



Life Sciences Seminar

Exploring the aetiology and treatment of hyposmia in a rat model of pre-motor Parkinson's disease

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The symptomatology of Parkinson's disease (PD) consists of motor and non-motor symptoms (NMSs). The latter has been linked to a loss of neurotransmitters other than dopamine and it has been shown to be modulated by treatments that do not act directly on the dopaminergic system, such as the glucagon-like peptide-1 receptor agonist exendin-4 (EX-4). Nevertheless, the aetiology of NMs, alongside with their potential treatments, has yet to be fully investigated. Recently, using injections of the neurotoxins N-ethyl-2-bromobenzylamine (DSP-4) and 6-hydroxydopamine (6-OHDA), we developed a rat model of pre-motor PD that displays NMSs in the absence of motor symptoms. Taking advantage of this model, the effect of partial noradrenergic and dopaminergic denervation in several brain regions within the olfactory pathway was investigated using immunohistochemical and electrophysiological techniques. Neuroinflammation was observed in the primary olfactory cortex, and the combined denervation led to a reduction in the expression of interneuronal calcium binding proteins in both the primary olfactory cortex and the prefrontal cortex. On the contrary, calcium binding proteins expression in the olfactory bulbs was found to be increased, alongside with dopaminergic expression. Electrophysiologically, neurones recorded intracellularly in layer II-III of the primary olfactory cortex from the model exhibited abnormal prolonged epileptiform-like depolarizing postsynaptic potentials on local electrical stimulation of lateral olfactory tract (LOT) afferent fibers. Both structural and electrophysiological changes were partially prevented following treatment with EX-4. This rat model of pre-motor PD offers a useful means for research into early diagnosis as well as early intervention of PD, possibly resulting in a delay of disease progression together with improved patients quality of life.

Thursday, August 20, 2020 03:00pm - 04:00pm

Foyer seminar room Ground floor / Office Bldg West (I21.EG.128)



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