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SPECT IMAGING OF THE SEROTONIN TRANSPORTER USING A NOVEL LIGAND - 123-I MZIEN- IN HUMAN SUBJECTS - A DOSIMETRY AND BIODISTRIBUTION STUDY

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Levels of serotonin in the body are regulated by the serotonin transporters (SERT), which are predominantly located on the presynaptic terminals of serotonin-containing neurons. Alterations in the density of SERT have been implicated in the pathophysiology of many neuropsychiatric disorders.

Aim: To evaluate 123-I mZIEN (2(S)-[(S)-2b-carbomethoxy-3b-[3'-((Z)-2-iodoethenyl)phenyl]nortropane), a novel radiopharmaceutical for imaging SERT. The biodistribution of the radiopharmaceutical in humans was investigated and dosimetry performed.

Methods: The study includes three healthy volunteers and three patients receiving SSRIs. Whole body images obtained on a gamma camera at 10 minutes, 1, 2, 3, 6, 24 and 48 hours post administration. Dosimetry was performed. ROIs were drawn over the brain, heart, kidneys, liver, lungs, salivary glands, spleen, thyroid and intestines. Blood was sampled at 5, 15, & 30 minutes and 1, 2, 3, 6, 24 and 48 hours post administration. Urine was collected at 1, 2, 3, 4, 6, 24 and 48 hours. Brain SPECT images were obtained using a neuroSPECT scanner at 4 hours, evaluated visually and analysed using ROI analysis.

Results: High quality SPECT images can be obtained after 100-150MBq 123-I mZIEN. Regional brain uptake was observed in midbrain and basal ganglia in healthy volunteers, consistent with the known distribution of SERT. Biodistribution images demonstrated highest uptake in the lungs, brain, liver and intestines. The effective dose was within range of other commonly used ligands and is acceptable for clinical imaging.

Conclusion: 123-I mZIEN is a promising agent for imaging SERT in humans with acceptable dosimetry.