UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Nuclear Medicine Techniques

2021-3-I0303D036

Aims

The student should know the principal applications of nuclear-medical techniques with radioactive tracersand the role of medical-nuclear techniques in the diagnosis of the main pathologies of the apparatuses: cardiovascular, respiratory, gastroenteric, urogenital, locomotor, of the Central Nervous System, of endocrinological pathologies and of pediatric and haematological diseases

Lo studente deve conoscere le principali applicazioni cliniche delle tecniche medico-nucleari con traccianti radioattivi e il ruolo delle tecniche medico-nucleari nella diagnostica delle principali patologie degli apparati: cardiovascolare, respiratorio, gastroenterico, urogenitale, locomotore, del Sistema Nervoso Centrale, di patologie endocrinologiche e di malattie pediatriche ed ematologiche

Contents

The course aims to provide knowledge of the principal diagnostic techniques used in conventional Nuclear Medicine and Positron Emission Tomography (PET)

Detailed program

Physics principles, technological basics and quality control of the main Nuclear Medicine methods: Scintigraphy,

Single Photon Emission Computed Tomography, Positron Emission Tomography

The role of medical-nuclear techniques in the diagnosis of the main pathologies of the apparatuses: cardiovascular, respiratory, gastroenteric, urogenital, locomotor, of the Central Nervous System, of endocrinological pathologies and of pediatric and haematological diseases.

Conventional Nuclear Medicine techniques; logistic organization of a Nuclear Medicine Department; layout of a hot lab and radioisotope management. Radiopharmaceutical labelling and relative quality controls. Administration modalities and acquisition protocols (planar and tomographic) of the principal Nuclear Medicine techniques

PET techniques**:** acquisition and reconstruction modalities in oncological, cardiac and neurological studies. Acquisition and reconstruction modalities in quality control procedures (blank), calibrations, corrections (axial and transaxial normalization). Coincidence time acquisition and reconstruction. 2D-3D acquisition and reconstruction modalities. Attenuation correction methods: transmission imaging using Ge68-Cs137 sources, CT. Logistic organization of a PET centre, Detection systems. Applications**:** pathologies of the thorax, abdomen, pelvis, brain, muscle-skeletal, cardiovascular and endocrine apparatus, with particular reference to the neoplastic pathology.

Fundamental of pharmacological and regulatory basis of radiopharmaceuticals used in diagnostic or therapy: physico-chemical properties; stability, pharmacokinetics and mechanism of action; approved clinical indication, safety, and Summary of Product Characteristics. Students will learn how to prepare radiopharmaceutical doses and how to perform quality control test.

Introduction to the decay equations and modes; methods for the production of radionuclides, the radionuclides in medicine; methods for the preparation of radiopharmaceuticals; aseptic preparation; fundamentals in radiopharmaceutical legislation; exercises.

Conventional Nuclear Medicine techniques; logistic organization of a Nuclear Medicine Department; layout of a hot lab and radioisotope management. Radiopharmaceutical labelling and relative quality controls. Administration modalities and acquisition protocols (planar and tomographic) of the principal Nuclear Medicine techniques

Prerequisites

Teaching form

Lectures and exercises

Textbook and teaching resource

The Teachers will provide educational materials

Semester

First semester

Assessment method

The **written test** includes 25 multiple choice questions (1 correct answer among 5 options) about all the topics of the course. The written test is evaluated with a mark ranging from 0 to 30. If the mark is superior to 18/30, the oral test will follow. The **oral test** consists in the evaluation of the knowledge acquired among the course topics through open questions, possibly related to the mistakes made during the written test.

Office hours

By appointment required by mail