Parkinson's disease

- Ratio of excitatory and inhibitory synaptic processes in periaqueductal gray matter of the brain activated by the raphe magnus nucleus in a model of Parkinson's disease with hydrocortisone protection
- Novel early-onset Alzheimer-associated genes influence risk through dysregulation of glutamate, immune activation, and intracellular signaling pathways
- Brain Microstructure Interrogation by Diffusion Tensor and Kurtosis Imaging in Progressive Supranuclear Palsy Subtypes
- Correction: RT-QuIC: a highly promising diagnostic method for neurodegenerative diseases-advantages and limitations
- Research progress of platelets in neurodegenerative diseases
- A splice-switching antisense oligonucleotide targeting APP reduces accumulation of alpha-synuclein in a mouse model of Parkinson's disease
- RNA G-Quadruplex Reprogramming with Guanine-Rich Antisense Oligonucleotides Inhibits Monoamine Oxidase B's Translation
- Subthalamic nucleus or globus pallidus internus deep brain stimulation for the treatment of parkinson's disease: An artificial intelligence approach

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James Parkinson was the first to describe Parkinson’s disease (PD) in 1817; he described it as a combination of tremor, rigidity, postural abnormalities, and bradykinesia.

Definition

Parkinson's disease is a progressive neurological disorder characterized by the preferential loss of dopaminergic neurons in the substantia nigra, which project to the striatum.

Parkinson's disease (PD) is a neurodegenerative disease involving the basal ganglia, resulting in motor and extra-motor deficits. These extra-motor deficits may be reflective of a self-regulatory deficit impacting patients' ability to regulate cognitive processes, thoughts, behaviors, and emotions.

With advances in knowledge disease, boundaries may change. Occasionally, these changes are of such a magnitude that they require redefinition of the disease. In recognition of the profound changes in our understanding of Parkinson's disease (PD), the International Parkinson and Movement Disorders Society (MDS) commissioned a task force to consider a redefinition of PD.

Several critical issues were identified that challenge current PD definitions. First, new findings challenge the central role of the classical pathologic criteria as the arbiter of diagnosis, notably genetic cases without synuclein deposition, the high prevalence of incidental Lewy body (LB) deposition, and the nonmotor prodrome of PD. It remains unclear, however, whether these challenges merit a change in the pathologic gold standard, especially considering the limitations of alternate gold standards. Second, the increasing recognition of dementia in PD challenges the distinction between diffuse LB disease and PD. Consideration might be given to removing dementia as an exclusion criterion for PD diagnosis. Third, there is increasing recognition of disease heterogeneity, suggesting that PD subtypes should be formally identified; however, current subtype classifications may not be

sufficiently robust to warrant formal delineation. Fourth, the recognition of a nonmotor prodrome of PD requires that new diagnostic criteria for early-stage and prodromal PD should be created; here, essential features of these criteria are proposed. Finally, there is a need to create new MDS diagnostic criteria that take these changes in disease definition into consideration [1].

see Parkinson's Disease Dementia

Classification

Idiopathic Parkinson’s disease

Current subtype classifications may not be sufficiently robust to warrant formal delineation.

see also Tremor predominant Parkinson's disease.

Sporadic Parkinson's disease and some genetic forms such as GBA1-associated parkinsonism, LRRK2-associated Parkinson's disease

Natural History

The natural history of PD may follow a more benign motor-predominant course in some patients, while in others the disabling non-motor features predominate. The underlying basis of the clinical heterogeneity is poorly understood, but it is becoming clear that this is, at least in part, due to genetic factors [2] [3] [4]. One of these genetic risk factors is mutation in the GBA1 gene, which has emerged numerically as the most important genetic abnormality associated with PD [5] [6], being found in about 5% of patients with the so-called sporadic PD

Scales

UPDRS

Epidemiology

Parkinson's Disease Epidemiology.

Etiology

see Parkinson's disease etiology.

Pathogenesis

Parkinson's disease Pathogenesis.

Pathophysiology

see Parkinson's disease pathophysiology.

Pathology

The main neuropathological finding is Alpha-synuclein-containing Lewy bodies and loss of dopaminergic neurons in the substantia nigra, manifesting as reduced facilitation of voluntary movements. With progression of PD, Lewy body pathology spreads to neocortical and cortical regions. Several environmental factors are associated with increased risk of PD. Autopsy studies show that the clinical diagnosis of PD is not confirmed at autopsy in a significant proportion of patients. Revised diagnostic criteria are expected to improve the clinician´s accuracy in diagnosing PD. Increasing knowledge on genetic and environmental risk factors of PD will probably elucidate the cause of this disease within the near future [7)]

Clinical Features

see Parkinson's disease clinical features.

Diagnosis

Parkinson's disease diagnosis.

Treatment

see Parkinson's disease treatment.

Outcome

Parkinson's disease outcome.

Complications

Parkinson's disease complications.

Research

Open science and collaboration are necessary to facilitate the advancement of Parkinson's disease (PD) research. Hackathons are collaborative events that bring together people with different skill sets and backgrounds to generate resources and creative solutions to problems. These events can be used as training and networking opportunities, thus we coordinated a virtual 3-day hackathon event, during which 49 early-career scientists from 12 countries built tools and pipelines with a focus on PD. Resources were created with the goal of helping scientists accelerate their own research by having access to the necessary code and tools. Each team was allocated one of nine different projects, each with a different goal. These included developing post-genome-wide association studies (GWAS) analysis pipelines, downstream analysis of genetic variation pipelines, and various visualization tools. Hackathons are a valuable approach to inspire creative thinking, supplement training in data science, and foster collaborative scientific relationships, which are foundational practices for early-career researchers. The resources generated can be used to accelerate research on the genetics of PD [8].

Meta-analysis

A meta-analysis investigated the effectiveness of short pulse width DBS (spDBS) versus conventional DBS (cDBS) in patients with Parkinson's disease.

Four databases (PubMed, Cochrane, Web of Science, and Embase) were independently searched until October 2021 by two reviewers. They utilized the following scales and items: therapeutic windows (TW), efficacy threshold, side effect threshold, Movement Disorder Society-Sponsored Revision Unified Parkinson's Disease Rating Scale (MDS-UPDRS) part III off-medication score, Speech Intelligence Test (SIT), and Freezing of Gait Questionnaire (FOG-Q).

The analysis included seven studies with a total of 87 patients. The results indicated that spDBS significantly widened the therapeutic windows (0.99, 95% CI = 0.61 to 1.38) while increasing the threshold amplitudes of side effects (2.25, 95% CI = 1.69 to 2.81) and threshold amplitudes of effects (1.60, 95% CI = 0.84 to 2.36). There was no statistically significant difference in UPDRS part III, SIT, and FOG-Q scores between spDBS and cDBS groups, suggesting that treatment with both cDBS and spDBS may result in similar effects of improved dysarthria and gait disorders.

Compared with cDBS, spDBS is effective in expanding therapeutic windows (TW). Both types of deep brain stimulation resulted in improved gait disorders and speech intelligibility [9]

Case series

see Parkinson's disease case series.

Case reports

Parkinson´s disease case reports.

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