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研究报告

一种潜在5-HT$_{1A}$脑受体显像剂^{99}Tc^{m}-Bicine/HYNIC-MPP2的制备及其生物性能

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摘要 优化合成了含有1-(2-甲氧基苯基)哌嗪(MPP)结构的配体2-(4-(2-甲氧基苯基)哌嗪基)乙胺-6-叔丁基氧羰基肼基吡啶-3-甲酸(HYNIC-MPP2)。在室温下以N,N-二(2-羟基乙基)氨基乙酸(Bicine)为共配体制备得到配合物^{99}Tc^{m}-Bicine/HYNIC-MPP2，其放射化学纯度大于95%，并且在6 h内保持稳定。脂水分配系数和电泳实验结果表明，该放射性标记配合物是水溶性和电中性的。正常小鼠体内生物分布实验结果表明，^{99}Tc^{m}-Bicine/HYNIC-MPP2有一定的脑摄取(注射后2 min时为0.31%ID/g)。脑区域分布及抑制实验显示，该配合物在5-HT$_{1A}$受体含量丰富的海马组织有较高摄取(注射后2 min时为1.00%ID/g)，而在受体含量低的小脑组织中摄取也低(注射后2 min时为0.63%ID/g)。抑制后，海马摄取降低较多(注射后2 min时为0.42%ID/g)，而小脑摄取则无明显变化。抑制前后海马/小脑比值分别为1.59和0.89。由此可见该标记配合物与5-HT$_{1A}$受体具有一定特异性结合，是一种新的潜在5-HT$_{1A}$ 受体显像剂。

关键词 5-HT$_{1A}$受体 ^{99}Tc^{m} 2-(4-(2-甲氧基苯基)哌嗪基)乙胺-6-叔丁基氧羰基肼基吡啶-3-甲酸（HYNIC-MPP2） 生物分布

分类号

Preparation and Bio-Evaluation of ^{99}Tc^{m}-Bicine/HYNIC-MPP2 as a Novel Agent for 5-HT$_{1A}$ Receptor Imaging

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Abstract The goal of this study is to develop a new ^{99}Tc^{m}-complex as a potential 5-HT$_{1A}$ receptor imaging agent. Ligand HYNIC-MPP2, containing the MPP moiety was synthesized and labeled with technetium-99m. The ^{99}Tc^{m}-Bicine/HYNIC-MPP2 complex was prepared in high yield (>95% by TLC) with N,N-bis(2-hydroxyethyl)glycine (Bicine) as coligand at room temperature (RT) and it remained stable over 6 h at RT. ^{99}Tc^{m}-Bicine/HYNIC-MPP2 complex is neutral and hydrophilic， that were conformed by paper electrophoresis and octanol/water partition coefficient, respectively. In *vivo* biodistribution of ^{99}Tc^{m}-Bicine/HYNIC MPP2 was investigated in normal mice. The result shows that this complex has moderate brain uptake (0.31%ID/g at 2 min post-injection（p.i.)）. The regional brain distribution and blocking studies show that its hippocampus uptake of ^{99}Tc^{m}-Bicine/HYNIC-MPP2 is the highest (1.00%ID/g at 2 min p.i.), while the cerebellum uptake is only 0.63%ID/g at 2 min p.i.. This is agreed with the distribution of 5-HT$_{1A}$ receptor in the brain. After blocking with 8-OH-DPAT, the uptake of hippocampus is decreased obviously (0.42%ID/g), while the cerebellar uptake has no significant difference. The hippocampus/cerebellum uptake ratio is decreased from 1.59 to 0.89 after blocking. This result shows that ^{99}Tc^{m}-Bicine/HYNIC-MPP2 has specific binding to the 5-HT$_{1A}$ receptor and it can be de

veloped as a potential 5-HT_{1A} receptor imaging agent in the future.

Key words 5-HT_{1A} receptor _ technetium-99m _ HYNIC-MPP2 _ biodistribution

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