P14 Revision for the practical examination

This practical session is not compulsory but students are highly recommended to attend (even another than their own group session, though should a problem with the hall capacity occur, "native" students will receive precedence).

Task: Orientation at survey of knowledge for the practical examination

Follow the presented survey and add your own notes according to the teacher's explanation and practical demonstration.

Attention! It is only an orientation at survey; at the practical examination you cannot raise objections that something "was not in the survey". The practical examination assesses the knowledge obtained during two terms of education, **not** the knowledge of a survey.

The basic requirements for each topic	Student's notes
Microscopy	
Gram staining: ❖ be able to perform it ❖ be able to observe a preparation and to identify G+/G– cocci/bacilli (+arrangement), yeasts, epithelial cells, WBCs ❖ know the principle	
Wet mount, other staining methods performed in practicals (survey)	
(Ziehl-Neelsen staining, see Acid fast bacteria)	
Interpretation of microscopic findings (importance of epithelial cells, leucocytes)	
Culture	
Most important culture media ❖ be able to recognize blood agar, Endo agar and Mueller Hinton agar ❖ be able to describe the function of all the fourteen media from J02	
Inoculation (be able to inoculate a strain/a swab)	
Description of colonies (practically)	
Biochemical identification	
Catalase test ❖ be able to perform it ❖ understand its principle ❖ be able to give an example of its use in diagnostics	
Strip tests ❖ know the most important ones (oxidase, PYR, INAC) and to give examples of their use ❖ be able to use them practically (incl. reading the results)	
Hajna, MIU and other similar tests ❖ know their practical use and what they detect	
Enterotest-like tests ❖ be able to read an Entero- or Staphy-test and o describe its principle	
Further notes:	

Outer influences, disinfection and sterilisation	
The safety rules in the laboratory	
The most common disinfectants and sterilization methods and the way they are used (chloramin, NaOCl, $Ca(OCl)_2$, iodine-povidone, hydrogen peroxide, peracetic acid, ajatin, UV-rays disinfection, hot air and steam sterilization, radiation sterilization)	
To understand the methodological difference between testing the growth limit and the survival limit	
To be able to read corresponding tests (Task 1, P06)	
To know how effect of disinfection and sterilization can be tested	
Antimicrobial drugs	
To know principles of microdilution test, diffusion disk test and E-test, to be able to read the results of all of them and to interpret them	
To understant the importance of MIC and its comparison with breakpoint level	
To know basic methods of testing the factors of resistance (beta-lactamases)	
Serological tests (J06 to J08)	
To be able to read the results any of these tests; students will get the necessary information (dilution in the first well, c. o. counting in ELISA etc.)	
To be able to describe the basic indication for the test and to interpret these results in combination with other parameters; including ASO!	
The principle of antigen/analysis reactions and its use for antigen detection in a specimen/antigen analysis of a strain/antibody detection	
To understand the major interpretation difference between direct and indirect diagnostic methods	
To know the principles of agglutination, precipitation, agglutination on carriers, CFT, neutralisation (ASO, HIT, VNT), reactions with labelled components, western blotting, incl. differences between them	
To understand titers, titer dynamics, seroconversion, importance of IgM/IgG (and knowing what reactions enable their detection – importance of conjugate), avidity (A-aspiring students)	
To be able to construct the scheme of HBsAg and anti-HBs testing	
To understand the terms “heterophilic antibodies” and “anticomplementarity test”	
Detection of nucleic acid	
To know the basic indication for these methods in microbiology	
To understand the difference between methods with/without amplification	
To know the basic principle of the reaction, including two major ways of product detection	
To understand the importance of internal control	
To be able to read practically a PCR result (in a picture), including IC result interpretation	
Further notes:	
Virology	
To know the ways of isolating a virus (including	

individual structures of a fertilized egg)	
To be able to differentiate a cell culture with/without CPE (in simplex cases only) and to understand, what a CPE is	
(plus serology: HIT, VNT, see serology)	
Parasites	
To know basic methods for parasites (Faust, Kato, Graham; thick and thin smear; C. A. T. swab and Giemsa stained smear for trichomonads; indirect diagnostics of tissue parasites)	
To be able to distinguish the most common helmint eggs (tapeworm, pinworm, common roundworm, whipworm) and tapeworm proglottid	
To know the basic principles of sampling for parasitology	
Easily culturable bacteria and yeasts (P01–P06; J13)	
To be able to find out (and utilize practically) a diagnostic algorithm to identify common bacteria except G+ rods (*Staphylococcus aureus,* coagulase-negative staphylococci*, Streptococcus pyogenes, S. agalactiae, S.* non-A-non-B*, S. pneumoniae,* oral streptococci*, Enterococcus faecalis, E. faecium, Escherichia coli, Klebsiella pneumoniae, Salmonella enterica, Proteus* sp., *Pseudomonas aeruginosa*, other G– non-fermenters, *Haemophilus influenzae, H. parainfluenzae, Pasteurella multocida, Neisseria gonorrhoeae, Neisseria meningitidis,* oral neisseriae, *Moraxella catarrhalis, Candida albicans, Candida* sp.)	
For G+ rods: to know their main characteristics; to be able to identify practically coryneform rods according to their palisade arrangement	
Anaerobic bacteria	
To be able to describe an anaerobic jar and an anaerobic box, their parts and their function	
For clostridia: to know their main characteristics; to be able to identify *C. tetani* according to its sphaerical terminal endospore	
Acid-fast rods	
To know the principle of Ziehl-Neelsen staining, to be able to distinguish between the pictures of positive and negative findings and pictures stained using other staining methods	
To know the principles of acid-fast rod culture, to know basic media, to be able to distinguish pictures of positive findings/negative findings/pictures describing something else	
Spiral bacteria	
To explain the use (and complications in use) of direct methods in spirochete diagnostics	
To understand screening/confirmatory reactions for *Borrelia* and *Treponema*	
To be able to read and interpret the tests (see also Serology)	
Further notes:	
Fungi	
To know basic diagnostic methods used in mycology	

To be able to read a microprecipitation test for lung aspergillosis and to explain its principle	
To know the basic principles of sampling for mycology	
See also "Easily culturable bacteria and yeasts (P01–P06; J13)"	
Biofilm	
To know the diagnostic methods of biofilm detection	
To know the difference between three most typical methods of venous catheter microbiologic diagnostic	
To be able to read the results of the biofilm growth: glucose/time experiment (see J14 Task 4)	
To be able to read MBEC values and to interpret the result (in comparison with MIC)	
Clinical microbiology	
To be able to find a pathogen in pharyngeal flora (and to know the composition of normal pharyngeal flora, and common pharyngeal pathogens)	
To be able to read a result of urine culture semiquantitatively and qualitatively	
For a simple mini-casuistry, be able to find out the best sampling method, including finding the best swab or container (practically)	
To understand basic principles of sampling under various circumstances	

Further notes: