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

Dustin W. Wooten

Under the supervision of Bradley T. Christian, Ph.D.

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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_{\text{max}}) and affinity (1/K_{\text{Dapp}}) indicating separate measurements of B_{\text{max}} and K_{\text{Dapp}} are more sensitive to group differences than the widely used binding potential alone.