

INTERNATIONAL SCHOOL OF ADVANCED BIOMEDICINE AND BIOINFORMATICS

4th Course

Stem Cells: Biology, BioTechnology, Medical Applications

Acitrezza (Catania), Italy, October 1-5, 2007



Gustav Klimt - Die Hoffnung I (La Speranza I), 1903 - National Gallery of Canada, Ottawa

According to a general consensus, **Stem Cells** are characterized by their **ability to differentiate into different phenotypes** as well as by their **proliferation potential**. The prototype stem cell is the zygote that is defined as **totipotent** since it may differentiate into **all** of the different cell types comprising the adult organism. **Stem Cells** are also found within differentiated tissues: depending on their **differentiation potential**, they may be defined as **pluripotent, multipotent, unipotent**. To exploit these phenomena for therapeutic applications, it is very important to characterize the molecular pathways underlying them. This is even more critical within **Oncology**: it is actually believed that tumours develop from a limited population of progenitor cells, defined as **Cancer Stem Cells**, that should be the specific target of anti-tumour therapy: accordingly, it is necessary to greatly improve our knowledge on their genotypes and phenotypes. Due to their theoretical and practical importance, the 2007 Course of the **International School of Advanced BioMedicine and BioInformatics** will address these critical issues trying to answer to the following questions among others.

- What are the molecular bases of the developmental totipotency of the zygote?
- What causes its gradual restriction to pluripotency first and multipotency thereafter during development?
- What are the specific **signals** that induce **Stem Cells** to differentiate into different phenotypes? What are their molecular targets?
- What do we actually know on the **Transcriptomics, EpiGenomics, Proteomics, Interactomics** of **Stem Cells** and what would we like to know?
- What are the most appropriate sources of **Stem Cells**?
- Are there biomarkers to be reliably used to identify and purify **Stem Cells**?
- Is it possible to isolate **Stem Cells** from adult organisms?
- Has **Regenerative Medicine**, based on Cell Replacement Therapy, definitely and satisfactorily replaced Molecular Genetics Therapy?
- Are there biomarkers for **Cancer Stem Cells** identification and targetting?

The School will start with a series of Tutorials (October 1 - 2, 2007) on

- **Oncogenes and Tumor Suppressor Genes** (Pietro Buffa)
- **The Phenotype of Stem Cells and the Molecular Pathways of their Differentiation** (Paolo Vigneri)
- **Hematopoietic Stem Cells** (Giuseppe Palumbo)
- **MicroRNAs: Structure and Function** (Davide Barbagallo)
- **MicroRNAs and Stem Cells** (Marco Ragusa)
- **Gene Silencing through siRNA and miRNA** (Vincenza Barresi)
- **High-Throughput Analytical BioTechnology** (Salvo Pernagallo)
- **Diabetes and Regenerative Medicine** (Salvo Piro)

These will be followed by advanced Seminars (October 3 - 4, 2007)

- 03-Oct **Andrew Johnson** Biology of Stem Cells
- 04-Oct **Andrew Johnson** Reprogramming Pluripotency in Somatic Cells
(Institute of Genetics, The University of Nottingham, Queen's Medical Centre, Nottingham NG7 2UH, UK. Andrew.D.Johnson@nottingham.ac.uk)
- 03-Oct **Paul J Scotting** Cancer Stem Cells
- 03-Oct **Paul J Scotting** Stem Cells in Neural Tumours
(Institute of Genetics, The University of Nottingham, Queen's Medical Centre, Nottingham NG7 2UH, UK. Paul.Scotting@nottingham.ac.uk)
- 03-Oct **Graziella Pellegrini** A transcription factor that controls self-renewal of ocular epithelia
- 04-Oct **Graziella Pellegrini** Epidermolysis bullosa: from cell isolation to patient treatment and molecular controls
(Department of Bio-Medical Sciences, University of Modena, Italy. Epithelial Stem Cell Research Center, The Veneto Eye Bank Foundation, H. SS Giovanni and Paolo, Venice, Italy. graziella.pellegrini@unimore.it)
- 04-Oct **Juanjo Diaz-Mochon** Peptide microarrays. The use of 10,000 PNA-encoded peptide libraries for studying proteases and kinase
- 04-Oct **Juanjo Diaz-Mochon** High- Throughput Platforms for DNA transfection assays
(School of Chemistry, University of Edinburgh, Edinburgh, UK. JJ.Diaz@ed.ac.uk)
- 05-Oct **Sanchez Martin** Multifunctionalized Microspheres for Cellular Delivery and Sensing
(School of Chemistry, University of Edinburgh, Edinburgh, UK. rsmartin@staffmail.ed.ac.uk)

Round Table (October 5, 2007)

Stem Cells: Science, Law, Ethics

Director of the School

M Purrello

Directors of the Course

R Bernardini, D Condorelli, R De Maria, C Di Pietro, R Giustolisi, A Messina, F Purrello, M Purrello, S Travali, M Zappia

Scientific Committee

A Agodi, M Alberghina, A Amato, R Avola, ML Barcellona, E Barresi, S Bianca, O Biondi, V Calabrese, A Calogero, MT Cambria, ML Carnazza, D Caruso, P Castellino, S Cavallaro, A Cianci, F Cicirata, C Corsaro, G Costa, N Crimi, N Cutuli, R D'Agata, G De Leo, V De Pinto, A Di Cataldo, F Di Raimondo, G Di Stefano, G Ettore, A Ferro, C Fiore, A Fiumara, G Garozzo, G Giuffrida, AM Giuffrida Stella, R Giugno, A Gulisano, S Lanzafame, G Lazzarino, G Li Destri, G Li Volsi, M Libra, G Longo, BM Lombardo, G Lupo, L Malatino, G Martinez, T Mattina, C Mazzarino, A Messina, M Mezzatesta, G Milone, M Mirisola, C Montoneri, S Motta, S Motta, F Nardo, F Nicoletti, V Nicoletti, C Pafumi, G Palumbo, M Panella, R Parenti, L Pavone, G Pellegrini, G Pennisi, A Petralia, G Pilato, S Piro, R Polosa, G Principato, A Pulvirenti, R Purrello, G Quattrocchi, G Rappazzo, A Ragusa, M Ragusa, N Ragusa, A Raudino, M Renis, C Romano, MA Romeo, G Russo, S Saccone, F Sammartano, M Santagati, M Scalia, G Schilirò, S Sciacca, S Sciacchitano, A Sciotto, P Scollo, G Sichel, A Sidoti, F Sinatra, V Spina, G Sorge, MG Sortino, L Sottile, S Stefani, S Stanzani, F Stivala, C Tamburino, C Tigano, F Uccellatore, C Vancheri, E Vasquez, FM Viglianisi, P Vigneri, R Vigneri, MT Vinciguerra, M Viola, R Viscuso

Tutors

D Barbagallo, M Barchitta, C Bosco, P Buffa, V Cafiso, F Campanile, L Duro, S Forte, MR Guglielmino, A Laganà, A Majorana, L Tomasello, A Trovato Salinaro

WebMasters

M Ragusa
D Barbagallo

Web Site

<http://www.bgbunict.it/school.htm>



Aegis

Università degli Studi di Catania

Facoltà di Farmacia

Facoltà di Medicina e Chirurgia

Facoltà di Scienze Mat. Fis. Nat.

Dipartimento di Scienze Biomediche

Dottorato di Ricerca in *Biologia, Genetica Umana, BioInformatica: Basi Cellulari e Molecolari del Fenotipo*

Dottorato di Ricerca in *Biotechnologie*

Dottorato di Ricerca in *Malattie Genetiche dell'Età Evolutiva*

Dottorato di Ricerca in *Oncologia*

Scuola di Specializzazione in *Biochimica Clinica*

Scuola di Specializzazione in *Genetica Medica*

Scuola di Specializzazione in *Neurologia*

Scuola di Specializzazione in *Patologia Clinica*

Associazione Italiana di Biologia Generale, Cellulare di Genetica Molecolare

Consorzio Interuniversitario per le BioTecnologie

IRCCS Oasi Maria Santissima

Istituto Oncologico del Mediterraneo (IOM)

*Ordine dei Medici Chirurghi e degli Odontoiatri
della Provincia di Catania*