeutic Approaches for Metabolic Disease
About this course	<p>Metabolic diseases are one of the most prevalent disorders and the major health hazards in the modern world. So, prevention and treatment of metabolic disease has crucial importance. Recently, new therapeutic approaches offer new clinical and scientific tools for diagnosis, prevention, and treatment of metabolic diseases.</p> <p>This course aims to introduce and clarify the new interdisciplinary therapeutic approaches emphasis on cell- based modeling and therapeutic technologies, bio-medical engineering, gene therapies, organism-based disease modeling and bio-discovery in metabolic disorders treatments. The course gives a good opportunity to describe and discuss the cell signaling pathways in disease focusing on metabolic disease. Moreover, this course provides a great chance to introduce cell-based models as a new therapeutic approaches of metabolic disease like diabetes mellitus.</p> <p>One of strengths of this course is its focus and introduce of interdisciplinary approaches like stem cells, genetics, and tissue engineering in management and therapies of metabolic diseases.</p>
Audience: Level (BSc. MSc., PhD, etc.)	This course primarily designed for Ph.D. candidates; M.D. and M.D/Ph.D. doctoral candidates.
Department	Royan Institute Center for Diabetes, Obesity and Metabolism
Instructor	Yaser Tahamtani
❖ Modules/Resources	The course includes preliminary modules on cellular and molecular biology and introduction to natural products that covers basic knowledge about this topic. In addition, the course includes advanced modules cover topics such as cell signaling pathways in disease development, tissue engineering, and advanced cellular biology.

Course Requirements	<p>Students must complete all introduced modules during the course. In addition, trainers should actively participate in cutting edge journal clubs, and workshops. Moreover, Students grades will be based on their scientific activities during the course, their presentation, and examination from the modules.</p>
Registration Costs	<p>2530 \$</p>
❖ Duration:	<p>One semester (6 months)</p>

Course Title	Molecular Medicine Training Course
About this course	<p>Molecular medicine is the study of molecular and cellular phenomena in biological systems that enhances our understanding of human diseases and facilitates discovery research in disease prevention, diagnosis and therapy. Molecular Medicine offers new scientific tools to address mechanistic aspects of different diseases, both in diagnostics and therapy.</p> <p>The course helps to clarify the causes of diseases on a molecular basis with the methods of molecular- and cell biology and to describe and discuss topics related to infectious diseases, chronic diseases, genetic diseases, endocrine disorders, malignancy and diseases arising from abnormal immune responses.</p> <p>One of the unique strengths of this course is its emphasis on an interdisciplinary approach whereby medical sciences, molecular and biochemical aspects of biology is addressed. Students will be encouraged to participate in interdisciplinary learning activities, and some of the courses from different programs are jointly offered.</p>
Audience: Level (BSc. MSc., PhD, etc.)	This training opportunity should be primarily designed for Ph.D. candidates; M.D. and M.D./Ph.D. doctoral candidates.
Department	Genetics
Instructor	Mohammad Reza Zamanian MD, PhD
❖ Modules/Resources	The course includes lectures on cellular biology and molecular genetics as they apply generally to normal cell and tissue function and to disease processes. Advanced modules cover topics such as molecular oncology, signaling, development and therapeutics, immunology and infectious agents among others. A selection of modules on issues such as bioinformatics, research methodology, statistics and ethical legal aspects of the discipline may be undertaken on an optional basis.

Course Requirements	<p>Students must complete a core module “Practical and self-directed research in Molecular Medicine” which includes a literature review, presentations, journal clubs, laboratory practical, and modules on statistics, biomedical ethics and bioinformatics. Students are examined on the basis of the submitted critical literature review essay, and written examinations of the modules taken.</p>
Registration Costs	<p>4000 \$</p>
❖ Duration:	<p>One semester (4.5 months)</p>