

Prof. Dr. Peter Dieter, Department of Physiological Chemistry, Carl Gustav Carus Faculty of Medicine, TU Dresden,
Fetscherstraße 74, D-1307 Dresden, Germany

Email: Peter.Dieter@tu-dresden.de, phone: (351)-458 6450, fax: (0351)-458 6307

Office: MTZ, Fiedlerstraße 42, 1st floor, Rm A 10050

Introduction to the molecular mechanisms of cell function in the context of cutting-edge applications in bioengineering and medicine. Biological concepts include: molecular building blocks, energetics, reaction kinetics, nucleic acids and DNA repair, transcription, translation, regulation and cytoskeleton. Applications include bioenergy, biomanufacturing, antibiotics, diabetes, protein therapeutics, gene circuit engineering, & tissue engineering. Quantitative principles, computational methods, and experimental methods will be integrated into lectures and labs.

LECTURE/SEMINAR/EXAMINATION

Required Text: Essential Cell Biology, B. Alberts et. al. 2009

Tuesday 11.30 am–2.30 pm (auxiliary date: even weeks: Friday 10 am-1 pm)

Location (see map)

Room 108b: Building 40, Dekanatsgebäude; Hörsaal 2 (HS2): Building 91, MTZ

Examination/Grading: Active Attendance / written

| Week | Time | Topic | Room |
|------|----------------------|--------------------------------|------|
| | April | | |
| 16 | Tue 16 | CH1 + CH2 + CH3 | 108b |
| 17 | Tue 23 | CH4 + CH5 | HS2 |
| 18 | Tue 30, 12.00 | CH6 | HS2 |
| | May | | |
| 18 | Tue 07 | EXAM SEMINAR 1: CH1-6 | 108b |
| 19 | Tue 14 | CH7 + CH8 | 108b |
| 22 | Tue 28 | CH9 + CH11 | 108b |
| | June | | |
| 23 | Tue 04 | CH12 + CH13 | 108b |
| 24 | Tue 11 | CH14 | 108b |
| 25 | Tue 18, 12.00 | EXAM SEMINAR 2: CH7-14 | 108b |
| 26 | Tue 25 | CH15 + CH16 | 108b |
| | July | | |
| 27 | Tue 02 | CH17 + CH18 | 108b |
| 28 | Tue 09, 13.00 | CH19 + CH20 | 108b |
| | Fri 12, 10.00 | EXAM LABORATORY | 108b |
| 29 | Tue 16 | EXAM SEMINAR 3: CH15-20 | 108b |

Prof. Dr. Peter Dieter, Department of Physiological Chemistry, Carl Gustav Carus Faculty of Medicine,
 TU Dresden, Fetscherstrasse 74, D-1307 Dresden, Germany
Email: Peter.Dieter@tu-dresden.de, phone: (351)-458 6450, fax: (0351)-458 6307
Office: MTZ, Fiedlerstrasse 42, 1st floor, Rm A 10050

Labs will provide practical experience with current methods used in molecular/cell biology and biotechnology. The first half of the course will cover protein folding, bioenergetics, cell growth, and microscopy. The second half will be devoted to a single multi-week module on genetic engineering and gene regulation. Students will build a bacterial gene expression system, learning recombinant DNA technology, cloning and gene expression measurement techniques. Labs will emphasize the experimental and analytical skills required in modern engineering and scientific research.

LABORATORY

Required: Laboratory Manual – White Lab coat

Tuesday: 3.00 pm – 6.00 pm

Location: MTZ, Fiedlerstrasse 42 (map: Bld. 91)

Examination/Grading: Active Attendance / Written

| Day | Content | Discipline Responsibility | Location |
|----------|--|---|------------------------------------|
| April 09 | Laboratory 1 Analysis of Simulated Epidemic and Hand Contamination and Cytological Studies | Microbiology Prof. Jacobs | Mikroskopierraum |
| April 16 | Laboratory 2 General Histology | Anatomy Prof. Kasper | Mikroskopierraum |
| April 23 | Laboratory 3 Quantitative Determination and Spectrums of Haemoglobins in Blood | Biochemistry Dr. Scheibe | Institut für Physiologische Chemie |
| April 30 | Laboratory 4 Determination of Activity of Lactate Dehydrogenase in Optical Test | Biochemistry Dr. Hempel | Institut für Physiologische Chemie |
| May 07 | Laboratory 5 Molecular Biological Diagnosis of Cystic Fibrosis with the Help of PCR | Biochemistry Dr. Kreuzmann | Institut für Physiologische Chemie |
| May 14 | Laboratory 6 Characterization of DNA using Restriction Endonucleases | Biochemistry Dr. Kreuzmann | Institut für Physiologische Chemie |
| May 28 | Laboratory 7 – Group I Bacterial Transformation | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |
| June 04 | Laboratory 7 – Group II Bacterial Transformation | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |
| June 11 | Laboratory 8 – Group I Plasmid Preparation from <i>E. coli</i> and Sequencing of Plasmid DNA | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |
| June 18 | Laboratory 8 – Group II Plasmid Preparation from <i>E. coli</i> and Sequencing of Plasmid DNA | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |
| June 25 | Laboratory 9 – Group I Transient Transfection of Eukaryotic Cells Western Blotting Technique | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |
| July 02 | Laboratory 9 – Group II Transient Transfection of Eukaryotic Cells Western Blotting Technique | Immunology Prof. Roers Anett Skupin | Institut für Immunologie |