**Rapid effects of hippocampal G-protein coupled estrogen receptor on social and object recognition learning in the absence of spatial cues in female mice**

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Estrogens can rapidly affect learning and memory tasks such as social recognition, object recognition, and object placement in female mice (Phan et al., 2011, 2012). Improvements in these tasks can be seen within 40 minutes of systemic and intrahippocampal administration of 17β-estradiol, the estrogen receptor (ER) α agonist, PPT, and the recently discovered G-protein coupled estrogen receptor (GPER) agonist, G-1. These paradigms were performed in the test mouse home cage, thus providing a number of spatial cues the mouse can use to assist in recognition learning. The Y-maze was designed to eliminate most of these cues. Intrahippocampal administration of 17β-estradiol improved object but not social recognition in the Y-maze within 40 minutes. However, systemic administration of 17β-estradiol did improve social recognition. This means that brain regions other than the hippocampus are involved in mediating social recognition in the absence of spatial cues. Intrahippocampal ERα and GPER agonists improve, while the ERβ agonist impairs social recognition. This study investigates the role of hippocampal GPER on social and object recognition in the Y-maze. We infused 50, 100, or 200nM G-1 (0.5μL per side, 0.2μ/min) into the CA1 region of the hippocampus of ovariectomized female mice and evaluated their performance on object or social recognition in the Y-maze. The social recognition experiment is currently underway. 50nM and 200nM G-1 improved object recognition learning in the Y-maze. Thus, the estrogenic improvements on object recognition in the absence of spatial cues are mediated, at least in part, through hippocampal GPER.