BOOK REVIEW

FLUORINE-18 LABELING OF RADIOPHARMACEUTICALS
by Michael R Kilbourn

Pub: National Academy Press Washington D.C. USA 1990, pp.149

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This monograph is a review of the current status of fluorine-18 chemistry and one of a series on Nuclear Medicine. The radionuclide fluorine-18 is a positron emitter with a physical half-life of 110 minutes and has achieved importance for imaging in positron emission transaxial tomography (PETT or PET). Following a short introduction on the physical properties of fluorine-18 with a comparison to other commonly used beta emitters the author has provided a very readable informative review which is divided into four main parts.

The first main section gives a detailed review of methods for the production of fluorine-18 by irradiation of suitable targets in a cyclotron or reactor. Section 2 provides a review of methods of [^{18}F]fluorination with reference to specific activities, radiochemical yields and nomenclature. The third section relates to electrophilic fluorination with examples in the fluorination of alkenes, of aromatic rings and of carbanions. The fourth and last major section reviews nucleophilic fluorination using [^{18}F]fluoride with leaving groups in aliphatic as well as aromatic compounds. There follows three Appendixes which add great value to the monograph as a reference text.

Appendix A consists of a table of more than 300 fluorine-18 labelled compounds including fatty acids, sugars (carbohydrates), nucleic acids (purines, pyrimidines and nucleosides), receptor ligands, amino acids and peptides, fluoro-substituted steroids, aryl fluorides, fluoroalkanes and miscellaneous compounds. The table gives the reagent, reaction type, yield, specific activity and reference to the synthesis of each of the listed compounds. Appendix B traces the history of the development of specific fluorine-18 radiopharmaceuticals from the first reported use for PET with 2-deoxy-2-[^{18}F]fluoro-D-glucose in 1977. Other fluorine-18 labelled

radiopharmaceuticals on which the author focusses are 6-[^{18}F]fluoroDOPA, fluoromethane, butyrophenone neuroleptics such as [^{18}F]spiperone and 16$_{\alpha}$-[^{18}F]fluoroestradiol-17ß. Appendix C is a listing of literature sources on general fluorine as well as [^{18}F]fluorine chemistry. There are 408 references listed and a short compound/subject index.

There are a number of minor drawing or typographic errors, for example the double bond is missing from [^{18}F]fluorouracil in Figure 2 on page 28 of the text and I am sure the author intended fluorine-19 not fluorine-21 in the heading on page 110. However the text is generally well produced and the print very readable. An important reference text for any library which caters for a Nuclear Medicine Department and especially for chemists involved in the synthesis of fluorine-18 labelled compounds.

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