P Grundlagen der Biologie I - Part Microbiology
Program FS17

Day 1 **Basics for the work with microorganisms / Isolation of microorganisms from the environment**
Day 2 **Morphology and diagnostics of bacteria / Antimicrobial agents**
Day 3 **Fungi - the eukaryotes among the microorganisms / Microbial physiology and interactions**

Day 1 **Basics for the work with microorganisms / Isolation of microorganisms from the environment**

Chapt. 1: Basics for the work with microorganisms

Experiment 1.1: Production of liquid culture medium (nutrient broth) (for Exp. 6.1)
Experiment 1.2: Isolation of single colonies for the production of pure cultures

Chapt. 2: Isolation of microorganisms from the environment

Experiment 2.1: Sampling of microorganisms using Rodac plates
Experiment 2.2: Microbial air analysis using spontaneous sedimentation
Experiment 2.3: Isolation of soilborne bacteria and selection of sporeformers
Experiment 2.4: Determination of the *E. coli* content in different environmental water samples
Experiment 2.5: Determination of the the *E. coli* content in raw water from a sewage treatment plant
Experiment 2.6: Testing the effect of a filter with pore size 0.45µm on raw water from a sewage treatment plant
Experiment 2.7: Determination of the titer of *E. coli* phages in the 0.45µm filtrate

Chapt. 4: Fungi - the eukaryotes among the microorganisms

Experiment 4.1: Determination of the cell number of a yeast colony

Chapt. 6: Microbial physiology and interactions (INOCULATIONS FOR DAY 3)

Experiment 6.2: Bacterial growth under aerobic and anaerobic conditions
Experiment 6.4: Phototropism and light regulation of fungal development
Experiment 6.8: Isolation of a major human commensal and biofilm forming bacterium from the oral cavity
Experiment 6.9: The phyllosphere as a niche for methylotrophic bacteria

Day 2 **Bacterial morphology/diagnostics and antimicrobials**

Chapt. 3: Morphology and diagnostics of bacteria

Experiment 3.1: Macroscopic examination
Experiment 3.2: Microscopic examination
Experiment 3.3: Gram stain and growth on MacConkey agar
Experiment 3.4: Oxidase-test for the differentiation of aerobic Gram-negative bacteria
Experiment 3.5: EnteroPluri-test for the identification of Gram-negative, oxidase-negative bacteria
Experiment 3.6: Amplification and sequencing of 16S-rDNA for the identification of Gram-negative and -positive bacteria

Chapt. 5: Antimicrobial agents

Experiment 5.1: Fungi as producers of antibiotics
Experiment 5.2: Susceptibility of different microorganisms towards different antibiotics
Experiment 5.3: Antimicrobial activity of mustard and garlic
Experiment 5.4: Detection of lysozyme activity in animal secretions

Chapt. 6: Microbial physiology and interactions (INOCULATIONS FOR DAY 3)

Experiment 6.3: Absorptive nutrition mode of microorganisms
Experiment 6.5: Horizontal gene transfer between *E. coli* strains by conjugation
Experiment 6.7: Quorum sensing by bacteria

Day 3 **Morphology of fungi / Microbial physiology and interactions**

Chapt. 4: Fungi - the eukaryotes among the microorganisms

Experiment 4.2: Microscopy of characteristic morphological features of different fungal phyla

Chapt. 6: Microbial physiology and interactions

Experiment 6.1: Growth curve of *E. coli* in liquid culture
Experiment 6.2: Bacterial growth under aerobic and anaerobic conditions (EVALUATION)
Experiment 6.3: Absorptive nutrition mode of microorganisms (EVALUATION)
Experiment 6.4: Phototropism and light regulation of fungal development (EVALUATION)
Experiment 6.5: Horizontal gene transfer between *E. coli* strains by conjugation (EVALUATION)
Experiment 6.6: Transcriptional regulation of the key enzyme in microbial nitrogen fixation
Experiment 6.7: Quorum sensing by bacteria (EVALUATION)
Experiment 6.8: Isolation of a major human commensal and biofilm forming bacterium from oral cavity (EVALUATION)
Experiment 6.9: The phyllosphere as a niche for methylotrophic bacteria (EVALUATION)

Chapt. 3: Morphology and diagnostics of bacteria (REPORTING)

Experiment 3.6: Amplification and sequencing of 16S-rDNA for the identification of bacteria