The Development of PET Techniques to Study the 5-HT_{1A} System

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The serotonin$_{1A}$ (5-HT_{1A}) system has been implicated in a wide variety of neuropsychiatric disorders. PET imaging provides an excellent method of analyzing 5-HT_{1A} physiology. This thesis focuses on the development [^{18}F]MeFWAY, laying the groundwork for translation into humans, and two of its isomers for PET assay of the 5-HT_{1A} system. As presented, [^{18}F]MeFWAY exhibits desired in vivo imaging properties similar to the commonly used 5-HT_{1A} PET antagonist [^{11}C]WAY-100635 providing the advantage of the longer lived ^{18}F label and simpler radiosynthesis. Furthermore, the [^{18}F]MeFWAY isomers demonstrate characteristics of potential use for measuring changes in endogenous 5-HT competition. Lastly, results will show the utility of [^{18}F]MeFWAY for in vivo measurement of receptor density (B_{max}) and affinity ($1/K_{Dapp}$) indicating separate measurements of B_{max} and K_{Dapp} are more sensitive to group differences than the widely used binding potential alone.