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Production of Fluorine-18 and Its Applications in Nuclear Medicine Using PET Equipment

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The physics of positrons becomes crucial when working with radioactive isotopes like Fluorine-18, which has a proton-rich nucleus and, therefore, an excess of energy that is released by emitting positrons and neutrinos. Fluorine-18 has important applications in medical diagnostics due to its similarity to the hydrogen molecules in the human body, especially when combined with the drug fluorodeoxyglucose ^{18}FDG . The diagnosis is performed using PET/CT equipment, which detects the annihilation photons produced by the interaction of positrons with electrons in the patient's organs or tissues. The production of this isotope is carried out in particle accelerators, such as the cyclotron. This study will focus on the production and use of Fluorine-18 in its form of ^{18}FDG as a radiopharmaceutical tracer for subsequent studies with PET/CT equipment, specifically the PET component.

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