APDA'S RESEARCH AGENDA AND ACCOMPLISHMENTS

REBECCA GILBERT, MD, PHD
Chief Scientific Officer,
American Parkinson Disease Association

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WHO WE ARE AND WHAT WE DO

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AMERICAN PARKINSON DISEASE ASSOCIATION

Every day, we provide the support, education, and research that will help everyone impacted by Parkinson's disease live life to the fullest.

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Local Programs & Services

- **Information and Referral**
  - I&R Centers
  - Toll free helpline 800-223-2732
  - Ask the Doctor

- **Education & Support**
  - Support groups
  - Symposiums, Educational Events, Webinars

- **Health & Wellness**
  - Exercise and movement classes
    - Dance, yoga, tai chi, boxing and more
  - Fitness Professionals Training Program
  - Creative arts programming

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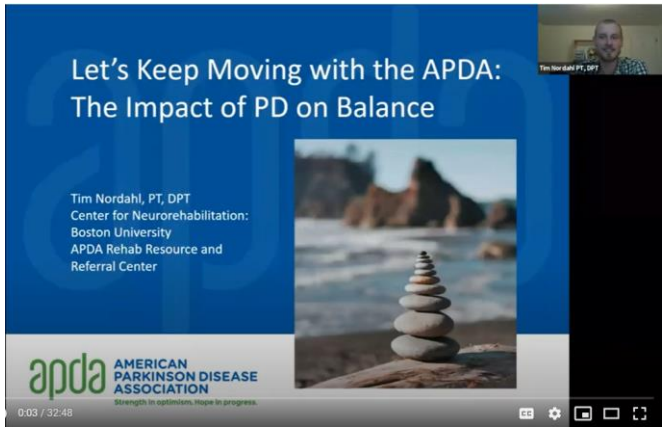
Online programming: education, support and wellness

Tai Chi with Craig (Level 2) 8/28/20

Dr. Gilbert Hosts



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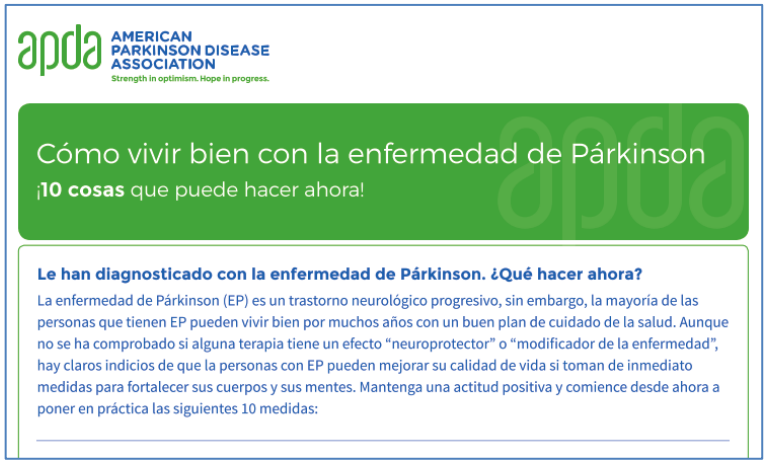
Nationwide Programs & Services

- Online resources
- Publications
- Webinars



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AMERICAN PARKINSON DISEASE ASSOCIATION - RESEARCH

George C. Cotzias Fellowship
Fellowship over three years.

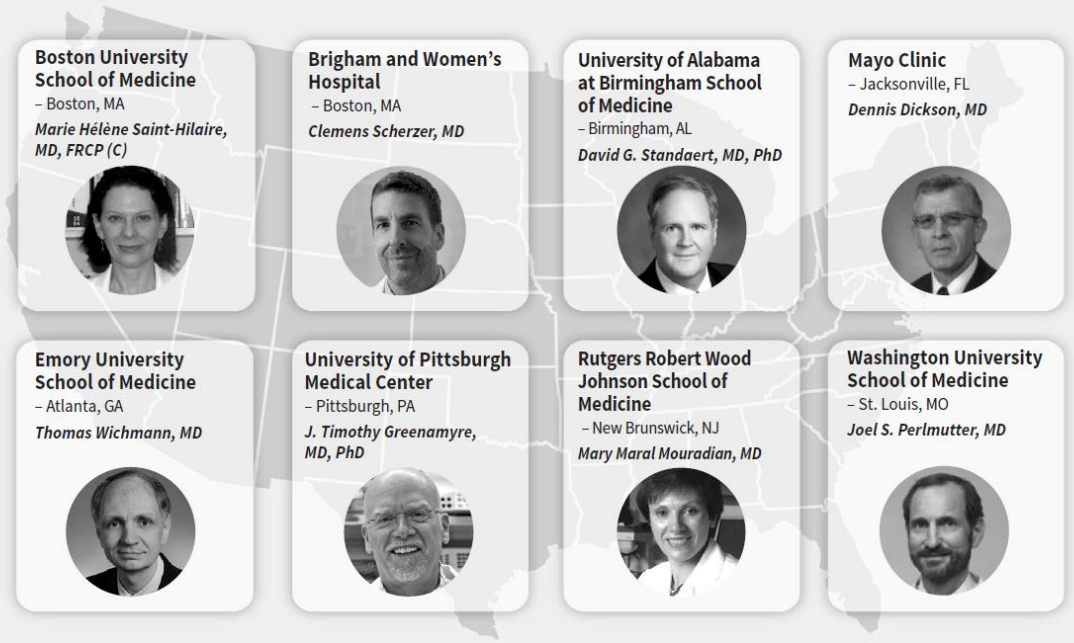
Post-Doctoral Fellowship
Fellowship for one year.

Research Grants
Renewable one year grant.

Diversity in PD Research Grant
Renewable one year grant.

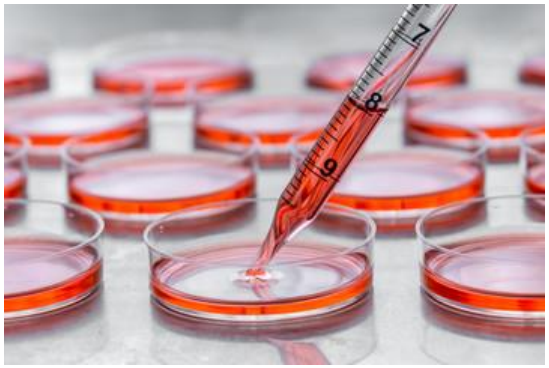
CENTERS FOR ADVANCED RESEARCH

APDA's Centers for Advanced Research support research trainees, fellowship programs, early-stage discovery and later-stage clinical translation. The Centers facilitate investigative research into the causes, treatments, and ultimately a cure for PD. The directors of each APDA Center (shown here) are among the most renowned in their field.

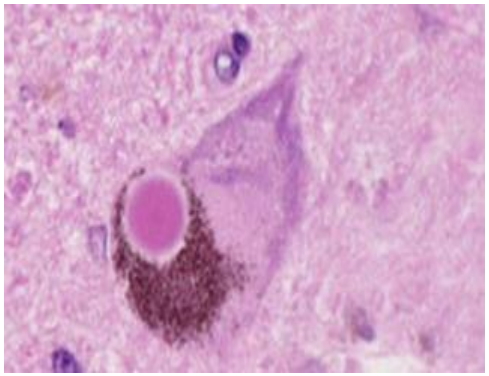


PD RESEARCH – PRECLINICAL AND CLINICAL

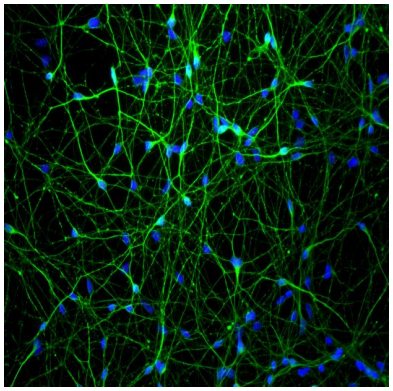
- Pre-clinical research - research involving cells, animal models, etc.
- Clinical research - research involving people



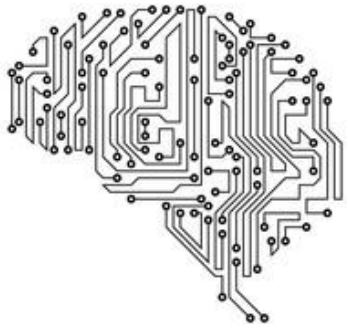
PARKINSON'S DISEASE: EXCITING THEMES IN CURRENT RESEARCH



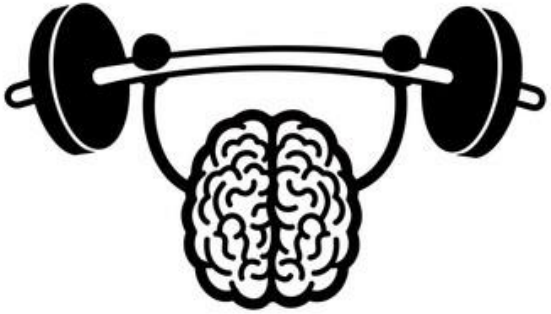
Abnormal accumulation of alpha-synuclein



The role of other cell types (not neurons)

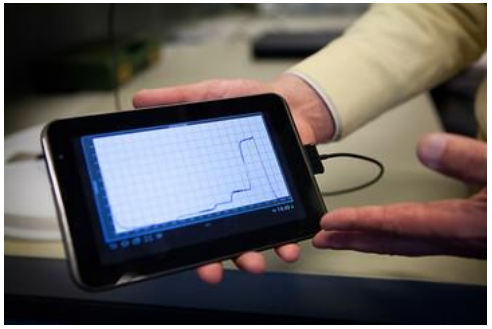


Brain circuitry



The role of exercise

Genetics



Digital biomarkers

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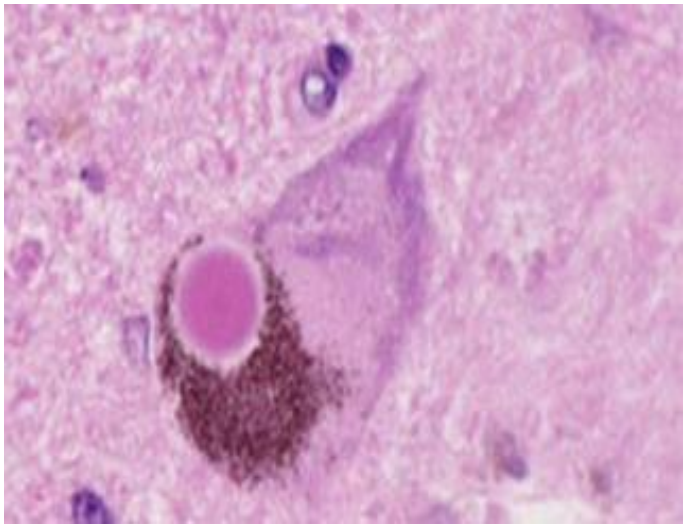
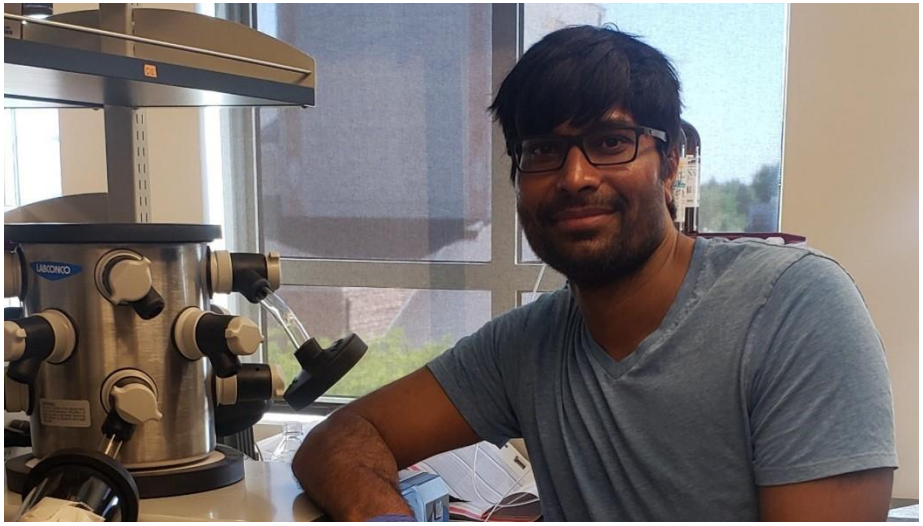
AMERICAN PARKINSON DISEASE ASSOCIATION - RESEARCH 2021

PARKINSON'S DISEASE AND ALPHA-SYNUCLEIN



HOW CAN WE STOP ALPHA-SYNUCLEIN FROM ACCUMULATING IN PD?

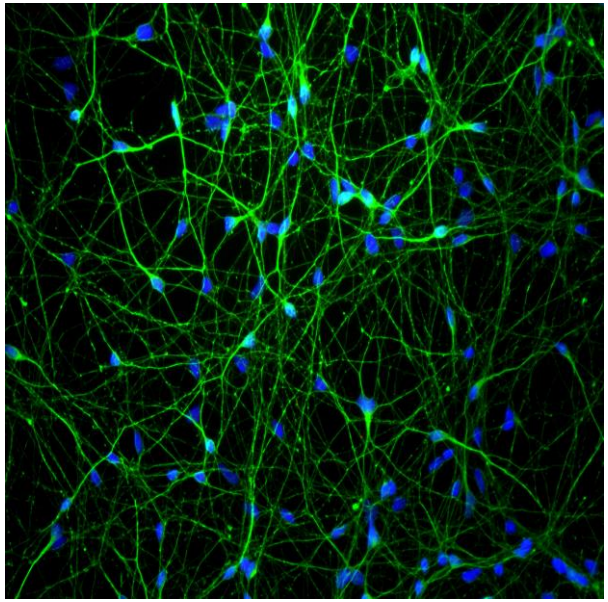


Dr. Sunil Kumar, University of Denver, Denver, CO

Objective:

To identify the portion of alpha-Synuclein that is essential for abnormal accumulation. The ultimate goal is to develop therapies that block this portion and prevent accumulation.

PARKINSON'S DISEASE AND OTHER BRAIN CELLS



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PARKINSON'S DISEASE AND GLIAL CELLS

The brain is composed of many different types of cells, not just neurons.

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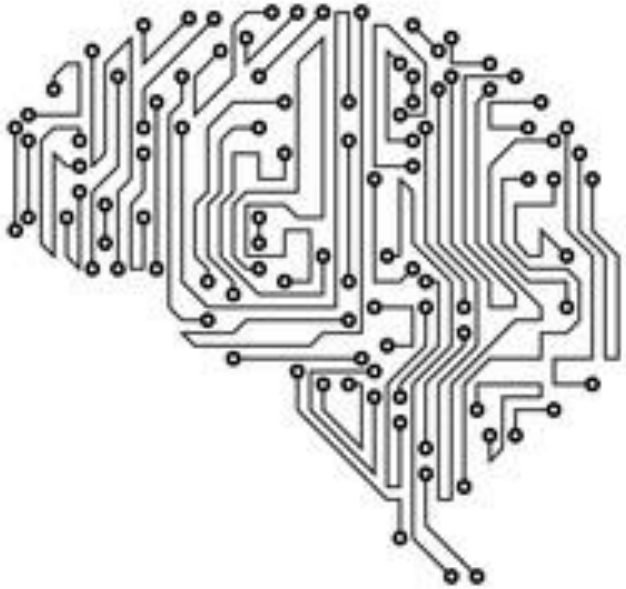
WHAT IS THE ROLE OF GLIAL CELLS IN PD?

Dr. Abby Olsen, Brigham and Women's Hospital, Boston, MA

Objective:
To understand the role of the glial cells in Parkinson's disease in order to eventually develop glial-based therapies for the disease.

PARKINSON'S DISEASE AND BRAIN CIRCUITRY



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PARKINSON'S DISEASE AND DEEP BRAIN STIMULATION (DBS)

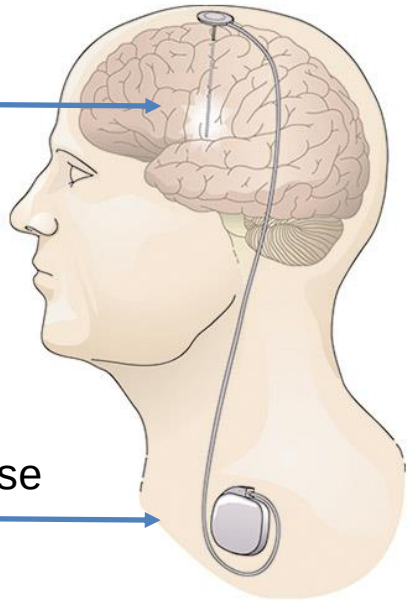
- DBS is a neurosurgical procedure in which electrodes are placed deep within the brain to deliver electrical impulses to brain structures in order to improve PD symptoms
- The electrodes are connected to an implantable pulse generator (IPG) in the chest, which can be programmed remotely

Lead

contact

Lead or electrode

IPG (implantable pulse generator)
contains the battery and computer



Programmer

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https://www.ninds.nih.gov/About-NINDS/Impact/NINDS-Contributions-Approved-Therapies/DBS

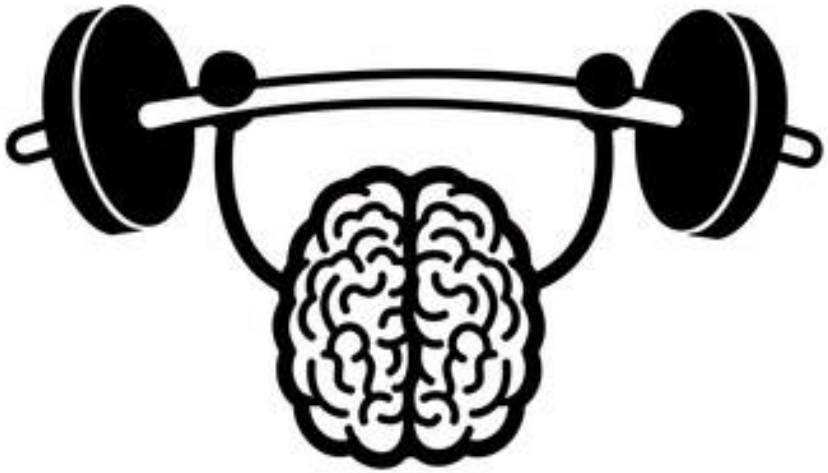
IS THERE A BETTER WAY TO PERFORM DEEP BRAIN STIMULATION?

Dr. Enrico Opri, Emory University, Atlanta, GA

Objective:

To investigate the use of Deep Brain Stimulation (DBS) Local Evoked Potentials (DLEPs), brain signals that can be used to guide where the DBS electrode placement during surgery. If these signals are used to guide placement, DBS could be performed more accurately under anesthesia.

PARKINSON'S DISEASE AND EXERCISE



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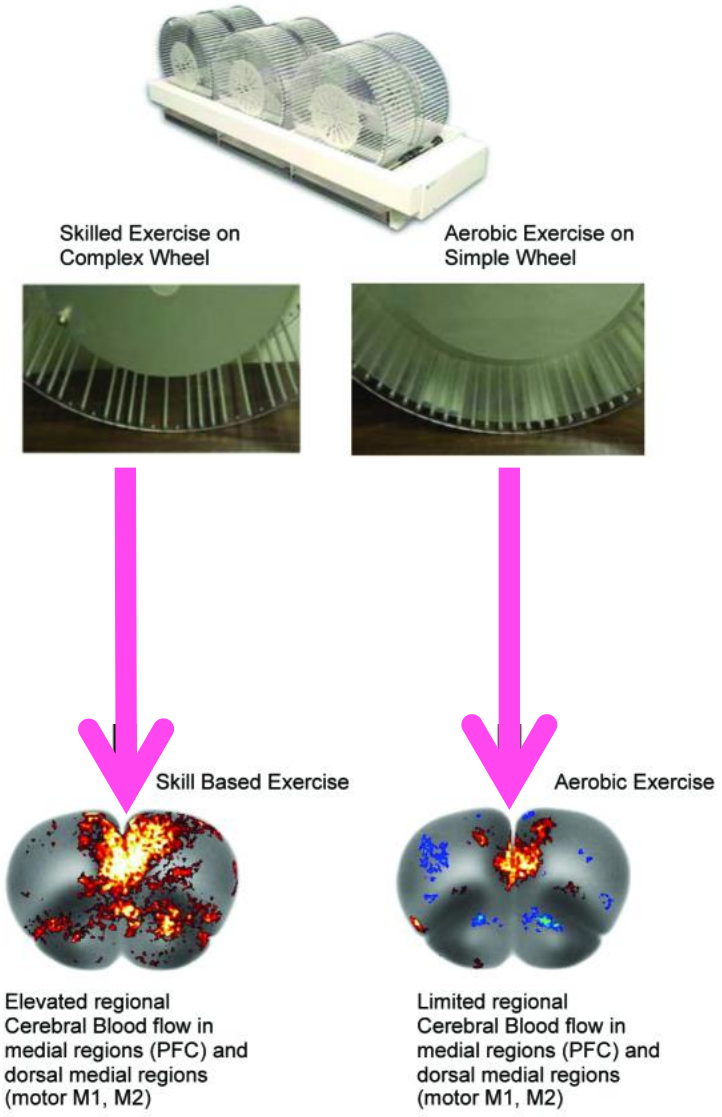
WHAT DOES EXERCISE DO?

J Hum Kinet. 2016
Sep 1; 52: 35–51.

Learn a new motor skill!



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PARKINSON'S DISEASE AND EXERCISE: SPARX STUDY

128 early PD patients, not on dopamine medications, were enrolled in either:

- High-intensity treadmill exercise (4 days per week, 80%-85% maximum heart rate)
- moderate-intensity treadmill exercise (4 days per week, 60%-65% maximum heart rate)
- wait-list control

After 6 months, high intensity group had a 0.3 point change in their United Parkinson's Disease Rating Scale. Control group had a 3 point change (JAMA Neurol. 2018 Feb; 75(2): 219–226)

JAMA Neurol. 2018 Feb; 75(2): 219–226.
Published online 2017 Dec 11. doi: 10.1001/jamaneurol.2017.3517
PMCID: PMC5838616
PMID: 29228079

Effect of High-Intensity Treadmill Exercise on Motor Symptoms in Patients With De Novo Parkinson Disease
A Phase 2 Randomized Clinical Trial

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WHY IS EXERCISE GOOD FOR THE PD BRAIN?

Dr. Constanza Cortes, University of Alabama, Birmingham, AL

Objective:

To understand the molecular underpinnings of the neuroprotective effects of exercise by determining the effects of exercise on PD pathology in the mouse brain.

PAST RESEARCH ACCOMPLISHMENTS

Novel Variants in *LRRK2* and *GBA* Identified in Latino Parkinson Disease Cohort Enriched for Caribbean Origin

Karen Nuytemans [1,2], [illegible] Rajabli [1], Parker L. Bussies [1], Katrina Celis [1], William K. Scott [1,2], [illegible] Cornelia C. Luca [3], Angel Vinuela [4], Margaret A. Pericak-Vance [1,2] and Jeff M. Vance [1,2]*

RESEARCH ARTICLE

Severity-Dependent Effects of Parkinson's Disease on Perceptu[illegible] Visual and Vestibular Heading

Sinem Balta Beylergil, PhD,[1,2] Mikkel Peters[illegible] PhD,[3] Palak Gupta, MS, [illegible] Mohamed Elkasaby, MD,[4,5] Camilla Kilbane, MD,[4] and Aasef G. Shaikh, MD, PhD[1,2,*]

[1]Department of Biomedical Engineering, Case Western [illegible] University, Cleveland, Ohio, USA
[2]National VA Parkinson Consortium Center, Neurology Service, Daroff-Dell'Osso Ocular Motility and Vestibular Laboratory, Louis Stokes Cleveland VA Medical Center, Cleveland, Ohio, USA
[3]Department of Clinical Medicine, Center of Functionally Integrative Neuroscience, Aarhus University, Aarhus, Denmark
[4]Department of Neurology, Case Western Reserve University, Cleveland, Ohio, USA
[5]Movement Disorders Center, Neurological Institute, University Hospitals, Cleveland, Ohio, USA

Journal of Neurochemistry JNC The Official Journal of the International Society for Neurochemistry

ORIGINAL ARTICLE

Cytisine is neuroprotective in female but not male 6-hydroxydopamine lesioned parkinsonian mice and acts in combination with 17-β-estradiol to inhibit apoptotic endoplasmic reticulum stress in dopaminergic neurons

Sara M. Zarate, Gauri Pandey, Sunand [illegible]hilukuri, Jose A. Garcia, [illegible]ittany Cude, Shannon Storey, Nihal A. Salem, Eric A. Bancroft, Michelle [illegible]ook, Rahul Srinivasan

First published: 23 December 2020 | https://doi.org/10.1111/jnc.15282

ARTICLE OPEN

Sex specific cognitive differences in Parkinson disease

Tyler Harrison Reekes[1,2], Christ[illegible]pher Ian Higginson[3], Christina Raye Ledbetter[2,4], Niroshan Sathivadivel[2,5], Richard Matthew Zweig[5] and Elizabeth Ann Disbrow[1,2,*]

MINI REVIEW
published: 15 January 2020
doi: 10.3389/fphar.2019.01494

Pedunculopontine Nucleus Degeneration Contributes to Both Motor and Non-Motor Symptoms of Parkinson's Disease

*Nicole Elaine Chambers, Kathryn L[illegible]a and Christopher Bishop**

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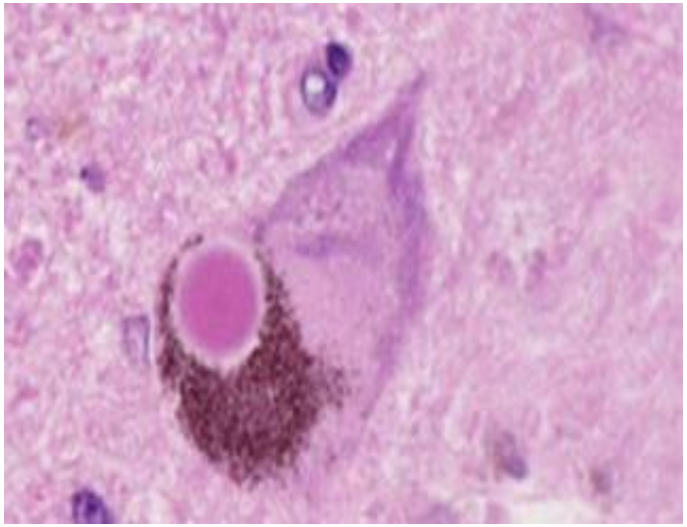
PARKINSON'S DISEASE AND ALPHA-SYNUCLEIN



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VIVEK UNNI – COTZIAS 2016

Vivek Unni, MD, PhD

- Parkinson Center of Oregon, Department of Neurology and Jungers Center for Neurosciences Research, Oregon Health & Science University, Portland, OR
- Project: *Molecular mechanisms of Lewy body pathology-associated cell death in Parkinson's disease.*
- The study demonstrated that alpha-synuclein plays a role in repair of damaged DNA. This is a brand-new role for alpha-synuclein and can broaden our understanding about what might happen to cause PD

SCIENTIFIC REPORTS

OPEN

Alpha-synuclein is a DNA binding protein that modulates DNA repair with implications for Lewy body disorders

Received: 24 October 2018
Accepted: 12 July 2019
Published online: 29 July 2019

Allison J. Schaser[1], Valerie R. Osterberg[1], Sydney E. Dent[1], Teresa L. Stackhouse[1], Colin M. Wakeham[2], Sydney W. Boutros[3], Leah J. Weston[1], Nichole Owen[4], Tamily A. Weissman[5], Esteban Luna[6], Ja[illegible], Kelvin C. Lu[illegible][6], Amanda K. McCullough[4,7], Randall L. Woltjer[8] & Vivek K. Unni[1,9]

Sci Rep. 2019 Jul 29;9(1):10919. doi: 10.1038/s41598-019-47227-z

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PARKINSON'S DISEASE AND GENETICS

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KAREN NUYTEMANS – RESEARCH GRANT 2019

Karen Nuytemans, PhD

- John P. Hussman Institute for Human Genomics and John T. Macdonald Department of Human Genetics, University of Miami, Miller School of Medicine, Miami, FL
- Project: *Genetic factors for Parkinson Disease in Hispanics*
- This study identified new mutations in LRRK2 unique to the Latino PD population.

frontiers in Neurology

BRIEF RESEARCH REPORT
published: 12 November 2020
doi: 10.3389/fneur.2020.573733

Novel Variants in *LRRK2* and *GBA* Identified in Latino Parkinson Disease Cohort Enriched for Caribbean Origin

Karen Nuytemans[1,2], Fa[illegible]d Rajabli[1], Parker L. Bussies[1], Katrina Celis[1], William K. Scott[1,2], [illegible] C. Luca[3], Angel Vinuela[4], Margaret A. Pericak-Vance[1,2] and Jeff M. Vance[1,2]*

Frontiers in Neurology. 2020. doi: 10.3389/fneur.2020.573733

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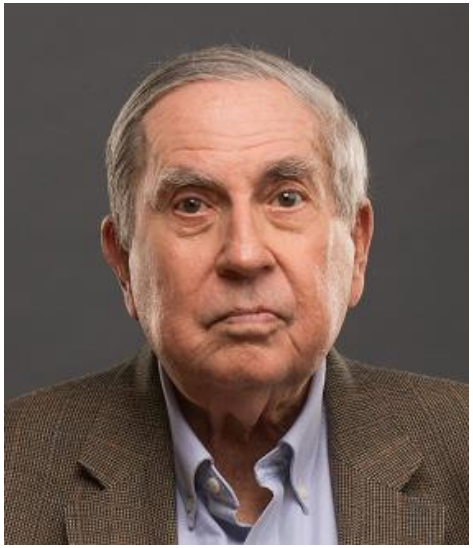
WHAT ARE THE DIFFERENCES BETWEEN MEN AND WOMEN WHO HAVE PD?



VS

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ELIZABETH DISBROW – RESEARCH GRANT 2018

Elizabeth Disbrow, PhD

- Louisiana State University Health Sciences Center, Shreveport, LA
- Project: *Diversity in Biomarker Discovery*
- This study showed that men with PD had significantly greater executive and processing speed impairments compared to women despite no differences in demographic variables or other measures of disease severity.

npj | Parkinson's Disease

www.nature.com/npjparkd

ARTICLE OPEN

Check for updates

Sex specific cognitive differences in Parkinson disease

Tyler Harrison Reekes[1,2], Christina Raye Ledbetter[2,4], Niroshan Sathivadivel[2,5], Richard Matthew Zweig and Elizabeth Ann Disbrow[1,2,5]

npj Parkinson's Disease. 2020. 6:7 ; https://doi.org/10.1038/s41531-020-0109-1

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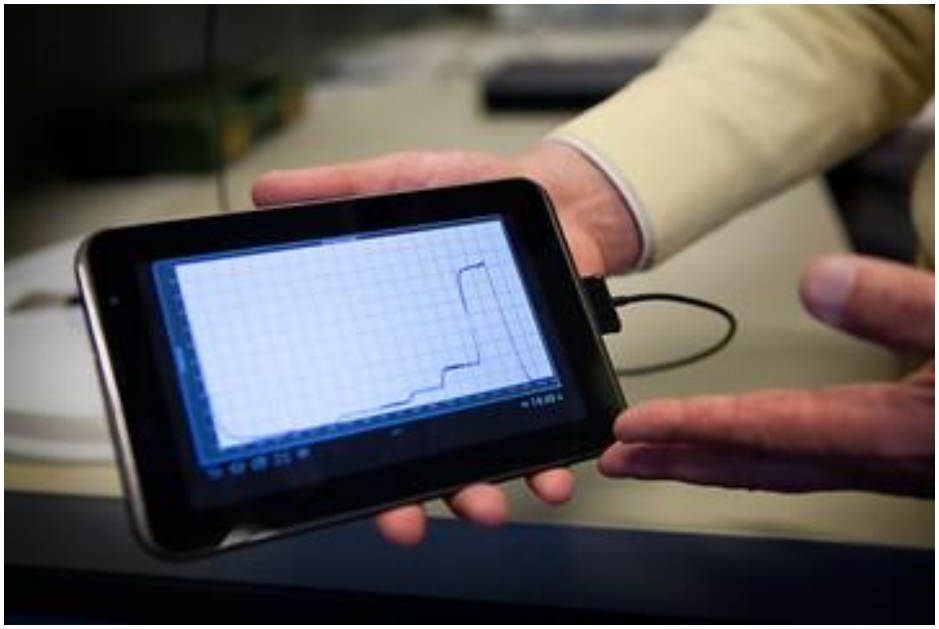
PARKINSON'S DISEASE AND DIGITAL BIOMARKERS



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YUANFANG GUAN – RESEARCH GRANT 2018

Yuanfang Guan, PhD

- University of Michigan, Ann Arbor, MI
- Project: *Digital Biomarkers for Monitoring Parkinson's Disease (PD)*
- This study developed an algorithm to extract biomarkers of PD from mobile phone accelerometer and gyroscope data

Article

Deep Learning Identifies Digital Biomarkers for Self-Reported Parkinson's Disease

Hanrui Zhang,[1] Kaiwen Deng,[1] Hongyang Li,[1] Roger L. Albin,[2,3] and Yuanfang Guan[1,4,5]
[1]Department of Computational Medicine and Bioinformatics, University of Michigan Medical School, Ann Arbor, MI 48109, USA
[2]Department of Neurology, University of Michigan Medical School, Ann Arbor, MI, USA
[3]Neurology Service & GRECC, VAAAHS, Ann Arbor, MI 48109, USA
[4]Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI 48109, USA
[5]Lead Contact
*Correspondence: gyuanfan@umich.edu
https://doi.org/10.1016/j.patter.2020.100042

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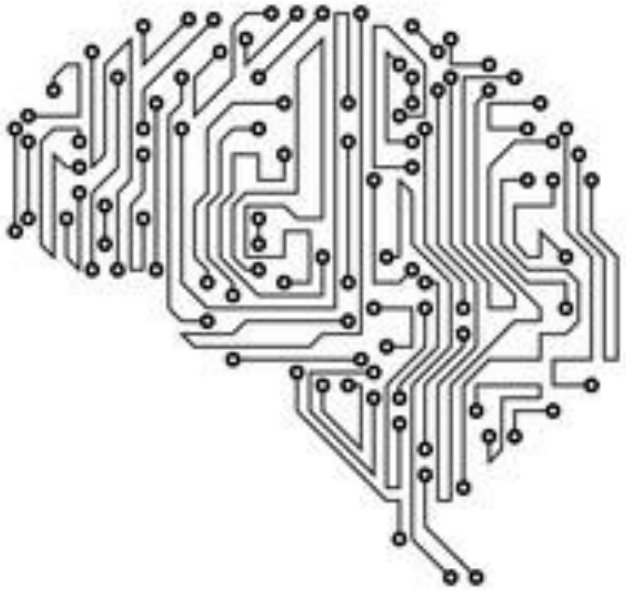
PARKINSON'S DISEASE AND BRAIN CIRCUITRY



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MALORIE HACKER – RESEARCH GRANT 2018

Mallory Hacker, PhD

- Vanderbilt University Medical Center, Nashville, TN
- Project: *Investigating Long-Term Clinical Outcomes of Subthalamic Nucleus Deep Brain Stimulation (DBS) in Early Stage Parkinson's Disease*
- Participants in the early STN DBS + optimal medical therapy group did better at 5 years than those who received optimal medical therapy alone.

ARTICLE CLASS OF EVIDENCE

Deep brain stimulation in early-stage Parkinson disease

Five-year outcomes

Mallory L. Hacker, PhD, MSCI, Ma[illegible]n Turchan, MS, Lauren E. Heusinkveld, BS, Amanda D. Currie, MD, Sarah H. Millan, BA, Anna L. Molinari, JD, Peter E. Konrad, MD, PhD, Thomas L. Davis, MD, Fenna T. Phibbs, MD, MPH, Peter Hedera, MD, PhD, Kevin R. Cannard, MD, Li Wang, MS, and David Charles, MD

Correspondence
Dr. Hacker
Mallory.Hacker@vumc.org

Neurology® 2020;95:e393-e401. doi:10.1212/WNL.0000000000009946

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AMERICAN PARKINSON DISEASE ASSOCIATION

Virtual Research Roundtable

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NEUROINFLAMMATION IN PARKINSON'S DISEASE: AN INTERVIEW WITH ADPA RESEARCHER, DR. EDWARD GRIFFIN

Dr. Edward Griffin researches the relationship between neuroinflammation and Parkinson's disease Today we introduce you to Dr. Edward Griffin, a post-doctoral fellow at the University of Alabama at Birmingham. He is the recipient of a 2019-2020 APDA Post-doctoral fellowship and is currently studying the role of inflammation in the development of Parkinson's disease (PD). We asked […]

READ MORE

APDA-FUNDED BREAKTHROUGHS IN PARKINSON'S RESEARCH

The year 2021 marks the 60th Anniversary of APDA, which was founded in 1961. This milestone has given us the chance to look back at our accomplishments over the past 60 years and reflect on what we have achieved – and also what we have yet to achieve. One of the key pillars of APDA's mission […]

READ MORE

WHERE ARE THEY NOW? APDA'S RESEARCH SUCCESS CONTINUED

Q & A with APDA research grant recipients Since 1961, APDA has been a funding partner in many major scientific breakthroughs and has awarded more than $51 million in research grants to date. APDA funds individual research grants and fellowships to scientists performing innovative Parkinson's disease (PD) research. Grants are awarded through a competitive application […]

READ MORE

To learn more about what we fund, visit us at
apdaparkinson.org/research

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APDA is here for you!

To find out more about our programs and services:

Toll-free: 800-223-2732

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