UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2627-2-I0301D008

Aims

At the end of the course, the student will acquire fundamental knowledge of general pharmacology, including the main mechanisms of action, therapeutic effects, and adverse reactions of drug classes relevant to dental practice, as well as the principles of anaesthesiology and the management of medical emergencies. The student will also gain knowledge of the substances and preventive agents used in the prevention of dental caries and oral cavity diseases. In addition, the student will understand the main factors influencing drug response, including sex- and gender-related differences.

At the end of the course, the student will be able to apply the acquired knowledge to interpret the main characteristics of drug classes relevant to dental practice, recognize common drug–drug interactions and their possible implications for dental hygiene treatment, understand the principles of medical emergency management, and appropriately use substances and preventive agents in the prevention of dental caries and oral cavity diseases, in accordance with the professional competences of the dental hygienist.

Contents

During the integrated course, students will explore the fundamental principles of general pharmacology, with particular reference to the mechanisms of action of the main drug classes relevant to dental practice. Key topics include pharmacokinetics and pharmacodynamics, drug interactions and the factors influencing inter-individual variability in drug response.

In parallel, the principles of anaesthesiology will be addressed, with specific focus on local anaesthetics and their use in dental practice, as well as the basic management of medical emergencies and urgent conditions, with particular attention to situations commonly encountered in dental settings.

Finally, students will acquire knowledge of the main agents and preventive measures used in the prevention of dental caries, dentinal hypersensitivity, and periodontal and gingival diseases, with an approach oriented toward

their appropriate use in oral hygiene practice.

Detailed program

The course consists of three integrated modules:

PHARMACOLOGY
The module will begin with an overview of the historical development of pharmacology and the main stages of drug development, distinguishing between preclinical and clinical studies, with reference to the role of pharmacovigilance.
The principles of pharmacokinetics (ADME) will then be explored, with reference to routes of administration, bioavailability, first-pass effect, tissue distribution, and the main processes of drug metabolism and excretion, including the role of cytochrome P450 enzymes and enterohepatic circulation.
The module will continue with pharmacodynamics, focusing on the main mechanisms of drug action, dose–response relationships, the concepts of therapeutic index and therapeutic window, and drug–receptor interactions.
Finally, inter-individual variability in drug response will be addressed, with reference to physiological, pathological, and genetic factors, sex- and gender-related differences, and the main adverse drug reactions (hypersensitivity, idiosyncrasy, and allergy).

ANAESTHESIOLOGY
The basic principles of anaesthesiology and the management of medical emergencies and urgent conditions will be addressed, with particular reference to shock, acute respiratory failure, and acute alterations in consciousness.
The principles of cardiopulmonary resuscitation and first aid will also be covered, with attention to the early recognition of emergencies, activation of the emergency response system, and basic life-saving manoeuvres.
Finally, the mechanisms of action of local and systemic anaesthetics will be illustrated, including an overview of local anaesthesia techniques, sedation, general anaesthesia, and sedoanalgesia, with particular attention to patient safety and the main clinical implications for dental hygiene practice.

APPLICATION OF SUBSTANCES FOR THE REDUCTION OF CARIES SUSCEPTIBILITY
The module addresses the main oral health issues related to dental caries, dentinal hypersensitivity, and gingival and periodontal diseases.
The principles of biofilm control and oral ecological balance will be explored, as well as the main preventive strategies based on mechanical tools (toothbrushes, dental floss, and interdental devices), chemical agents (toothpastes and mouthrinses, with particular reference to chlorhexidine), and biological approaches (oral probiotics).
The module also includes an overview of home-based and professional oral hygiene strategies aimed at maintaining oral health.

Prerequisites

Knowledge of the introductory courses indicated in the regulation of the degree course are required.

Teaching form

The integrated course includes lectures and interactive teaching activities aimed at active learning of the course

contents.

During selected sessions, digital tools for student interaction will be used, including the Wooclap platform, through quizzes, polls, and real-time discussions. Audiovisual materials may be used to support the understanding of the topics, including video-based educational resources (e.g. JoVE).

Teaching activities are delivered in person.

The course is taught in Italian, with the possible use of teaching materials in English.

Throughout the course, the principles of gender medicine will be integrated, with particular attention to sex- and gender-related differences in drug response, emergency management, and oral health prevention strategies.

Textbook and teaching resource

For an in-depth and comprehensive study of the topics covered in the course, the following textbooks are recommended:

1. Pharmacology module

- Cella, Di Giulio, Gorio, Scaglione, "Farmacologia generale e speciale per le lauree sanitarie triennali", Piccin.
  This textbook provides a comprehensive overview of the fundamental principles of both general and special pharmacology, with a specific focus on the needs of undergraduate healthcare degree programmes.
- Collino, Cicala, Ialenti, "Farmacologia generale", UTET.
  A reference textbook covering the fundamental concepts of general pharmacology, providing a solid theoretical and practical foundation for students.

2. Anaesthesiology module
Ranieri, Mascia, Terragni, Urbino, "Elementi di Anestesiologia e Terapia Intensiva", C.G. Edizioni Medico Scientifiche.
A key textbook for understanding the main concepts and clinical practice in anaesthesiology and intensive care, essential for the management of medical emergencies and urgent conditions.

3. Application of agents for caries prevention and oral susceptibility
Esther Wilkins, "La pratica clinica dell'igienista dentale", Piccin.
An essential textbook for students aiming to acquire both theoretical knowledge and practical skills in oral hygiene and the prevention of periodontal diseases.

Semester

The course will be delivered in the second year of the study program, during the second semester.

Assessment method

The examination consists of a written test composed of multiple-choice questions and open-ended questions,

aimed at assessing the overall knowledge and understanding of the course contents.

The test is structured by modules as follows:

- 22 multiple-choice questions and open-ended questions for the Pharmacology module;
- 11 multiple-choice questions for the Anaesthesiology module;
- for the “Application of agents for caries prevention and oral susceptibility” module, a quiz consisting of 16 true/false questions, each worth 2 points.

The examinations for the Pharmacology and Anaesthesiology modules are taken in a single session. The quiz for the “Application of agents for caries prevention and oral susceptibility” module is administered on the same day, at a later time.

The assessment takes into account the correctness, relevance, and completeness of the answers, in order to ensure a fair and consistent evaluation of the competences acquired within the integrated course.

Differences related to sex and gender in drug response, anaesthesiology, and oral hygiene practice may be included in the assessment, in accordance with the topics covered during the course.

Office hours

Teachers will receive students by appointment, either in person or via online methods.

Sustainable Development Goals

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