MDS Curriculum Track: Parkinson's Disease — Advances in Pathology, Genetics, Biomarkers, and Therapeutics – Part 1

Track Description and Learning Objectives

The **MDS Curriculum Track: Parkinson's Disease — Advances in Pathology, Genetics, Biomarkers, and Therapeutics – Part 1** will provide a summary of recent advances in the field of Parkinson's disease, including biomarkers, genetics clinical trials, and hot topics.

LEARNING OBJECTIVES

1. Define the role of genetics, transcriptomics, proteomics, and microbiome to contextualise future research.
2. Critically discuss novel biomarkers in Parkinson's disease.
3. Demonstrate understanding of symptomatic and disease-modifying clinical trials in Parkinson's disease.

Module 1: Pathomechanisms and Biological Definition of Parkinson's Disease (2.25 hours)

This module explores the shifting understanding of Parkinson's disease, with a focus on disease definition, experimental models, skin conditions and the gut-brain axis. It introduces learners to the evolving concepts in pathophysiology and research tools used.

RESOURCES:

- **ARTICLE: From iPS Cells to Rodents and Nonhuman Primates: Filling Gaps in Modeling Parkinson's Disease**
  Tiago F. Outeiro et al.

- **VIDEO: Current Proposals and Future Directions for Re-Defining PD**
  Lorraine Kalia, MD, PhD - Toronto Western Hospital, University of Toronto, Toronto, ON, Canada

- **VIDEO: Gut Brain Axis in Movement Disorders**
  Ai Huey Tan, MD, PhD, FRCP - University of Malaya, Kuala Lumpur, Malaysia

- **ARTICLE: Skin Conditions and Movement Disorders: Hiding in Plain Sight**
  Kristina Kulcsarova et al.

Module 2: Genetic and Molecular Drivers of Parkinson's Disease (2.5 hours)

This module focuses on the genetic underpinnings and cellular mechanisms that contribute to Parkinson's disease. Learners will explore multiomic studies, genotype-phenotype correlations, and emerging disease genes.

RESOURCES:

- **ARTICLE: New Multiomic Studies Shed Light on Cellular Diversity and Neuronal Susceptibility in Parkinson's disease**
  Marianna Liang et al.

- **ARTICLE: Genotype-phenotype relations for the Parkinson's disease genes SNCA, LRRK2, VPS35: MDSGene systematic review**
  Joanne Trinh et al.

- **ARTICLE: Genotype-phenotype Relations for the Parkinson's disease Genes Parkin, PINK1, DJ1: MDSGene Systematic Review**
  Meike Kasten et al.

- **ARTICLE: Mendelian Randomization Study Using Dopaminergic Neuron-Specific eQTL Nominates Potential Causal Genes for Parkinson's Disease**
  Xinglun Dang et al.

  ARTICLE: Mitochondria-Related Genome-Wide Mendelian Randomization Identifies Putatively Causal Genes for Neurodegenerative Diseases
  Zheyi Wang et al.

Module 3: Biomarkers and Clinical Research Horizons (2.5 hours)

This module reviews promising approaches for disease monitoring and treatment evaluation. It covers digital biomarkers, wearable technology, seed amplification assays, and an update on clinical trials.

RESOURCES:

- **ARTICLE: Quantitative wearable sensors for objective assessment of Parkinson's disease**
  Walter Maetzler et al.

- **ARTICLE: Digital Outcomes as Biomarkers of Disease Progression in Early Parkinson's Disease: A Systematic Review**
  Pablo Rábano-Suárez et al.

- **MDS Scientific Issues: The past, present, and future roles of α-synuclein seed amplification assays**
  Omar El-Agnaf, PhD; Ilham Abdi, PhD; Nobutaka Hattori, MD, PhD, FANA; Tiago Outeiro, PhD

- **VIDEO: Clinical Trials in Parkinson's Disease: An Update of Ongoing and Upcoming Trials**
  Simon Stott, PhD - The Cure Parkinson's Trust, London, United Kingdom