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POSITRON EMITTING NUCLIDES AND THEIR SYNTHETIC INCORPORATION IN RADIOPHARMACEUTICALS

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The recent progress which has been made in the design of photon imaging instruments using annihilation coincidence counting to detect the radiation produced by the decay of positron emitting nuclides has renewed interest in the use of organic radiopharmaceuticals labeled with these nuclides (1,2,3).

Of the most abundant elements occurring in organic molecules, carbon, nitrogen and oxygen have radioisotopes (^{11}C, ^{13}N, ^{15}O) which decay by the emission of radiation which can be detected outside the body barrier. The incorporation of these isotopes into organic molecules, therefore, offers the potential to trace the distribution of these molecules in humans and animals without significant alteration in biological activity which often occurs on labeling with a foreign radioelement. Therefore the positron emitting nuclides, ^{11}C, ^{13}N and ^{15}O, are unique in their potential applicability to the study of metabolism in humans. These nuclides are usually cyclotron produced and their incorporation into radiopharmaceuticals and use in biological studies encompasses the combined expertise of individuals in many disciplines. It is within this broad context that the synthesis of radiopharmaceuticals tagged with short-lived positron emitting nuclides must be considered.

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