

Synthesis and biodistribution of 1-((2-methoxyphenyl) piperazine)ferrocenecarboxamide labeled with technetium-99m as a potential brain receptor imaging agent

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The goal of this study is to develop a novel brain receptor imaging agent. This study reports the synthesis, characterization and the biological evaluation of 1-((2-methoxyphenyl) piperazine)ferrocenecarboxamide labeled with technetium-99m (99mTc-MP). The 99mTc-MP was obtained by HPLC (20 to 50% ACN of 0 at 5 min then 50% ACN of 5 at 17 min to finally with 50 at 20% ACN of 17 at 20 min), is stable, neutral and lipophilic enough to cross the blood-brain barrier which was confirmed by octanol/water partition coefficient ($\text{LogP} = 1.82$). In vivo biodistribution indicated that this complex had exceptional brain uptake (2.47% ID/g at 5 min and 0.75% ID/g at 60 min). The distribution of the activity at 15 minutes post-injection in various rat brain regions showed a higher accumulation in the hippocampus area. After blocking with 8-hydroxy-2-(dipropylamino) tetralin, the uptake of hippocampus was decreased significantly from 0.87% ID/g to 0.21% ID/g at 15 min p.i., while the cerebellum had no significant decrease.

The new 99mTc-cyclopentadienyltricarbonyl technetium complex reported here showed promising biological results, making it an interesting starting point for the development of a new 99mTc-complex as brain receptor imaging agent.

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