

Radiology diagnosing imaging and radiotherapy techniques

INTEGRATED COURSE: PHARMACOLGY

SSD: BIO/14, MED/36

CFU: 6

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MODULE: Radiopharmaceuticals

SSD: BIO/14

CFU: 3

Professor: [Silvia Consalvi](#)

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MODULE: safe handling of radiopharmaceuticals

SSD: MED/36

CFU: 1

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MODULE: safe handling of radiopharmaceuticals

SSD: MED/36

CFU: 2

Professor: Miriam Conte

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PREREQUISITES

The student must have knowledge of biochemistry, microbiology, general pathology and basic physiology that allows him to understand the contents of the program related to pharmacokinetics and pharmacodynamics, as well as the physiological basis of the adverse effects of the drugs studied. Basic knowledge of medical physics and chemistry.

LEARNING OBJECTIVES

The course will deal with the general principles of pharmacology that apply to all drugs and therefore the classes of drugs directly and indirectly correlated with radiological practice. In particular, in the general part, students will have to learn the principles of pharmacokinetics, pharmacodynamics, pharmacogenetics that apply to all classes of drugs, including radiopharmaceuticals and contrast media. In the special part, particular emphasis will be placed on radiopharmaceuticals (used for both diagnostic and therapeutic purposes), contrast media and drugs used for the control of inflammation, pain, anxious states, the main neurological disorders, anticancer drugs, monoclonal antibodies, antibacterial chemotherapy and drugs used in the respiratory emergency. After completing the course, students should know and understand the mechanism of

action, pharmacokinetics, side effects, toxicological aspects, contraindications of the main radionuclides used in SPECT and PET nuclear medicine and must be able to control, when perform an instrumental examination using a radiopharmaceutical, the patient's physical safety.

LEARNING OUTCOMES

knowledge and understanding

At the end of the course the student will know the pharmacokinetics and pharmacodynamics of the drugs, both directly and indirectly connected with radiological preclinical practice and will know the principles and consequences of drug interactions. He will also know the main radiopharmaceuticals used for both diagnostic and therapeutic purposes and contrast media, in addition to the drugs used in inflammation, those used in the main neurological disorders, anticancer drugs, antibacterial chemotherapy and drugs used in the respiratory emergency. Students will also be able to implement their pharmacological knowledge especially regarding new drugs in use through the use of IT tools. Know the physical and chemical principles of radiopharmaceuticals. Describe the chemical and physical principles of radiopharmaceuticals. Know the principles for proper management of radiopharmaceuticals in nuclear medicine. Explain the correct use of a radiopharmaceutical control system

Applying knowledge and understanding

At the end of the course, the student will be able to use the knowledge acquired for the independent study of the aspects relating to the specific field to which the student will devote himself in the professional activity. Use and handle radiopharmaceuticals consciously

communication skills

At the end of the course, the student will have to know how to use scientific terminology adequately specifies.

making judgements

At the end of the course, the student must be able to make general assessments relating to the topics covered.

COURSE SYLLABUS

Radiopharmaceuticals

Principles of general pharmacology.

New drug development and study phases. Clinical trials of drugs.

Pharmacodynamics: mechanism of action of agonist and antagonist drugs, receptors and signaling pathways

Pharmacokinetics: factors influencing it, elimination and biotransformation of drugs

Gene therapy, pharmacogenomics and gender pharmacology.

Treatment of inflammation and pain: glucocorticoids, NSAIDs, opioid analgesics.

Cardiovascular pharmacology.

Drugs for the treatment of asthma and anaphylactic shock.

Sedative-hypnotic drugs for the treatment of insomnia and anxiety.

Pharmacology of neurodegenerative diseases: drugs for the treatment of Parkinson's disease

Antibacterial chemotherapy.

Antineoplastic chemotherapy, general principles of Target Therapy.

Radiopharmaceuticals in nuclear medicine. Experimentation and marketing of radiopharmaceuticals.

Radiopharmaceuticals in use for diagnostic practice.

Radiopharmaceuticals in use for therapeutic practice.

safe handling of radiopharmaceuticals

- General information on radiopharmaceuticals in Nuclear Medicine
- Structure of the atom and nucleus
- Radioisotopes: decay mode
- Radioisotope production: cyclotron
- Criteria for choosing a radiopharmaceutical
- Production and quality control of radiopharmaceuticals
- PET radiopharmaceuticals
- SPECT radiopharmaceuticals
- General information on PET, general information on SPECT
- production and quality control of PET radiopharmaceuticals
- production and quality control of SPECT radiopharmaceuticals
- Organization of a PET and SPECT radiopharmacy

COURSE STRUCTURE

The integrated course is organized into Radiopharmaceuticals module (30 hours) and Radiopharmaceutical Setup Safety module (30 hours) organized in lectures using .PPT and theoretical-practical exercises and through the use of printed materials provided by the lecturer.

COURSE GRADE DETERMINATION

The examination test is unique for the entire integrated course; no examination tests can be taken for individual modules. Verification of learning is through the conduct of a written test involving open-ended questions. The oral may be taken to improve the grade. The 'unit of measurement used will be a grade expressed in thirtieths. The exam will be considered passed with a minimum grade of 18/30.

The final exam grade will be calculated in thirtieths according to the following criteria:

Ineligible: Poor or deficient knowledge and understanding of topics; limited ability to analyze and synthesize; frequent generalization of required content; inability to use technical language.

18-20: Barely sufficient knowledge and understanding of the topics, with obvious imperfections; barely sufficient ability to analyze, synthesize and exercise independent judgment; poor ability to use technical language.

21-23: Sufficient knowledge and understanding of the topics; sufficient ability to analyze and synthesize with ability to argue the required content with logic and coherence; sufficient ability to use technical language.

24-26: Fair knowledge and understanding of topics; fair ability to analyze and synthesize with ability to rigorously argue the required content; fair ability to use technical language

27-29: Good knowledge and understanding of the required content; good ability to analyze and synthesize with ability to rigorously argue the required content; good ability to use technical language.

30-30L: Excellent level of knowledge and understanding of the required contents with excellent ability to analyze and synthesize with ability to rigorously, innovatively and originally argue the required contents; excellent ability to use technical language.

OPTIONAL ACTIVITIES

Students will have the opportunity to carry out theoretical / practical exercises and participate in seminars. The teachers will provide constant support during and after the lessons

READING MATERIALS

Radiopharmaceuticals

- Bertram G. Katzung. Basic and Clinical Pharmacology. 14th edition, 24 apr 2018

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- Radiopharmaceutical Chemistry ; Editors: Lewis, Jason S., Windhorst, Albert D., Zeglis, Brian M. (Eds.) eBook ISBN 978-3-319-98947-1 ; Springer International Publishing
- Materiale didattico fornito dal docente / Teaching materials provided by the lecturer

