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Third
Polish-French Intensive Course in Biotechnology
organized by
Faculty of Biotechnology, Jagiellonian University in Krakow, Poland
and
Institute Jacques-Monod, CNRS, Universite Paris 7, Paris, France

Krakow, February 11 – 15, 2008

Place: Kraków, Jagiellonian University, Faculty of Biochemistry, Biophysics and Biotechnology, Gronostajowa St., 7;
room D107

Participants: students of biology from the Institute Jacques-Monod, Universite Paris 7 and MSc and PhD students of the Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University

Programme

Monday, February 11th

Opening of the course (Józef Dulak – Vice-Dean of the Faculty) – 9.15

Lecture 1: 9.20 – 10.05 **J. Bereta “Monoclonal antibodies – production and application”**

10.05 – 10.15 break

Lecture 2: 10.15 – 10.55 cont.

10.55 – 11.05 break

Lecture 3 11.05 – 11.50 **J. Cichy “Imaging of immune system responses”**

11.50 – 12.00 break

Lecture 4 12.00 – 12.45 cont.

Afternoon – free

Tuesday, February 12th

Lecture 5 9.00 – 9.45 **J. Dulak “Gene therapy: principles and perspectives”**

9.45 – 9.55 break

Lecture 6 9.55 – 10.40 cont.

10.40 – 10.50 break

Lecture 7 10.50 – 11.35 **I. Horwacik “Peptides isolated from phage displayed libraries and their application in design of anti-cancer vaccines”**

11.35 - 11.45 break

Lecture 8 11.45 – 12.30 cont.

Wednesday, February 13th

Lecture 9 9.00 – 9.45 **M. Majka “Few easy steps to understand stem cells”**

9.45 – 9.55 break

Lecture 10 9.55 – 10.40 cont.

10.40 – 10.50 break

Lecture 11 10.50 – 11.35 **A. M. Osyczka “Bone tissue engineering with adult human mesenchymal stem cells: BMPs, biomaterials and beyond”**

11.35 – 11.45 break

Lecture 12 11.45 – 12.30 cont.

Thursday, February 14th

Lecture 13 9.00 – 9.45 **J. Drukała “Application of autologous keratinocytes in wound healing – the principal role of skin stem cells in this process”**

9.45 – 9.55 break

Lecture 14 9.55 – 10.40 **A. Józkowicz “Angiogenesis: matter of life and death”**

10.40 – 10.50 break

Lecture 15 10.50 – 11.35 cont.

11.35 – 11.45 break

Lecture 16 11.45 – 12.30 **Isabelle Caille**

Friday, February 15th

10.00 - Termination of the intensive course – final exam.

Teachers:

Joanna Bereta, PhD „Monoclonal antibodies – production and application”
Department of Cellular Biochemistry
[joannab@awe.mol.uj.edu.pl]

What are monoclonal antibodies. The differences between polyclonal and monoclonal antibodies. Classical method of obtaining monoclonal antibodies. Novel methodologies for obtaining fully human monoclonal antibodies. Applications of monoclonal antibodies in biotechnology, science, diagnostics and medicine. Some examples of usage of monoclonal antibodies in therapies.

Joanna Cichy, PhD **“Imaging of immune system responses”**

Department of Immunology

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The generation and maintenance of immune responses largely depend on the migratory behaviour of immune cells. Rare antigen-specific lymphocytes (T and B cells) must find one another and “matching” antigen presenting cells for successful adaptive immune responses. The focus of the lecture will be on recent advances in a role of immune cell trafficking in host defence.

Józef Dulak, PhD **„Gene therapy: principles and perspectives ”**

Department of Medical Biotechnology

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Gene therapy involves an introduction of nucleic acids into cells of patients to prevent or cure the genetic disorders or chronic diseases. Now, the fate of patients is locked away inside of their genes. In the future, gene therapy can offer a chance to unlock these doors, changing the clinical procedures from a symptom-based to a cause-based practice. The lecture is intended to provide the state-of-the-art survey of basic science, technology and clinical application of gene therapy.

Irena Horwacik, PhD **„Peptides isolated from phage displayed libraries and their application in design of anti-cancer vaccines”**

Laboratory of Molecular Genetics and Virology

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Molecular engineering on *E. coli* filamentous phage vectors has led to construction of peptide libraries, in which vast numbers of peptides of given length are presented on the surface of the viral particles, as products of fusion with one of the viral capsid proteins. Such phage displayed peptide libraries can be screened *in vitro* in a process called “panning” with various receptor molecules in quest for their ligands. Research on phage displayed peptide libraries has proved their applicability in many fields including anti-bacterial and anti-cancer vaccines construction and new drug design. One of the interesting aspects of the technique is identification of peptides mimicking tumour-associated carbohydrate antigens, which are over-expressed after cancer transformation. What is more, experimental data have provided evidence that some of the identified peptides can be successfully used as immunogens to induce immune responses to the native antigen, and may provide feasible means to overcome poor immunogenicity (T-cell independence) of some carbohydrates.

Data will be presented on ongoing project carried out in the Laboratory of Molecular Genetics and Virology, in which peptide mimicking GD2 ganglioside, a neuroblastoma antigen, isolated from phage displayed peptide libraries with mouse monoclonal antibody 14G2a, are

used to induce the anti-carbohydrate immune responses. Our research has aimed to investigate the structural and the immunochemical basis of the observed peptide mimicry of GD2 ganglioside. Additionally, functional features of the peptides have been analysed during *in vivo* studies on mouse models. The information generated by the studies may be utilised to design and optimise active, specific immunotherapy of minimal residual disease in children with high risk neuroblastoma.

Marcin Majka, MD, PhD „Few easy steps to understand stem cells”

Department of Transplantation, Collegium Medicum, Jagiellonian University
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Stem cells are believed to be a remedy for all kinds of diseases and it is believed that stem cells research will provide medicine with new therapeutic strategies in the near future. That is why in recent years, a lot of effort has been put to understand biology of these cells and to translate that knowledge to the clinic. Based on published studies several clinical trials have been started, including use of stem cells in cardiac repair, spinal cord injury or in wound healing. This lecture will introduce basic information about biology of stem cells, as well as about different ways of their isolation.

Anna Maria Osyczka, PhD “Bone tissue engineering with adult human mesenchymal stem cells: BMPs, biomaterials and beyond”

Department of Cytology and Histology, Faculty of Biology and Earth Sciences
Jagiellonian University
[a.m.osyczka@uj.edu.pl]

Justyna Drukała, PhD „Application of autologous keratinocytes in wound healing – the principal role of skin stem cells in this process”

Department of Cell Biology
[justyna@mol.uj.edu.pl]

Human skin structure, substitutes of skin components, skin cells in *in vitro* culture, epidermal cells application – clinical trials, current status concerning epidermal stem cells, use of epidermal stem cells in medicine.

Alicja Józkowicz, PhD “Angiogenesis: matter of life and death “
Department of Medical Biotechnology
[alicia@awe.mol.uj.edu.pl]

Formation of new blood vessels is necessary for the development of the organism, its proper functions and protection against environmental insults. Blood vessels are formed by means of vasculogenesis (from progenitor cells, mainly in embryo) and by angiogenesis, which is the formation of new blood vessels from pre-existing ones. Angiogenesis is involved in the initiation and progression of many diseases, and the therapeutic importance of this process is recently well recognized. The lecture is aimed to present the basics of molecular mechanisms of angiogenesis.

Isabelle Caille, PhD
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December 7, 2007