Cycle A: Infection Biology

Coordinator: Guy Cornelis

A1: Advanced Immunology I and II (A1.1 and A1.2) (2 hrs/week)

T. Rolink, J. Pieters, R. Landmann

In the present lecture series various diseases caused by abnormalities within the immune system will be discussed. During the first hour of each lecture an overview of the clinical aspects of such a disease will be given while during the second hour the immunological basis of this will be discussed in the form of a journal club.

A2: Molecular Virology (2 hrs/week)

K. Ballmer-Hofer

This course covers virus nomenclature, virion structure and assembly, viral life cycles, viral coding, replication and expression strategies, virus-host interaction such as virus transmission and spreading, tumor virology, virus vectors, virus evolution.

A3: Microbial Cell Structures and Drug Targets (1 hr/week)

U. Jenal, D. Bumann, W. Keck

This course will give an introduction to antimicrobials, their most prominent cellular targets and action mechanisms. Mechanisms of antibiotic resistance will be discussed as well as their impact on the fight against the clinically most relevant infections. Finally, the course will give some insights into the efforts to identify promising chemotherapeutical targets and develop novel antimicrobials.

A4: General Mechanisms of Microbial Pathogenesis (2 hrs/week)

G. Cornelis, C. Dehio, J. Pieters

Pathogenic bacteria manipulate the cells of their host and paralyze the immune response. They synthesize and secrete effector proteins that interfere with various key intracellular processes like actin polymerization and signal transduction. Some of these effectors can enter the cells by themselves (A-B toxins) or are injected by highly sophisticated organelles, called injectisomes. In addition, pathogenic bacteria have “defensive” weapons allowing them to resist the action of complement, to acquire iron, to escape the antibody response etc. The lectures describe all the basic mechanisms of virulence and underlying cell biology concepts, using the best-understood model systems.

A5: Major Microbial Diseases and Vaccine Development (2 hrs/week)

G. Cornelis, C. Dehio, J. Pieters

Every bacterial pathogen is endowed with a unique combination of virulence factors and mechanisms, giving a well-defined syndrome. This second course on microbial pathogenesis describes individual bacterial pathogens: ecology, pathology, virulence functions including the genetic and regulation aspects and the possible targets for vaccine development.

A6: Molecular Parasitology (2 hrs/week)

H.-P. Beck, I. Felger

This course on molecular parasitology will broadly cover the molecular basis of parasite-host interactions focussing on protozoan parasites. This will include antigenic variation, parasite invasion strategies, protein transport of intracellular parasites, and evasion mechanisms of parasites. It also will cover host polymorphisms involved in parasitic infections. During the course recent findings will be presented and critically discussed. During the course molecular techniques and research strategies will also briefly be presented.

A7: Signaling in inflammation (1hr/week)

C. Arrieumerlou

After a general introduction on innate immunity, the course will cover the molecular basis of cell signaling during inflammation in response to pathogenic infections. This will include chemotaxis signaling, phagocytosis signaling, pathogen recognition and NF-KB activation mechanisms. Emphasis will be placed on fundamental properties of signaling, such as specificity and signaling dynamics, as well as a systems biology approach to inflammation.

A8: Recent advances in Systems Biology (2hr/week)

D. Bumann

In this introduction to Systems Biology and related subjects, we will first discuss recent findings that show limitations of reductionism and highlight the need for a Systems perspective. We will then look into suitable experimental platforms as well as modeling approaches with a special emphasis on metabolism. Finally, the course will introduce recent concepts in gene expression noise, population heterogeneity, and robust network design.

Cycle B: Neuroscience

Coordinator: Neuroscience Network Basel S. Grumbacher, C. Alioth

For details see http://www.biozentrum.unibas.ch/neuro/

The lecture series will provide basic knowledge in neurobiology. All the graduate students who aim to obtain a Ph.D. in neuroscience should attend these lectures. In each semester one particular topic from developmental to clinical aspects of neuroscience
will be covered. Lectures will include a general introduction into the topic as well as a discussion of the latest results in the field. Lectures will be taught by experts from the University of Basel, the Friedrich Miescher Institute and from industry.
The workshops consist of regular trinational trainings, which may include theoretical, as well as practical, teaching in all aspects of Neuroscience. Trainings are organized in the context of the Eltem Neurex program, and involve teachers scientists, as well as students, of the 3 Universities of Basel, Freiburg (Germany) and Strasbourg (France).

B1: Developmental Neuroscience (2 hrs/week)

S. Arber, Y.A. Barde and others

Neurogenesis – mechanisms of neuronal circuit assembly – patterning – axon guidance – synaptogenesis – refinement of synaptic connections – development of visual, olfactory, peripheral, motor and somatosensory system – neurotrophins – stem cells.

B2: Signaling in the Nervous System (2 hrs/week)

A. Lüthi, K. Vogt and others

Neuronal cell biology – excitability and ion channels – neurotransmitter release – postsynaptic organization – ionotropic and metabotropic neurotransmitter receptors – synaptic transmission – dendritic integration – synaptic plasticity – receptor trafficking – methods in electrophysiology and synaptic imaging – drug-induced synaptic plasticity – genetic analysis of synaptic plasticity

B3: Genes and Behavior (2 hrs/week)

P. Caroni, J. Kapfhammer and others

Sensory circuits and encoding of sensory information – Motor control – Vision – Cortical processing and function Developmental and adult learning – Emotion, fear, decision making, consciousness – From genes to behavior and from behavior to genes

B4: Neurological Diseases (2 hrs/week)

N. Schaeren-Wiemers, M. Tolnay and others
Alzheimer‘s disease – Prion diseases – Epilepsy – Cerebrovascular disease – Basal ganglia diseases – Parkinson‘s disease – Trinucleotide repeats in neuro-genetic disorders – Huntington’s disease – CNS injury and repair – Motor neuron diseases – CNS inflammation: immune-mediated demyelinating diseases – Peripheral neuropathies – Molecular psychiatry: Neurobiology of Schizophrenia

B5: Eltem-Neurex Workshops (1 CP/workshop)

P. Piguet (Coordinator ELTEM) and lecturers of the Trinational Neuroscience Network (Basel, Freiburg, Strasbourg)
These workshops are open for students from Basel, Freiburg and Strasbourg. Each workshop deals with a particular topic in neurobiology and introduces the techniques used. For workshops in preparation: please consult the section “Workshops and Trainings” in http://www.neurex.org

Cycle C: Growth and Development

Coordinator: Anne Spang

C1: Cytoskeleton (2 hrs/week)

U. Aebi, B. Fahrenkrog, C.-A. Schoenenberger

Cell motility as well as changes in cell shape during development, differentiation and pathogenesis depend on temporally and spatially well-controlled reorganization of the cytoskeleton, often in response to external cues. The lecture will cover the structural features

of the major components of the cytoskeleton, their assembly and their regulation in health and disease. The cross-talk with the environment and amongst the different components will be discussed. Emphasis will be put on the organization of supramolecular networks and their plasticity. Distinct functional aspects, such as the role of the cytoskeleton in signaling and intracellular transport or in cell division, will be elaborated upon.

C2: Functional Organization of the Cell Nucleus (2 hrs/week)

U. Aebi, B. Fahrenkrog, C.-A. Schoenenberger

In eukaryotic cells, the nucleus represents the most complex organelle. Nuclear architecture contributes to complex processes such as gene expression, DNA replication, transcription, recombination and repair, RNA processing, nucleocytoplasmic transport, and apoptosis. The lecture will focus on: chromosome organization and dynamics; DNA replication and transcription; nuclear organelles such as nuclear bodies and the nucleolus; RNA processing and the survival of motor neurons (SMN) gene complex; nuclear pore complexes and nucleocytoplasmic transport; the role of the small GTPase Ran in nucleocytoplasmic transport, spindle assembly and nuclear envelope breakdown; the nuclear lamina, lamin-binding proteins, and nuclear envelope structure, assembly/ disassembly and dynamics; diseases related to nuclear defects; and the role of the nucleus in apoptosis.

C3: Membrane Traffic (2 hrs/week)

M. Spiess, H.-P. Hauri, J. Pieters, A. Spang

Protein targeting to the membranes of bacterial plasma membrane, endoplasmic reticulum, mitochondria, peroxisomes, etc.; Membrane protein topogenesis; Membrane and protein transport in the secretory pathway; Endocytosis and phagocytosis; Formation of transport vesicles.

C4: Extracellular Matrix and Cell Adhesion (2 hrs/week)

R. Chiquet-Ehrismann, M. Rüegg, M. Chiquet

Cellular interactions regulate normal development of multicellular organisms and errors lead to malformations and severe diseases such as cancer. We will provide an introduction into the molecular composition of extracellular matrices and cell-cell and cell extracellular matrix adhesion proteins. We will discuss the mechanism of interaction of the adhesion receptors with the cytoskeleton and with intracellular signaling cascades. We will provide the basic information as well as examples of the current state-of-the-art research by lectures of invited expert scientists.

C5: Molecular Mechanisms of Development (2 hrs/week)

M. Affolter, W. Gehring, U. Jenal

Progress in molecular biology, genetic analysis and imaging technology in the past few years has led to a dramatic increase in the understanding of developmental processes. A number of different pathways have been elucidated that lead to the acquisition of different fates by originally equivalent cells. The spectrum of molecules involved in taking these decisions range from receptor-ligand complexes at the cell surface to transcription factors in the nucleus and targets of these transcription regulators. This lecture will present examples for developmental switches in a variety of systems, including single-cell organisms, plants,

nematodes, flies and vertebrates. The lecture will illustrate a way of thinking rather than attempt to cover single details of the issues discussed.

C6: Vertebrate Development and Genetics (2 hrs/week)

R. Zeller, G. Holländer, A. Zuniga and others

This course will introduce the molecular mechanisms controlling vertebrate development and discuss the most relevant vertebrate genetic models and tools to analyze developmental processes. It will also highlight the relevance of understanding developmental mechanisms with respect to development of the immune system, stem cell biology and congenital malformations affecting humans.

C7/C8: Cellular Signalling I + II (2 hrs/week each)

K. Ballmer-Hofer, A. Eberle, M. Hall, M. Affolter

Signalling I and II: This course gives an introduction into cellular signaling mechanisms. A general introduction will be followed by specific topics covering tyrosine and serine/threonine kinase growth factor receptors, protein/protein and protein/lipid interaction modules, signalling by Ras family G proteins, lipid kinases, phospholipid-coupled transduction systems, protein kinase C, G protein-coupled receptors, steroid receptors and other intracellular receptors, the cytokine receptor superfamily and their ligands, MAP kinase pathways, signalling to cell cycle regulators, signalling by nociceptors. For details see: http://imr.web.psi.ch/lectures/signalling_lect.html

C9: Experimental Cancer Research I: Biology and Molecular Biology

N. Hynes, C. Moroni and others (2 hrs/week)

The aim of the course is to give students in the life science area broad knowledge in the cancer research. The lecturers discuss all aspects of cancer research, ranging from molecular results gleaned from basic research, encompassing the pathology of cancer and finally discussing new and „old“ cancer therapeutics. The lecturers range from those conducting basic research in the cancer area, to scientists developing novel anti-cancer therapeutics in the pharmaceutical industry, to clinicians who work daily with cancer patients. The course is carried out in two cycles, each in the spring semester, and is aimed at advanced students in the life sciences.

C10: Experimental Cancer Research II: Clinic and Molecular Biology

N. Hynes, C. Moroni and others (2 hrs/week)

Cycle D: Structure and Function of Macromolecules

Coordinator: Stephan Grzesiek

D1: Molecular Structure, Function, and Dynamics of Membranes and Membrane Proteins (2 hrs/week)

A. Seelig, T. Schirmer, J. Seelig, U. Aebi, A. Engel

Biological membranes are composed of proteins and lipids, which can both be glycosylated. Together these molecules form a functional unit. The lecture series leads towards the understanding of the structural and functional aspects of biological membranes. It gives insight into the diversity of membrane constituents and into their structural analysis by x-ray, nuclear magnetic resonance spectroscopy and electron microscopy. Moreover, the thermodynamics and kinetics of lipidprotein interactions monitored by means of different biophysical techniques are discussed.

D2: Methods of Molecular Biophysics (2 hrs/week**)**

D. Klostermeier

Continuous developments and technical advances of biophysical techniques allow to tackle more and more complex problems. High-throughput capabilities enable us to address questions related to genome-wide analyses, or systems biology. Furthermore, structural information on increasingly large complexes has become available over the last years. Recent developments in single molecule techniques have provided information on dynamics and conformational changes of biomolecules that have not been accessible previously. By applying biophysical techniques, information on the shape of individual molecules and their complexes, their interactions, dynamics, and their three-dimensional structure, down to atomic resolution, can be obtained, leading to a detailed understanding of molecular mechanisms. The lecture will cover a broad range of conventional and modern techniques of molecular biophysics, including analytical ultracentrifugation, mass spectrometry, fluorescence correlation spectroscopy, single molecule fluorescence spectroscopy, NMR, EPR, X-ray crystallography, cryo-electron microscopy, and optical and magnetic tweezers. Each lecture will provide an introduction to the technique, followed by examples of applications in modern biophysical research.

D3: Interactions, Structures, and Dynamics of Soluble Proteins

T. Schirmer, S. Grzesiek, A. Seelig (2 hrs/week)

This course will provide an overview of the forces and interactions that stabilize biological macromolecules. The role of these interactions for the structure and stability of peptides, proteins and DNA will be discussed. Topics include molecular geometries, electrostatic interactions, hydrogen bonding, van der Waals interactions, solvation effects, molecular dynamics, and structure prediction.

D4: Investigation of Biological Mechanisms by Spectroscopic Methods

S. Grzesiek, J. Seelig, A. Seelig, D. Klostermeier (2 hrs/week)

Spectroscopic techniques are of fundamental importance for the analysis of the molecular structure and the function of biological processes. The lecture series introduces different spectroscopic techniques such as circular dichroism, fluorescence, infrared spectroscopy, mass spectrometry and nuclear resonance spectroscopy. Individual lectures will give an introduction to the theory of the various techniques and show recent applications to diverse biological systems.

D5: Large scale protein production of functional proteins (2 hrs/week)

S. Grzesiek, S. Dames, C. Schönenberger

Large amounts of functionally and structurally intact protein are essential for structural biology and many other fields of biochemistry and biophysics. Such amounts are rarely available from native material. This lecture series will focus on the various approaches for large-scale protein production in prokaryotic and eukaryotic cell lines as well as in vitro systems, their respective advantages and disadvantages, strategies to overcome the various problems inherent to the systems and on the functional recovery of the proteins themselves.

Cycle E: Computational and Systems Biology

Coordinator: Torsten Schwede

The following courses take place in the fall semester 2008 and in the spring semester 2009. Starting with the fall semester 2009 the follow up program will change due to the introduction of a new Bachelor and Master curriculum in Computational Biology. Lectures starting in fall 2009 will be announced early 2009.

E1: Introduction to Bioinformatics I (2 hrs/week)

T. Schwede, E. van Nimwegen, M. Zavolan

The lecture series "Bioinformatics I & II " covers a broad overview of current approaches in the field of Bioinformatics. The first part, taking place during the winter semester, will cover sequence comparisons and alignments, genome annotation, aspects of evolution on genomes, genes and proteins, and expression analysis. Requirements: The lecture series is designed as an introduction for students with a degree in molecular biology or related areas. Special programming or informatics skills are not required to attend this course.

E2: Practical Exercises in Bioinformatics I (2 hrs/week)

T. Schwede, E. van Nimwegen, M. Zavolan

The “Practical Exercises in Bioinformatics I“ will provide the opportunity to practically explore the topics covered by the “Bioinformatics I” lecture series. Students will have the opportunity to work through “real world” problems using current bioinformatics tools. Requirements: this course is designed entirely as a supplement for the “Introduction to Bioinformatics I”.

E3: Introduction to Bioinformatics II (2 hrs/week)

T. Schwede, E. van Nimwegen, M. Zavolan, P. Jenö, M. Meuwly, S. Berneche

The lecture series "Bioinformatics I & II" covers a broad overview of current approaches in the field of Bioinformatics. The second part addresses the analysis of signals in sequences, mathematical modeling an simulation of biological phenomena, proteomics, molecular modeling and virtual drug design. Requirements: The lecture series is designed as an introduction for students with a degree in molecular biology or related areas. Special programming or informatics skills are not required to attend this course.

E4: Practical Exercises in Bioinformatics II (2 hrs/week)

T. Schwede, E. van Nimwegen, M. Zavolan, P. Jenö, M. Meuwly, S. Berneche

The “Practical Exercises in Bioinformatics“ will provide the opportunity to explore the topics covered by the “Bioinformatics II” lecture series on a practical level. Students will have the opportunity to work through “real world” problems using current bioinformatics tools. Requirements: this course is designed entirely as a supplement for the “Introduction to Bioinformatics I”.

E5: Genomics in Drug Discovery Research (2 hrs/week)

P. Herrling and others

This course discusses the application of genomics research on drug discovery in the pharmaceutical industry. Integrated approaches of computational biology and bioinformatics have lately emerged as key disciplines for the application of human genome derived data to disease gene discovery and molecular epidemiology. These disciplines are increasingly important in the biopharmaceutical industry for the discovery of novel, more effective, and safer medicines.

E6: Proteomics in Drug Discovery Research (2 hrs/week)

P. Herrling, and others

The accelerating determination of genome sequences and their interpretation with genomics tools has brought with it many challenges. One of them is the determination of the structure, function and expression of all of the corresponding proteins that are encoded therein. Substantial amounts of every genome examined to date, including the draft of the human genome, reveal protein sequences for which there are no structural or functional correlates and therefore represent fundamentally unknown entities. Proteomics aims at understanding of how the structure and function of these proteins and their post-ribosomal modifications contribute to life processes. This class addresses potential applications of proteomics to the finding of new drugs.

E7: Quantitative Reasoning with Biological Data with Exercises (2 hrs/week)

E. van Nimwegen

In computational biology one typically has to deal with large biological data sets that are noisy and of very heterogeneous quality. In addition our knowledge of the biological systems is always highly incomplete and rife with uncertainties. The lecture series will present a general mathematical formalism called 'probability theory as extended logic' for 'reasoning' with incomplete and noisy data. This formalism unites methodologies from Bayesian statistics, statistical inference, and learning theory, information theory, and statistical mechanical theory. The theoretical exposition will be accompanied by detailed examples of realistic applications. The applications will include both general problems of interest to natural scientists as well as specific applications from current research in computational biology.

E8: Computational Modeling and Simulation (2 hrs/week)

M. Zavolan, E. van Nimwegen

The behavior of biological systems is notoriously difficult to predict. Such systems are composed of a large number of interacting components, and little is known about which of these components or interactions are relevant for any given behavior. In silico

experimentation, using mathematical and computational models, can yield dramatic insights into which components are essential for a given behavior.
This course will introduce modeling and simulation techniques with application to biological systems: systems of coupled ordinary differential equations, stochastic processes, agent-based simulations, models of cell growth and population dynamics, genetic algorithms. Working knowledge of programming is required.

Cycle F: Plant Sciences

Coordinator at the University of Basel: Thomas Boller

This cycle has been established by the Zurich-Basel Plant Science Center. It has two elements. The first (G1) is a core seminar "Spectrum of the Plant Sciences", which is held every winter semester (Monday, 16.15-18.00, two credit points). The second (G2) are the "Intensive Courses in the Plant Sciences" (1-2 credit points). As a rule, courses are given in English. At least 12 credit points are required to complete the program successfully: Two credit points from G1, at least four credit points from intensive courses given in G2, and the rest from elective courses in other related specializations outside the graduate program of the Center. Detailed information and the current programme can be found on the following webpage: ttp://www.plantscience.unibas.ch/education/program_en.html

F1: Spectrum in Plant Sciences (2 hrs/week, 2CP)

B. Baur, T. Boller, M. Heinlein, B. Hohn, T. Hohn, C. Körner, F. Meins Jr., A. Wiemken and professors of the University of Zürich and of the ETH Zürich participating in the Zurich-Basel Plant Science Center

The goal of the core seminar “Spectrum of the Plant Sciences” is to present the many and varied scientific issues and research methods of the Center and to show how they are related. New learning techniques will be put into practice. The core seminar will be offered concurrently at the ETH Zurich and the University of Basel during the winter semester (Monday from 16:15 to 18:00) and will be broadcast live by “Tele- Poly”. Each 2-hour period will be devoted to one of the scientific topics of the Center and will be prepared jointly by two professors from different institutions. The language of the core seminar will be English. The doctoral students will attend the core seminars once during their studies and will earn two credits.

F2: Intensive Courses in the Plant Sciences (1 or 2 CP/course)

B. Baur, T. Boller, M. Heinlein, B. Hohn, T. Hohn, C. Körner, F. Meins Jr., A. Wiemken and professors of the University of Zürich and of the ETH Zürich participating in the Zurich-Basel Plant Science Center

Intensive courses will impart specialised knowledge and methodology in the area of Plant Sciences. One or several research groups will prepare each intensive course. Doctoral students will choose intensive courses from the program, earning one credit for two course days. In addition to taking specialised courses, acquiring additional qualifications is very important for later professional experience and advancement; therefore, additional courses will be given by external experts. These courses will be organised according to the specific requirements of the participating scientists. With some exceptions, all the courses will be given in English and will last for a maximum of four days.

Cycle G: Molecular Biology

Coordinator: Susan Gasser

G1: Dynamics and Maintenance of the Genome: DNA Replication, Repair, Recombination

P. Schär, N. Thomä, S. Gasser, D. Schübeler (2 hrs/week)

With many genomes having been sequenced, our understanding of the basic enzymology that ensures its replication and faithful transmission from mother to daughter cells now takes center stage. The lectures will cover mechanisms, regulation and biological significance of DNA metabolism in all forms. This will include general aspects of genome organization and dynamics, the enzymology, control and coordination of DNA replication, and the formation and repair of the various forms of DNA damage that occur continuously in our cells. In addition to the molecular and mechanistic aspects, the course will illustrate the significance of genome instability and maintenance in development, carcinogenesis, premature ageing and other forms of genetic degenerative conditions

G2: Transcriptional Regulation and Gene Expression (2 hrs/week)

P. Matthias and R.G. Clerc

This course deals with all the facets of transcriptional regulation and gene expression, in particular in eukaryotes. The emphasis will be put on the regulatory interplay between transcription factors. Topics that will be discussed include: Regulatory DNA sequences: promoters, enhancers, locus control regions; General transcription machinery; Transcription factors: cell-specific and ubiquitous regulatory factors; Mechanistic aspects of transcription activation; Chromatin, histones, DNA methylation ; Gene regulatory networks; Transcription factors in health and disease; Gene disruption experiments in the functional dissection of transcription control; Transcription factors as the final integrators of signaling cascades.

G3: Structure, Processing and Function of RNA (2 hrs/week)

W. Filipowicz, M. Buehler, R. Ciosk, H. Grosshans

The discovery that RNA is not only a carrier of genetic information or a structural scaffold in ribonucleoprotein particles but can also act as a catalyst in many different cellular processes, greatly stimulated research on the structure, processing and function of RNA. The lecture will cover the following topics: chemistry and structure of RNA; major classes of cellular RNAs (mRNAs, tRNAs, rRNAs, snRNAs, and the newly discovered small regulatory ~20-nt RNAs); chemistry and structure of RNA; pre-mRNA processing with emphasis on splicing and polyadenylation; biogenesis of tRNA and rRNA; biochemistry and function of RNA interference (RNAi) and microRNAs; RNA trafficking in the cell, RNA quality control and RNA degradation; and regulated mRNA translation during development. Also covered are RNA-protein interactions and major classes of ribonucleoprotein particles and the evolution of RNAs.

G4: Chromatin and Epigenetics (2 hrs/week)

S. Gasser, D. Schübeler, A. Peters, R. Paro

This course will cover all aspects of heritable patterning of gene expression and the biological importance of "epigenomes". The modification of nucleosomes and of DNA, and the assembly of chromatin into higher order structures will be discussed. Mechanisms of inheritance will be presented as well as imprinting, X inactivation, and the role of RNA in establishing silent chromatin. Finally, the course will cover the impact of chromatin structure on differentiation, cell plasticity and development.

G5: Translational Control and Post-translational Protein Modification

M. Hall, J. Hofsteenge, P. Jenö (2 hrs/week)

This course will describe the components of the translational apparatus and their putative roles in each of the three steps of protein synthesis: initiation, elongation, and termination. The first part of the course will draw information from the current literature to cover specific cases of translational control. The translational control section will cover a wide spectrum of topics including frame shifting, attenuation, phosphorylation, and transformation. The second part of the course will emphasize the role of translational control in the regulation of cell growth, with particular emphasis on the TOR signaling network. Once synthesized, proteins often require posttranslational modifications either to achieve their full biological activity or to regulate their activity. In these lectures we will discuss the various forms of posttranslational modifications of proteins and the consequences of these modifications for protein function. The lectures will give an up-to-date overview of protein splicing, poly-protein processing, different forms of modifications of amino acids, protein folding and protein transport phenomena requiring proteolysis.

Cycle H: Molecular Medicine

Coordinator: Radek Skoda

H1/2: Molecular Medicine I and II (2 x 2 hrs/week)

B. Biedermann, Ch. Moroni, R. Skoda, M. Heim, and others

The purpose of this lecture series is to introduce biologists to the mechanisms that cause human diseases. Emphasis will be on the genetic and environmental factors that lead to diseases, and how this knowledge can be used to develop diagnostic and therapeutic procedures. The series will start with a lecture on the human genome and its impact on molecular medicine, followed by lectures on infectious diseases (e.g. AIDS, Malaria), and disorders of the immune system (e.g. rheumatoid arthritis). Other lectures will concentrate on organ systems such as blood, cardiovascular system, gastro-intestinal and respiratory system and more general topics such as cancer, psychiatric disease and aging.

Cycle I: Soft Skills

Coordinator: Urs Jenal
The courses of the Soft Skills cycle are eligible only for PhD students. All courses will be held in the spring semester. Dates will be published.

I1: Effective scientific communication I:

Writing and Publishing an Effective Journal Paper (1 day)

H. Silyn-Roberts

This course is to help participants understand the following: the characteristics of an effective paper in terms of how readers extract information from it; requirements for each section of a paper; what reviewers and editors look for; the process of publishing a paper.
To be covered:
The general structure of a journal paper. For each section: the purpose and characteristics of the section; how to write it; difficulties in writing it; tense of the verb; common faults; review checklist.
Method of learning:
PowerPoint presentation by Heather Silyn-Roberts.
Group discussion between presenter and participants.
Participants' individual assessment of the papers they have brought with them. In the full-day course: participants will also construct a plan for each section of a paper describing their experimental work, e.g. an element of their PhD work; Diplom work, etc.

I2: Effective scientific communication II:

Making an Effective Conference Poster (half day)

H. Silyn-Roberts

This course is to help participants construct for a conference a display poster that effectively communicates the essential elements of a piece of scientific work. To be covered: Features of posters that viewers like; planning; design and structure of information; figures and tables; effective and ineffective features of posters; review checklist. Method of learning:
PowerPoint presentation by Heather Silyn-Roberts.
Discussion of the requirements.
Participants' assessment and grading of posters (posters brought by participants, photos).

I3: Effective scientific communication III:

Making an Effective Seminar or Conference Presentation (1 day)

H. Silyn-Roberts

This course is to help participants learn how to use the skills of rhetoric, structuring of information, and preparation of visual aids to present scientific information in a professional manner at a conference or seminar. To learn what to avoid doing.
To be covered:
Guidelines for beginners; types of notes; structuring a presentation; using overview information at the beginning and end; dealing with detail; spoken style; wording (your own, visual aids); designing visual aids; delivering the talk; dealing with
needing to pause, interruptions, finishing in a hurry; answering questions.

Method of learning:
All participants will present a prepared five-minute seminar based on their work.
Each presentation is followed by group discussion analysing the effective and ineffective points.
PowerPoint presentation by Heather Silyn-Roberts of what to do and what not to do when making a scientific presentation.
Time allowed for participants to improve their presentation, followed by the second, improved version by each participant. Group discussion after each presentation. Also practice in finishing in a professional manner when one's time has run out. NOTE: each participant who has gone through this course has shown a marked improvement in presentation technique and confidence in the second presentation.

I4: Introduction to statistics for biologists (1 week)

L. Bordoli

This one week practical course is designed to provide graduate students in the biomedical sciences with experience in the application of basic statistical analysis techniques to a variety of biological problems. Attendees will work through short tutorial on the topics discussed in the class. During the practical exercises students will learn how to work with the widely used "R" language and environment for statistical computing and graphics. The course dates are 19-23 January 2009. The number of participants is limited.

Graduate Teaching Program: Schedule 2008 - 2011

	Cycle A	Cycle B	Cycle C	Cycle D	Cycle E	Cycle F	Cycle G	Cycle H	Cycle I
	Infection Biology	Neuroscience	Growth & Development	Structure and Function of Macromolecules	Computational and Systems Biology	Plant Sciences	Molecular Biology	Molecular Medicine	Soft Skills
Semester									
Fall 2008	A1.1	B3	C2, C3, C4, C5, C7	D4	E1, E2, E5, E8	F1, F2	G3	H1	
Spring 2009	A1.2, A8	B4	C8, C10	D1	E3, E4, E6, E7	F2	G4	H2	I1, I2, I3, I4
Fall 2009	A1.1, A2, A3, A4 A6, A7	B1	C1	D2	to be announced	F1, F2	G5	H1	
Spring 2010	A5, A1.2	B2	C9	D3	t. b. a.	F2	G1, G2	H2	I1, I2, I3
Fall 2010	A1.1	B3	C2, C3, C4, C5, C6, C7	D5	t. b. a.	F1, F2	G3	H1	
Spring 2011	A1.2, A8	B4	C8, C10	D4	t. b. a.	F2	G4	H2	I1, I2, I3
Fall 2011	A1.1, A2, A3, A4 A6, A7	B1	C1	D1	t. b. a.	F1, F2	G5	H1	
CPs total	16	9	18	10	16	4	10	4	3