

[Overview of aroma dispensing »](#)

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### Overview of aroma dispensing

An impairment in odor detection and odor identification has been reported for neurodegenerative disease such as Parkinson's disease, Alzheimer's Disease, Huntington's Disease and in Schizophrenia. Since the olfactory deficits can be detected presymptomatically, the use of olfactory testing is being considered as a component of the battery of tests used for the early detection of Parkinson's, Alzheimer's and Huntington's Diseases. In addition to early detection, olfactory testing can discriminate among different Parkinson's disorder subtypes. However, the ability to study olfaction in a clinical setting with ease and in a precise and quantitative way has been a challenge. Generally the choice has been between cumbersome research type instruments on one hand, and the simpler qualitative and semi-quantitative methods, such as the squeeze and sniff or the scratch and sniff techniques, on the other. MicroFab has been working under a NIH grant on the development of a new digital solid state olfactometer and its evaluation. This new olfactometer is based on ink-jet microdispensing technology and was used to quantify olfactory thresholds to odorants, in nanomolar quantities, in Parkinson's and Alzheimer's disease patients, and normal controls. The microdispensing technology allows a precise determination of the smell threshold.

### Detection of early onset of neurodegenerative diseases

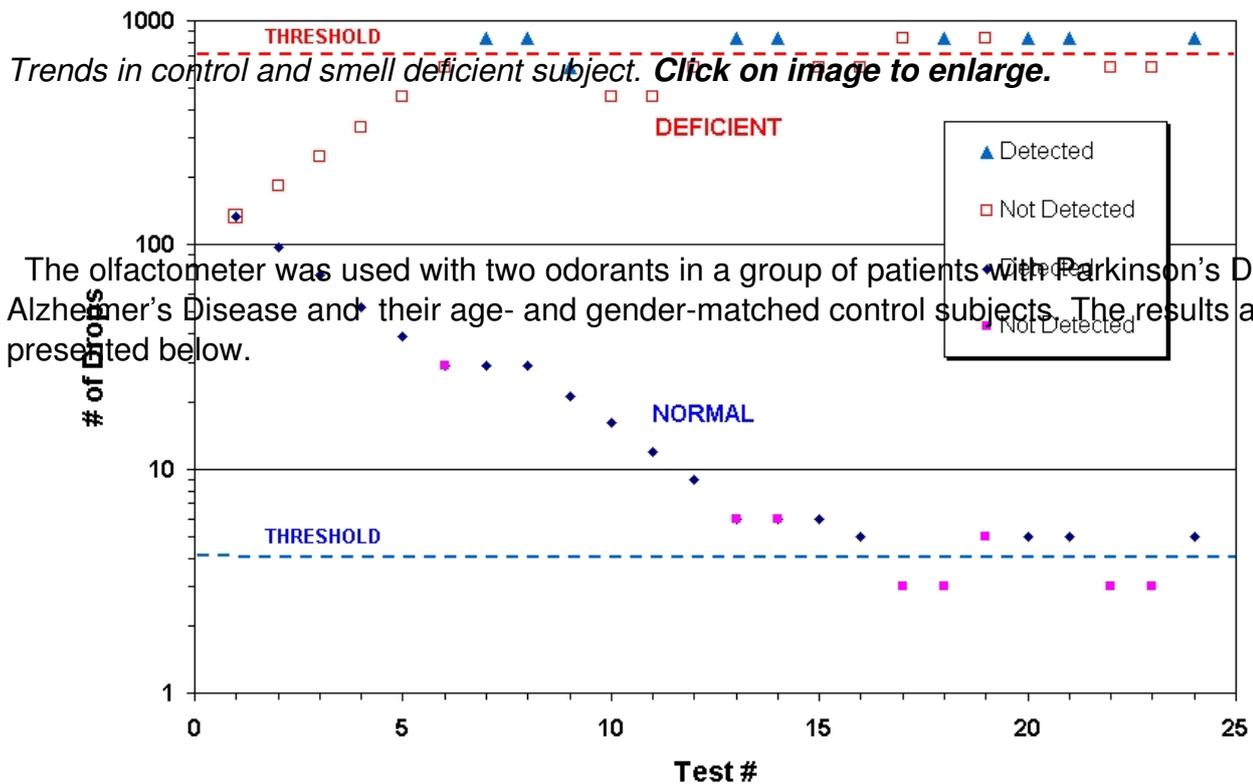


The olfactometer consists of a piezoelectrically driven microdispensing device. Small variable volumes of the odorants are dispensed onto a heating elements. The volatile oils are presented to the subject by a very low flow of air. The olfactometer also has a control box with a microprocessor, LCD display, operator buttons, and has the capacity to download test data. The controller is preprogrammed to step the drop count by logarithmic increments, and insure adequate recovery time for the subject between trials.

The olfactometer was used to measure the threshold of two olfactants in a group of Parkinson's Disease, Alzheimer's Disease, and control subjects. A rose olfactant (phenylethyl alcohol) was chosen because of its selectivity in stimulating the olfactory cranial nerve without affecting the intranasal trigeminal nerve endings. The lemon olfactant (lemon extract) was included as a control because of its known irritation of the trigeminal nerve.

All subjects were instructed to sniff a cloud of odoriferous vapor. In the first trial, a small air volume dosed with 12.06 nl. of the odorant was delivered to the subject's input airstream. In subsequent trials, logarithmic decrements of the odorant (range .09 nl. to 102.5 nl.) were delivered in the same small air volume and the patient was asked to report whether an odor had been detected. All subjects were required to have two consecutive trials correct before moving onto the next trial. If two consecutive trials were incorrect, the subject had to repeat the last correct trial.

**Sample of Test Results**



Comparison between normal and impaired subjects - lemon fragrance  
Additional Information (PDF)

[Determination of the olfactory threshold using a piezoelectric microdispenser for neurodegenerative disease diagnostics](#) **Lemon Fragrance**  
Journal of Measurement Science and Technology.

