

5<sup>th</sup> International Conference on

# Alzheimer's Disease & Dementia

September 29-October 01, 2016 London, UK

## The projection from postrhinal cortex to ventral lateral orbitofrontal cortex impacts on spatial memory

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**Background:** Over the past decades, great effort has been spending on research of Alzheimer disease (AD), many scientists focus on the predictors of AD. Spatial memory deficits have been recognized in the early stages of AD, but have been studied less[1]. The previous studies have shown a close relationship between spatial memory and postrhinal cortex (POR)[2], but which projection from POR impacts on spatial memory is still to be found out. So with the help of optogenetics, we can do further research.

**Purpose:** To find out which projection from POR impacts on spatial memory.

**Methods:** Using optogenetics to control neuron activity, using novel object recognition to test the spatial memory performance of mice, using immunofluorescence of c-Fos to search the terminal cortex, choose 3-month C57BL/6 mouse.

**Results:** In novel object recognition testing, when inhibiting glutamatergic neurons activity of POR in both study and recognition phase, the spatial memory level of experimental group is lower than matched group ( $t=2.38$ ,  $P<0.05$ ); when inhibiting glutamatergic neurons activity of POR only in study phase, there is no significant differences in both group ( $t=7.68$ ,  $P>0.05$ ); when inhibiting glutamatergic neurons activity of POR only in recognition phase, the spatial memory level of experimental group is lower than matched group ( $t=3.23$ ,  $P<0.05$ ). 1.5h after optical stimulation, immunofluorescence of c-Fos shows that c-Fos positive neurons of ventral lateral orbitofrontal cortex (OFC) in experimental group is less than matched group ( $t=2.87$ ,  $P<0.05$ ).

**Conclusion:** The projection from POR to OFC impacts on the recognition phase of spatial memory via glutamatergic neuron.

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