

Synaptic Transmissions in the Basal Ganglia

<https://neurodegenerationresearch.eu/survey/synaptic-transmissions-in-the-basal-ganglia/>

Principal Investigators

KITA, HITOSHI

Institution

UNIVERSITY OF TENNESSEE HEALTH SCI CTR

Contact information of lead PI

Country

USA

Title of project or programme

Synaptic Transmissions in the Basal Ganglia

Source of funding information

NIH (NINDS)

Total sum awarded (Euro)

€ 903,096.33

Start date of award

01/12/2006

Total duration of award in years

3

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords

Basal Ganglia, Synaptic Transmission, Electrocorticogram, Parkinson Disease, optogenetics

Research Abstract

DESCRIPTION (provided by applicant): Parkinson's disease (PD) is the second most common devastating neurodegenerative disorder affecting up to 25% of individuals over 65 years of age. Data from patients and animal models of PD have shown that the development of parkinsonisms is associated with the emergence of abnormally strong and widely synchronized oscillatory activity (OS) of the basal ganglia that developed after degeneration of midbrain

dopamine containing neurons. Based on recent studies, we hypothesize that abnormal OS in the dopamine-depleted basal ganglia of PD patients is critically dependent on the development of abnormal OS in a nucleus called the external segment of the globus pallidus (GPe), which has strong neuronal connections with most of other nuclei in the basal ganglia. The main goal of this project is to reveal alterations of the functional and anatomical connectivity of GPe that underlie the generation of abnormal OS. Specifically, the aims of this grant are to reveal how dopamine depletion alters 1) the firing behavior of GPe neurons, 2) the conductivity of abnormal OS in the cortico-striato- GPe pathway, and 3) the properties of subthalamo-GPe loop that amplifies abnormal OS, all of which will provide information for designing experimental therapeutic strategies to reduce behavioral deficits in PD subjects. The results of the proposed studies will advance our understanding of the functional organization of the basal ganglia in pathological conditions and provide clear directions for future investigations including the formulation of treatment strategies of human parkinsonisms.

Lay Summary

PUBLIC HEALTH RELEVANCE: The proposed research is relevant to public health because a large number of people, up to 25% of aging population over 65 years of age, suffer from parkinsonisms. Growing evidence suggests that abnormal signal transfer associated with abnormal neuronal activity underlies the development of parkinsonisms. We believe that new understandings of how the abnormal activity develops, along with newly developed methodologies to suppress identified abnormal activity in the basal ganglia, will provide a valuable foundation for the development of treatment strategies for parkinsonisms.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Parkinson's disease & PD-related disorders

Years:

2016

Database Categories:

N/A

Database Tags:

N/A