



# Monitoring Dopamine Disorders: New Biomarker for Brain Dopamine

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## DESCRIPTION

Dopamine D2 receptors (D2Rs) are autoreceptors on dopamine neurons in the brain. Their expression correlates directly with brain dopamine levels in dopamine-dependent disorders like Parkinson's, ADHD, Schizophrenia, and addiction. Brain D2R expression is a well-known biomarker for brain dopamine levels, drug abuse, and dependence. Current methods to study the levels of brain dopamine can be cost inhibitive and invasive. Researchers at BYU have developed a device that uses microfluidics technology to easily detect D2R expression in blood samples. Specific populations of D2R-expressing white blood cells mirror the levels of D2R expression in the brain, for example in Parkinson's disease (Fig. 1).

## PROBLEM SOLVED

A biomarker for brain dopamine can enable the diagnosis, monitoring, and treatment of disorders of dopamine transmission. This invention will provide primary and secondary health professionals a tool to monitor these dopamine disorders non-invasively, which will improve diagnosis and treatment.

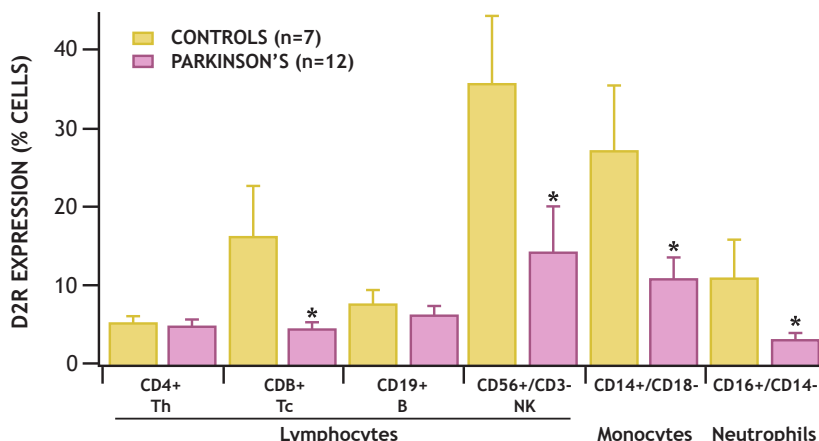


Figure 1: Downregulation of D2R expression in specific leukocytes in Parkinson's Disease. This graph shows preliminary data comparing leukocytes expression (as determined by cellular markers of CDx) in a 7 control subjects and 12 persons with PD. D2R expression (% cells) was lowered significantly in Tc lymphocytes, natural killer (NK) lymphocytes, monocytes and neutrophils. Asterisks represent significance level  $p < 0.05$ .

## KEY ADVANTAGES

- » Objective measure of treatment efficacy
- » Improved diagnosis and treatment
- » Cost effective

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## APPLICATIONS

The invention could be used by health professionals to monitor dopamine levels in the brain. This will lead to an objective measure of brain dopamine and biofeedback for improvement.

IP Status:  
Patent Pending



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