

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

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MODULE: Safe handling of radiopharmaceuticals

SSD: MED/36

CFU: 3

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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

- General pharmacology
- Development of new drugs and study phases. Clinical trial of drugs.
- Testing and marketing of radiopharmaceuticals. Standards of Good Preparation of Radiopharmaceuticals in Nuclear Medicine. Gender pharmacology. Pharmacokinetics and factors that influence it. Drug interactions.
- Pharmacodynamics.
- Special Pharmacology
- Treatment of pain inflammation.
- Fans, glucocorticoids, opioid analgesics.
- General principles of cardiovascular therapy.
- Medicines used in the treatment of anxiety.
- Medicines for the treatment of asthma and the treatment of anaphylactic shock.
- Antibacterial chemotherapy.
- General principles of antineoplastic chemotherapy. General principles of Target Therapy.
- Monoclonal antibodies.
- General principles of pharmacology of neurodegenerative diseases.
- Pharmacology of contrast media (gastrointestinal tests, intravascular tests, blood tests)
- magnetic resonance).
- Radiopharmaceuticals in nuclear medicine: general information. Radiopharmaceuticals in use for diagnostic practice
- and therapeutic.
- Radiotherapy: modalities, radiopharmaceuticals for metabolic radiotherapy.

Safety in radiopharmaceuticals preparation

- 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 PHARMACOLOGY module is organized in lectures (60 hours) and theoretical-practical exercises. The lessons are held by projecting illustrative images (Power-Point) and through the use of paper material provided by the teacher

COURSE GRADE DETERMINATION

The exam is unique for the entire integrated course, it is not possible to take exam tests for the individual modules. The verification of learning takes place through a final exam, which ensures the acquisition of the knowledge and skills expected by conducting a written test that includes open-ended questions. The unit of measurement used will be a mark expressed in thirtieths. The exam will be deemed passed with a minimum mark of 18/30.

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

Not suitable: Poor or lacking knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations of the requested contents; inability to use technical language.

18-20: Just sufficient knowledge and understanding of the topics, with obvious imperfections; just sufficient capacity for analysis, synthesis and autonomy of judgment; poor ability to use technical language.

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

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

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

30-30L: Excellent level of knowledge and understanding of the required contents with an excellent ability to analyze and synthesize with the ability to argue the required contents in a rigorous, innovative and original way; excellent ability to use technical language

RADIOPHARMACEUTICALS

The verification of learning takes place through a final exam, which ensures the acquisition of the knowledge and skills expected by conducting a written test that includes open-ended questions.

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

SAFETY IN RADIOPHARMACEUTICAL PREPARATION

- Radiopharmaceutical Chemistry ; Editors: Lewis, Jason S., Windhorst, Albert D., Zeglis, Brian M. (Eds.) eBook ISBN 978-3-319-98947-1 ; Springer International Publishing

