Chemical Design and Application of $^{18}$F-Positron Emitting, Fluorescent Probes

Positron emission tomography becomes further entrenched into our medical system with every patient-2-fluorodeoxyglucose (FDG) scan run and with every new PET/MR system sold. There are many possible methods for generating fluoride-18 PET contrast for positron emitting tomography. We focus on the design of safe, isotopic exchange radiochemistry which minimalizes danger to the radiochemist. Of particular interest are mild aqueous chemistries that allow the direct labeling of fluorophores.

Pre-clinical applications of synthesized multimodality imaging probes are discussed, including the use of these probes to: guide surgical repair, intraoperatively identify cancer at the margins of resection, identify the extent of cancer to improve resection, and to locate malignant deposits in regional lymph nodes. We report new chemistry focusing on the development of imaging agents that may eventually be used in a clinical setting.

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