UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Microbiology:methods and Techniques

2425-2-I0302D009-I0302D032M

Aims

To provide basic knowledge of diagnostic techniques of clinical microbiology

Contents

Student's skills:

- Collection, transportation and treatment of biological samples.
- Techniques of culture, identification, interpretation.
- Quality controls: CQI and VEQ in Clinical Microbiology lab.
- Alert study, infectious diseases and nosocomial infections.
- The biological risk in Microbiology lab.

Detailed program

- Role of the microbiology laboratory.
- Prevention and control of infections in the laboratory: general rules of conduct, routes of exposure associated with laboratory activities.
- Criteria for classifying microorganisms into danger classes.
- Minimum microbiology laboratory requirements.
- Standardized microbiological procedures.
- Quality control in microbiology: definitions, operational protocols, control charts, common sources of error, control of susceptibility tests, standardized control strains, internal and external quality control.
- The diagnostic path: appropriateness of the pre-analytical phase, definitions, collection, transport and

identification of the clinical sample, criteria for defining an unsuitable sample and management of non-conformities.

Direct microbiological diagnosis:

- Microscopic examination and sample preparation, observation and staining techniques.
- Cultural examination: techniques of sowing and isolation of microorganisms in culture; culture media and inoculation techniques; media commonly used in the microbiology laboratory and growth characteristics of microorganisms.
- Determination of presumptive species: macroscopic appearance and microscopic appearance of the colonies after staining.
- Biochemical identifications with automatic instrumentation, catalase test, coagulase test, cytochrome oxidase test, mobility test, urease test, indole test, voges-poskauer test, three-sugar iron agar test, bile test-aesculin, fermentation reactions, decarboxylation reactions, citrate use test, nitrate reduction test, hippurate hydrolysis test; serological identifications.
- Essential methods for the identification of bacteria and fungi: biochemical identifications with automatic instrumentation, maldi-tof identification: general information and sample preparation.
- Susceptibility testing to antimicrobial agents: agar diffusion techniques, microdilution, agardilution, epsilometer susceptibility testing and automated systems;
- Interpretation of the antibiogram according to EUCAST guidelines.
- Specific methods for detecting resistance.

Indirect microbiological diagnosis:
Immunoenzymatic techniques, immunofluorescence, immunoblot, chemiluminescence assays.

Intravascular and cardiac infections

- Definitions, blood infections: blood culture - factors determining the outcome of the blood culture and sampling methods.
- Blood culture systems, media used, sample conservation, instrumentation used and test principle, pre-analytical precautions, interpretation of results, variables and critical issues of blood culture, molecular methods, QUICK-FISCH technique.
- Central venous catheter infections: diagnostic techniques.
- Microbiology of sterile liquids: amnionitis, pericarditis, peritonitis, pleurisy, septic arthritis, bursitis - laboratory investigations and techniques, flow chart.

Upper and lower respiratory tract infections

- General information, collection of biological material and suitability of the collected samples.
- Pathogenic microorganisms and their dyeing characteristics, isolation in specific media, identification;
- Laboratory techniques and flow charts

The mycobacteriology laboratory: general information, operator safety, dyeing, cultural and identification characteristics, sample decontamination techniques, automatic detection systems.

Direct and molecular immunofluorescence detection of respiratory viruses.

Infections of the genitourinary system

- General information, microorganisms involved, type and collection of samples, flow diagrams.
- Culture methods and techniques: sowing of samples, bacterial count, media used, dyeing, biochemical, serological identification techniques.
- Genital infections: sexually transmitted infections; general information, methods of collection of biological samples, responsible microorganisms, diagnostic isolation and identification techniques, serological and molecular investigations.

Central nervous system infections

- General information, meningitis - typology and etiology.
- Diagnosis of meningitis: collection and transport of CSF, characteristics of CSF, viral and bacterial meningitis.
- Laboratory diagnosis: microscopic, cultural, serological, molecular microbiological techniques.

Infections of the gastrointestinal tract

- General information, investigations and laboratory techniques.
- Intestinal parasitoses: general information, biological cycles of the pathogens involved, collection and treatment of samples.
- Direct and indirect diagnostic techniques: permanent staining
- Immunofluorescence techniques, EIA techniques, molecular techniques, culture techniques, serological investigations.

Arthropod infections

Prerequisites

Teaching form

All lessons are held in person in delivery mode:

- 8 lessons of 2 hours carried out in presence mode

Textbook and teaching resource

E. W.Koneman, S.D.Allen, W.M.Janda, Introduzione alla Microbiologia, Antonio Delfino Ed.

Download SOPs of Health Protection Agency, from website: http://www.hpa-standardmethods.org.uk/pdf_sops.asp

AMCLI Percorsi diagnostici

EUCAST www.eucast.org

Semester

First semester

Assessment method

Oral test to check preparation on microbiology techniques, to assess independent thinking skills, and to check communication skills in disciplinary field.

Office hours

On appointment requested by mail

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY