Practical Components of the radiopharmacy syllabus

During a two-year period of work in a radiopharmacy department the applicant should gain a sufficient practical experience in the following areas as to be able to perform these duties independently and to be able to assume responsibility for supervising others undertaking these tasks in the future. If the applicant's own place of work is not able to provide the full-range of facilities necessary to gain this experience then either they or their supervisor should make arrangements to work for a period of time in another department of Radiopharmacy, Pharmacy or Nuclear Medicine where the necessary resources are available. The experience is then documented in the form of the check list presented in Appendix III. Applicants should feel free to contact a member of the Radiopharmacy Board (see Appendix IV) for advice if needed.

Operation of a GMP facility

which provides full control of the environment, materials, procedures, equipment, and personnel involved in the preparation of (radio)pharmaceuticals.

Working in a sterile environment

aseptic-technique,
monitoring personal technique,
monitoring the environment

Design and application of a quality assurance programme.

Use of safe radiation practices,

procedures for personal dose limitation and monitoring
contamination monitoring
accidents involving radioactivity
local and national regulations and procedures
radioactive waste disposal

Documentation of radiopharmaceutical procedures

standard operating procedures, product and equipment specifications, records of radiopharmaceutical preparation, analysis and other processes

Use, maintenance and calibration of equipment used in radiophamacies

radioisotope calibrator (ionisation chamber): accuracy, constancy, linearity and geometry effects
contamination monitors: - efficiency, minimum detectable activity
(gamma) scintillation counters: - efficiency, resolution, minimum detectable activity, counting statistics
liquid scintillation counter: - efficiency and counting statistics
laminar flow hoods/ radioisotope work-stations
centrifuges, autoclaves, balances

Procurement of Radiopharmaceuticals

Types and limits of radionuclide material that can be ordered
Ordering radiopharmaceuticals - consideration of purchase orders, suppliers, ordering schedules and times, precalibration times and record keeping, including familiarity with computer procedures
Receipt of radiopharmaceuticals - delivery procedures, trace of delayed shipments, surveys, wipe tests, radioassay, packaging, disposal, storage requirements, and record keeping logs

Radiopharmaceutical preparation

Elution of a ^{99m}Mo-^{99m}Tc generator; quality control of eluates
Preparation of ^{99m}Tc radiopharmaceuticals using 'kits'
Preparation of 'in-house' radiopharmaceuticals (non-kit)
Labelling of red and white blood cells
Protein radio-iodination
Preparation of PET radiopharmaceuticals

Quality control of radiopharmaceuticals

Radionuclidic purity using absorption methods and gamma-ray spectroscopy
Radiochemical purity using thin-layer chromatography, solid-phase extraction and HPLC methods
Chemical purity: pH, aluminium-ion content
Particle size of particulate radiopharmaceuticals: filtration, light microscopy
Pharmaceutical acceptablity: visual inspection, sterility, freedom from endotoxin (Limulus test)

Supply of radiopharmaceuticals

Dispensing, labelling, allocation of control numbers and expiry dates, packaging, transport

Participation in research and development projects

Presentation of work at an open scientific meeting

The student should also gain the following general experience

two weeks in a centre preparing PET radiopharmaceuticals or single-photon radiopharmaceuticals if this is not included in their three year experience
two weeks in a clinical department of Nuclear Medicine including observation of the handling of patients, operation of imaging equipment, interpretation of images and quantitative data