UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Molecular Microbiology

2223-1-F0601Q052

Aims

The Molecular Microbiology module provides competences and skills in the basis of molecular microbiological applied to molecular mechanism in bacteria 1. Knowledge and understanding. Knowledge of the basis of Molecular Microbiology 2. Applying knowledge and understanding. At the end of the course the student will be able to apply the knowledge acquired in the molecular mechanisms of bacteria. 3. Making judgment. The student will be able to elaborate the knowledge in molecular microbiology. 4. Communication skills. At the end of the course the student will be able to write experimental reports with microbiological vocabulary 5. Learning skills. The student will be able to apply the acquired knowledge in the field of molecular microbiology

Contents

The content of the course will be focused on: molecular mechanisms involved in cellular division in prokariotics; examples of microbial differentation as in Caulobacter crescentus; molecular mechanisms involved in sporulation and germination; biofilms; secretion system in bacteria; interaction bacteria-host; interaction bacteria-environment

Detailed program

1.BACTERIAL CELL DIVISION Building of cytokinesis apparatus Formation of FtsZ ring Proteins of the divisome Regulation of divisome proteins Regulation of control of cell cycle and DNA replication 2.EXAMPLE OF CELLULAR DIFFERENTATION Cell cycle of Caulobacter crescentus Phases of cell cycle Regulation of cell cycle Control of the regulation of cell cycle and DNA replication Regulation of divisome proteins 3.EXAMPLE OF CELLULAR DIFFERENTATION Cell cycle of Bacillus subtilis Phases of cell cycle Sporulation Germination 4.MICROBIAL BIOFILM Biofilms in nature and biofilm formation Role of biofilm Biofilm as differentiated community Quorum sensing phenomenon Formation of the quorum sensing phenomenon Regulation of the quorum sensing

phenomenon Autoinductors in different bacteria 5. MICROORGANISM-HUMAN INTERACTIONS Mechanisms of pathogenesis Main steps of infective process Contact Adhesion/Colonization Replication Secretion systems type I, II, III, IV, V, VI Virulence factors and bacterial toxins 6.MICROORGANISM-ENVIRONMENT INTERACTIONS Physiological adaptation Variation of gene expression in response to environmental stress Genetic adaptation Response to environment variations and genome alterations in response to mutation events or acquisition of exogen DNA

Prerequisites

The course requires a background in General Microbiology and Molecular Biology

Teaching form

Oral Lessons

Textbook and teaching resource

All the last editions of books of Microbiology as background, but the course needs the availability of the Reviews and papers indicated during the lessons from the Professor

Semester

first semester

Assessment method

written and oral examination. The student have to respond to 4 open questions on the topics trated during the course. On the basis of the answer the student can deeper explain this topics during the oral examination.

Office hours

By direct contact with the Professor through an appointment by emailto:
patrizia.digennaro@unimib.it

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING