

# Neurodegeneration and Brain Function in Aging with HIV and Parkinsons Disease

<https://neurodegenerationresearch.eu/survey/neurodegeneration-and-brain-function-in-aging-with-hiv-and-parkinsons-disease/>

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## Contact information of lead PI Country

USA

## Title of project or programme

Neurodegeneration and Brain Function in Aging with HIV and Parkinsons Disease

## Source of funding information

NIH (NINDS)

## Total sum awarded (Euro)

€ 2,750,355.05

## Start date of award

20/09/2014

## Total duration of award in years

2

## The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

## Keywords

Parkinson Disease, Nerve Degeneration, Basal Ganglia, HIV, Aging

## Research Abstract

DESCRIPTION: Recent advances in anti-retroviral therapy (ART) in their various combinations have dramatically increased the life expectancy of HIV-infected persons. The potential synergy

between immunosenescence and HIV viral loads in HIV-infected aging individuals increases susceptibility to HIV-related brain injury and functional brain network degradation similar to that seen in Parkinson Disease (PD). Only recently have the similarities in the subcortical involvement in HIV and PD been noted. HIV invades subcortical areas in the brain including the basal ganglia (BG), leading to reduced dopaminergic function in HIV patients. Thus, the neurodegenerative processes in the aging HIV brain may involve the same BG-thalamo-motor cortical networks as in PD. We will assess these networks by using a multimodal neuroimaging approach that includes Magnetic Resonance Imaging for gray matter volume, Diffusion Tensor Imaging-based measures for white matter integrity, and functional connectivity MRI-based measures for functional network connectivity between brain regions at rest and when engaged in a task. The purpose of this application is to elucidate the effects of aging on the functional and structural subcortical-cortical brain circuits that subserve cognition and motor functions in individuals with HIV-infection relative to normal aging in healthy participants, and abnormal aging in PD patients. We will combine brain measures with neuropsychological measures and quantitative kinematic tools that enable measurement of fine motor control. These tools have proven sensitive in very early stage, untreated PD, and provide a unique opportunity to test early signs of motor disturbance in aging HIV patients. Despite the many challenges they face, some HIV patients manage to age successfully, most likely by neural network redistribution of resources to enhance function as evidenced in successful healthy elderly. This research will identify structural and functional brain abnormalities in the aging HIV population and enable detection of emerging motor and coordination problems in aging HIV-infected patients, which could increase their risk for physical injury, and provide a basis for designing therapeutic interventions for aging individuals with HIV-infection. The Specific Aims of this proposal are to Aim1. Assess the BG-cortical networks in older HIV-infected patients, relative to normal aging and mild PD using resting-state functional connectivity MRI, structural MRI, and Diffusion Tensor Imaging (DTI). Aim2. Compare cognitive and motor control functions and their associated neural networks in older HIV- infected patients with those of age-matched healthy controls and mild PD patients. Aim3. Determine the relationship of age, clinical disease severity, and motor skill with subcortico-cortical connectivity in HIV and mild PD patients.

### **Lay Summary**

**PUBLIC HEALTH RELEVANCE:** The HIV-infected population is surviving into old age, thanks to medicine regimens that are successful in lowering deadly viral loads. Despite this medical success, older HIV-infected individuals remain especially open to accelerated functional declines of aging, and vulnerable to neurodegenerative disorders such as Parkinson's disease (PD). This research will contribute to public health by using brain imaging to identify structural and functional brain abnormalities to identify degenerative processes in the aging HIV population and provide a basis for designing therapeutic interventions for aging individuals with HIV-infection.

### **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