

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 |
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| Microscopy | |
| Gram staining: <ul style="list-style-type: none"> ❖ 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 <ul style="list-style-type: none"> ❖ 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 <ul style="list-style-type: none"> ❖ be able to perform it ❖ understand its principle ❖ be able to give an example of its use in diagnostics | |
| Strip tests <ul style="list-style-type: none"> ❖ 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 <ul style="list-style-type: none"> ❖ know their practical use and what they detect | |
| Enterotest-like tests <ul style="list-style-type: none"> ❖ be able to read an Entero- or Staphy-test and describe its principle | |
| Further notes: | |

| Outer influences, disinfection and sterilisation | |
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| 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 understand 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 | |

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| 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 helminth 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 (<i>Staphylococcus aureus</i> , coagulase-negative staphylococci, <i>Streptococcus pyogenes</i> , <i>S. agalactiae</i> , <i>S. non-A-non-B</i> , <i>S. pneumoniae</i> , oral streptococci, <i>Enterococcus faecalis</i> , <i>E. faecium</i> , <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , <i>Salmonella enterica</i> , <i>Proteus</i> sp., <i>Pseudomonas aeruginosa</i> , other G– non-fermenters, <i>Haemophilus influenzae</i> , <i>H. parainfluenzae</i> , <i>Pasteurella multocida</i> , <i>Neisseria gonorrhoeae</i> , <i>Neisseria meningitidis</i> , oral neisseriae, <i>Moraxella catarrhalis</i> , <i>Candida albicans</i> , <i>Candida</i> 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 <i>C. tetani</i> according to its spherical 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 <i>Borrelia</i> and <i>Treponema</i> | |
| To be able to read and interpret the tests (see also Serology) | |
| Further notes: | |
| Fungi | |
| To know basic diagnostic methods used in mycology | |

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| 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 anal swab culture | |
| To be able to read a result of urine culture semiquantitatively and qualitatively | |
| To be able to read a result of wound culture (superficial and deep wound) | |
| To be able to read a result of blood culture (microscopy and culture) | |
| To be able to read a result of vaginal smear (including counting the Nugent score) | |
| To be able to read a result of vaginal swab (culture) | |
| For a simple mini-casistry, 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: