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OPENING LECTURE - Organic PET-Radiopharmaceuticals –Aspects of Previous and Current Labelling Techniques

Monday 17 September 2012 14:00 (20 minutes)

Diagnostic radiopharmacy has a long-term development since the early investigations of G. v. Hevesy/ F. A. Paneth and the routine availability of radionuclides. After the age of gamma-emitting radiopharmaceuticals, which are still the working horses of nuclear medicine, in the late seventies a new radiochemical/radiopharmaceutical progression started: The era of Positron Emission Tomography (PET) accompanied by the development of PET-scanners and related reconstruction- and processing-algorithms.
Meanwhile PET is an established routine method –starting with few PET-Centres worldwide coming to a broad application in many countries of the world. This growth was accompanied by various influences to basic labelling techniques.
What are the trends in (PET-) radiopharmaceuticals/labelling techniques?
- For routine use automatable, simple one- or two-step synthesis are preferred
- A continuous increase of activity level in routine production takes place
- Development of targetry for improved yields and radiochemical purity
- Aspects of pharmaceutical production rule the daily life for routine PET (GMP)
- Search for new and simple labelling methods
- Search for highly specific radiotracers
- Introduction of positron emitting metallic radionuclides with medium half life
- Combining therapeutic and diagnostic isotope pairs for therapy and dose estimation

These developments are pushed on by applying PET not only for functional diagnostics but also by follow up diagnostics, the need for quantification of physiological parameters and the acceleration of drug application. In addition, radiochemists are aiming at further evolvement of new labelling techniques based on the progress in –primarily –organic chemistry. Such synthetic pathways have to be simplified, downgraded and speeded up mainly driven by the short half-life of the radionuclides applied. That needs a high level of automation and low substance amounts to be handled.

The presentation will cover these topics from the radiopharmaceutical point of view.

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