Influenza, Inflammation, and Parkinsons Disease

https://www.neurodegenerationresearch.eu/survey/influenza-inflammation-and-parkinsons-disease/

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Country

USA

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Influenza, Inflammation, and Parkinsons Disease

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1

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

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Research Abstract

DESCRIPTION (provided by applicant): The etiology of Parkinson’s disease is multivariate, ranging from identified genetic mutations to strict environmental causation. One environmental

agent that has been shown to induce Parkinsonism is virus, including influenza. Our lab, and others, has shown that the highly pathogenic avian influenza virus, H5N1, is neurotropic and can induce a number of Parkinsonism pathologies including loss of the DA phenotype in DA neurons, increased activation of the immune system and increased phosphorylation and aggregation of alpha- synuclein. What is unknown, at this time, is whether the induced Parkinsonian pathologies that we observed are specific to only certain strains of influenza (those known to be neurotropic (H5N1)), or can also be induced by those that do not enter the CNS, including the 1918-H1N1 influenza virus that was responsible for the Spanish flu and has been implicated in von Economo's encephalopathy and the H1N1 influenza virus strain (A/H1N1/CA/04/2009) most responsible for the 2009 pandemic. We also seek to determine the critical gene(s) responsible for influenza neurotropism. In this application, we propose 3 specific aims to investigate the role of influenza in neurodegenerative disease, concentrating on pathologies observed in Parkinson's disease. These are: 1) Identify strains of Type A Influenza that are/are not neurotropic, and identify the gene(s) within the influenza genome that confer neurotropism, 2) Determine the immune response in brain initiated by neurotropic and non-neurotropic influenza viruses, and 3) Determine if the parkinsonian pathologies induced by the H5N1 Type A Influenza virus are common to other Type A influenza viruses. The results of these studies, which utilize a unique series of chimeric influenza viruses generated between the neurotropic H5N1 and 1918-H1N1and 2009 H1N1 influenza viruses, will allow us to identify the key components within the virus that allow entry into the nervous system and understand how peripheral infection can signal activation of the immune response in brain. In terms of human health, these studies will allow us to predict how current (i.e. H5N1 and H1N1) and future emerging influenza strains will impact the CNS; as well as identify targets (both known and unknown) that allow for development of therapeutic agents to interfere with these processes.

Lay Summary

More than 25-50 million cases of the flu are reported each year. A number of these influenza viruses are capable of infecting the brain, resulting in a number of neurological symptoms, including altered consciousness, disorientation, seizure, and as well as neurodegenerative disorders such as encephalitic parkinsonism. In this application we propose studies to understand how influenza can enter the nervous system as well as initiate an inflammatory response. In terms of human health, these studies will allow us to predict how current (i.e. H5N1 and H1N1), and future emerging influenza strains will impact the CNS; as well as identify targets (both known and unknown) that allow for development of therapeutic agents to interfere with these processes.

Further information available at:

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United States of America

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Parkinson's disease & PD-related disorders

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