**Early Detection and Mindfulness Intervention: the Yin and Yang for Parkinson’s Disease**

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**Parkinson’s Disease in a Nutshell**

Parkinson’s disease (PD) is a movement and neurodegenerative disorder. It happens when nerve cells in the brain don’t produce sufficient dopamine, a chemical that control motor system. The accumulation of neuronal protein clumps (Lewy bodies) is a pathological hallmark of PD. Symptoms begin subtle and gradually, with 4 primary symptoms: 1) tremor, or trembling in hands, arms, legs, jaw, and face, 2) rigidity, or stiffness of the limbs and trunk, 3) bradykinesia, or slowness of movement, and 4) postural instability, or impaired balance and coordination. As the disease progresses, patients may have trouble walking, talking, or doing simple tasks. They may also have depression, urinary problems or constipation, skin problems and sleep disruptions. Current diagnosis is based on medical history and a neurological examination. There is no lab test for PD, so it can be difficult to diagnose accurately especially at an early stage.

**Current Treatment Options**

Currently, there is no cure for PD. A variety of medications such as levodopa/carbidopa provide relief from the symptoms. A therapy called deep brain stimulation (DBS) may help severe cases. In DBS, electrodes are surgically implanted into the brain to send electrical pulses to stimulate parts of the brain that control movement.

**What is a Disease Biomarker ?**

A biomarker is an indicator that can be any measurable characteristic to reflect the presence or severity of a disease. It is important to identify early detection biomarkers for PD as it is known that 50%–70% of dopaminergic neurons are already lost when patients were first diagnosed with PD in the presence of its motor onset. Our group is currently focusing on developing molecular biomarkers for PD in blood by using small ribonucleic acids (RNAs) called microRNAs.

**Mindfulness Intervention**

PD is the second most common neurodegenerative disorder of the central nervous system. According to the European Parkinson’s Disease Association, it is estimated that worldwide, 6.3 million people have PD. The National Parkinson’s Association estimates 10 million people world-wide suffer from Parkinson’s. In the US alone, as many as 1 million Americans live with PD. The age of onset is usually over 60, but it is estimated that one in ten are diagnosed before the age of 50, with slightly more men than women being affected. PD is a complex chronic, progressive neurodegenerative syndrome. In PD, large numbers of dopaminergic neurons located within basal ganglia circuitry degenerate. The neuropathology of PD also involves many brain areas beyond the dopaminergic nigrostriatal system not directly involved in motor control. This complex combined depletion contributes to both clinical motor symptomatology including bradykinesia, tremor, rigidity, and postural instability, as well as non-motor symptoms.

Non-motor symptoms include cognitive deficits, highlighted by executive dysfunction (deficits in planning, complex attention, working memory and impulse control); as well as depression, sleep disorders, autonomic dysfunction and sensory symptoms. These non-motor symptoms contribute to poor quality of life and disability in patients with Parkinson's disease.

Despite currently available treatments, PD leads to worsening disability and there remains a need for new approaches. In this way, mindfulness based approaches may provide an important adjuvant therapy in the treatment of PD in relation to non-motor symptoms and quality of life and could possibly have a positive effect on motor function.