

# **ROLE OF RGS14 PROTEIN IN VISUAL MEMORY AND THE REGULATION OF SYNAPTIC PLASTICITY IN PERIRHINAL CORTEX**

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Though the concept of participation of perirhinal cortex and frontal cortex in the processing of object memory has long been appreciated, but recently our laboratory extended this to area V2 of visual cortex. We found that activation of area V2 neurons by overexpression of RGS14 protein led to an enhancement of object recognition memory. The memory enhancement was of such extent that it converted the short term memory of 45 minutes into long lasting long-term memory that could be traced even after many months. Here, we have tested the memory enhancer effect of RGS14 in perirhinal cortex (PRh), an area known to be involved in object memory processing, and further explored the relationship of behavioral memory performance with synaptic plasticity within this area. Stimulation of PRh with RGS14 protein produced an equally robust increase in object memory as was observed in area V2. In addition, we found that RGS14-mediated activation of PRh, (i) blocked the depotentiation induced by 1Hz stimulation during 10min; (ii) blocked the LTP induced by 20Hz stimulation while showed no effect at 100Hz stimulation; and (iii) reduced the LTD induced by the application of 20  $\mu$ M of carbachol, a cholinergic agonist, during 10min, however no effect was observed at a higher concentration (50  $\mu$ M). Furthermore, we also observed that phosphorylated isoforms of AMPA receptor 1 (iGluR1) were significantly reduced. Thus, our results indicate that iGluR1 reflects the level of synaptic plasticity (LTP and LTD) observed in RGS-animals but lack this correlation in behavioral outcome. This work was supported by projects from MINECO, Junta de Andalucía y NIH.

## Áreas Temáticas:

1. Neurociencia de sistemas
2. Neurociencia cognitiva y conductual