

# Projects Available in the Laboratory of Sensory and Motor Systems

## Olfaction as an early symptom of Parkinson's Disease

This project is an exciting project that has two stages. The first stage will be to work on developing a new test of olfaction, the hole-board olfactory test, using normal rats. The reason for this is that along with the characteristic shaking associated with Parkinson's Disease one of the most prevalent symptoms is loss of smell, with 80-100% of patients being affected. It is also thought that loss of smell may present much earlier than motor deficits, and thus may be an early indicator of neurodegeneration, prior to other symptoms. Being able to detect Parkinson's Disease early would be of great benefit as it would allow the use of neuroprotective therapies in order to halt the progression of the disease, before a debilitating level of loss has occurred.

The second stage of this project is that once the olfactory test has been developed it will be used to examine olfaction in two animal models of Parkinson's Disease, the standard 6-OHDA model and also a new model being developed in this lab. This project will combine the excitement of developing and validating new methods never before used in science with new research into the second most common neurodegenerative disease in our society. The results obtained will potentially provide important information into one of the major symptoms of Parkinson's Disease and also investigate the value of this symptom in the early diagnosis of the disease.

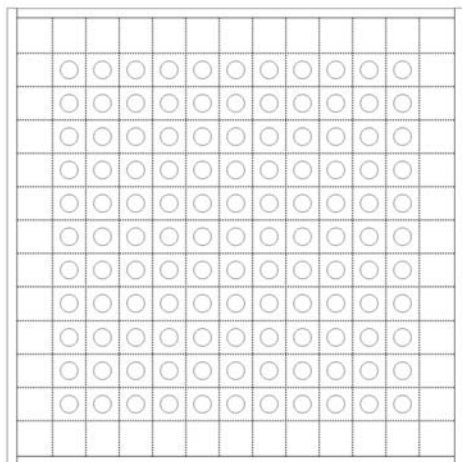
### Anticipated papers arising from this project

1. Methods paper describing Hole Board Test of Olfaction (describe test and loss of smell in 6-OHDA model of PD; 1<sup>st</sup> Author)
2. Examination of smell in graded 6-OHDA lesion model (and perhaps new model) to show that smell is affected by very small changes in 6-OHDA. Compare motor behavioural tests with olfaction (1<sup>st</sup> Author).
3. The olfactory component of the new model of PD underdevelopment (2<sup>nd</sup> Author)

### Tests Performed

#### Experiment #1

With 10 uninjured rats work up the hole-board olfactory test (H-BOT).



Top View



End View

The Hole Board is 1m x 1m with a grid of 11 holes by 11 holes that are 4cm in diameter. The underside of the board is divided into 121 compartments, 4cm deep. For each test into one of these compartments a paper cup is placed with warmed peanut butter on it. The rat is released such that its head is above the centre compartment (therefore equidistant from all compartments). Each test is performed in complete darkness and is videoed with an infrared camera. The amount of time and the number of compartments explored before locating the warmed peanut butter will be recorded as a measure of olfaction.

Tests will be repeated with sunflower seeds which are also popular with rats but which are not volatile and therefore do not give off olfactory cues.

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### ***Experiment #2***

Perform graded series of lesions 6-OHDA lesions which is a model of early stage Parkinson's Disease, including a vehicle injected group. Test on the H-BOT and the Narrow Beam.

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