Biomarkers for early intervention in Parkinson disease

https://neurodegenerationresearch.eu/survey/biomarkers-for-early-intervention-in-parkinson-disease/

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Country

USA

Title of project or programme

Biomarkers for early intervention in Parkinson disease

Source of funding information

NIH (NINDS)

Total sum awarded (Euro)

€ 2,330,471.56

Start date of award

30/09/2012

Total duration of award in years

1

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Early Intervention, Parkinson Disease, biomarker development, Biological Markers, Massive Parallel Sequencing

Research Abstract

DESCRIPTION (provided by applicant): No cures exist, but the number of Parkinson’s patients is expected to nearly double to 9.3 million in 2030. Two roadblocks impede progress on disease-

modifying therapeutics. Current clinical trials are handicapped by late diagnosis, relying on impaired movements that occur when underlying neuropathology has far advanced. Moreover, in phase II clinical trials, testing safety and tolerability of a compound is straightforward, but drug effects on the underlying disease processes cannot be detected by current symptom-based measures. Here we propose a specific and a general strategy to overcome these roadblocks. More than 90,000 non-protein coding, regulatory RNAs may account for the complexity of the human brain in health and disease. Thousands of these previously hidden RNAs abound in dopaminergic neurons and regulate Parkinson's gene expression and bioenergetics processes involved in the disease onset. Regulatory RNAs integrate environmental, epigenetic, and genetic variation and directly reflect altered physiology without translation into protein. This offers a potentially ground breaking opportunity for biomarker development. Initially, we will systematically delineate all non-coding RNAs associated with incipient Parkinson's neuropathology in dopamine neurons laser-captured from 100 human brains using massively parallel sequencing and unlimited transcriptome reconstruction. Then, we will translate regulatory RNAs linked to the earliest neuropathological processes into digital biomarkers detectable in bloodstream and cerebrospinal fluid of 242 and 167 subjects, respectively. To build a generally useful express lane for biomarker development we propose a Harvard-NINDS partnership. It will leverage an unparalleled infrastructure and deliver a longitudinal Parkinson's biobank — a catalytic, open platform for jump-starting the discovery and validation of PD biomarkers. Ancillary cerebrospinal fluid collection will be performed in the Harvard NeuroDiscovery Center Biomarker Study, a longitudinal, case-control study that already tracks clinical phenotypes and linked biospecimens of >1,886 individuals with Parkinson's disease and controls. This study will discover and translate viable biomarkers for the early detection of Parkinson's disease processes and contribute to a generally useful express lane for biomarkers development.

Lay Summary

PUBLIC HEALTH RELEVANCE: No cures exist, but the number of Parkinson's patients is expected to nearly double to 9.3 million in 2030 posing an increasing threat to public health with annual costs estimated at $10.8 billion in the US alone. We propose a specific and a general strategy to overcome two critical roadblocks that impede progress on developing disease-modifying therapeutics.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Parkinson's disease & PD-related disorders

Years:
2016

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