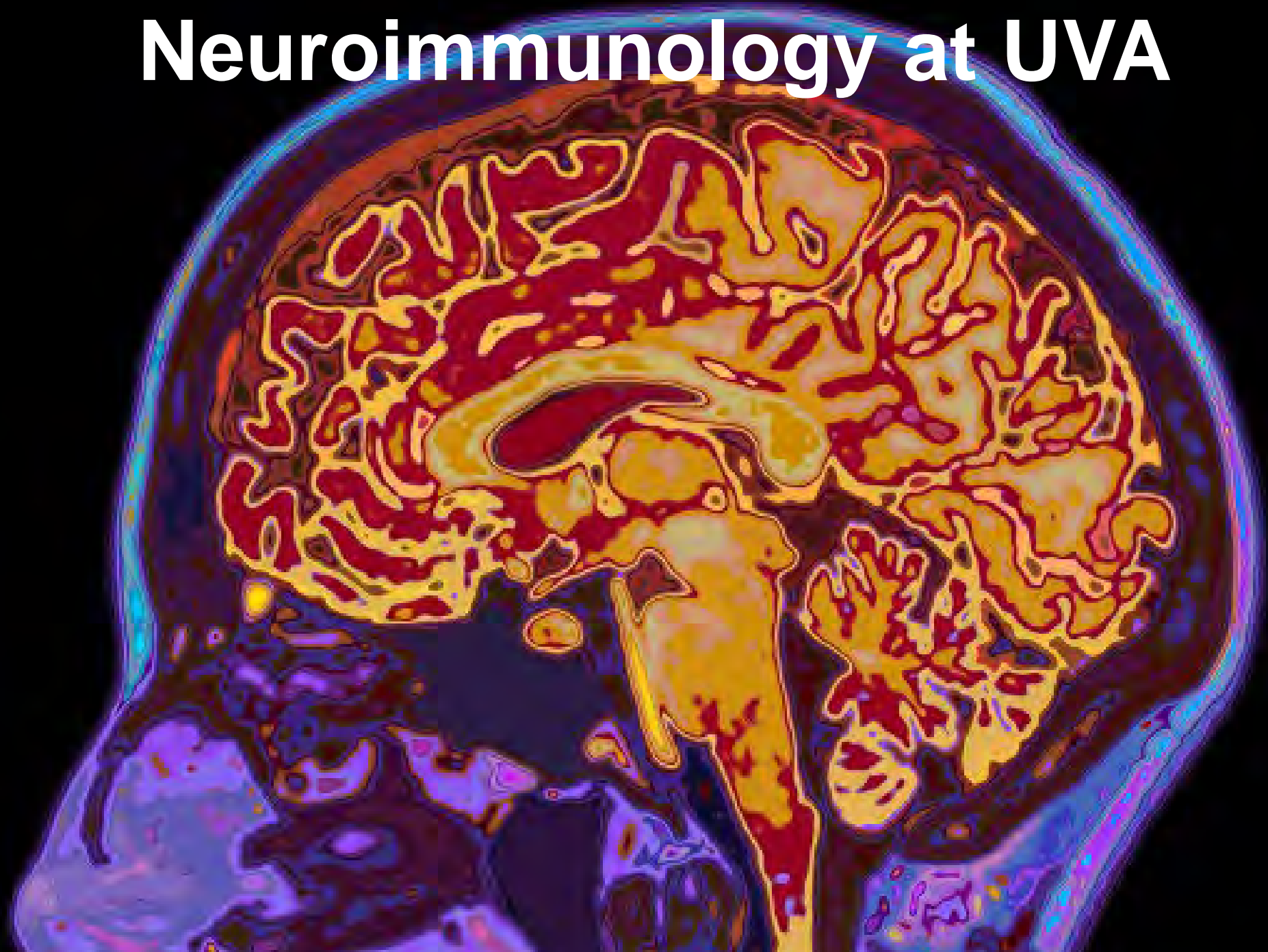


Neuroimmunology at UVA



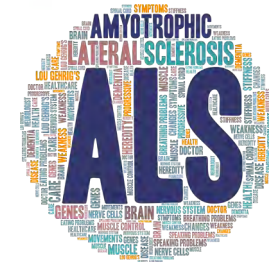
A new strategy to combat neurological disease

Alzheimer's disease



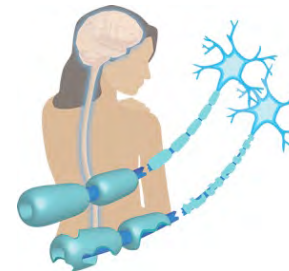
Brain injury

Stroke



ALS

Autism



Multiple Sclerosis

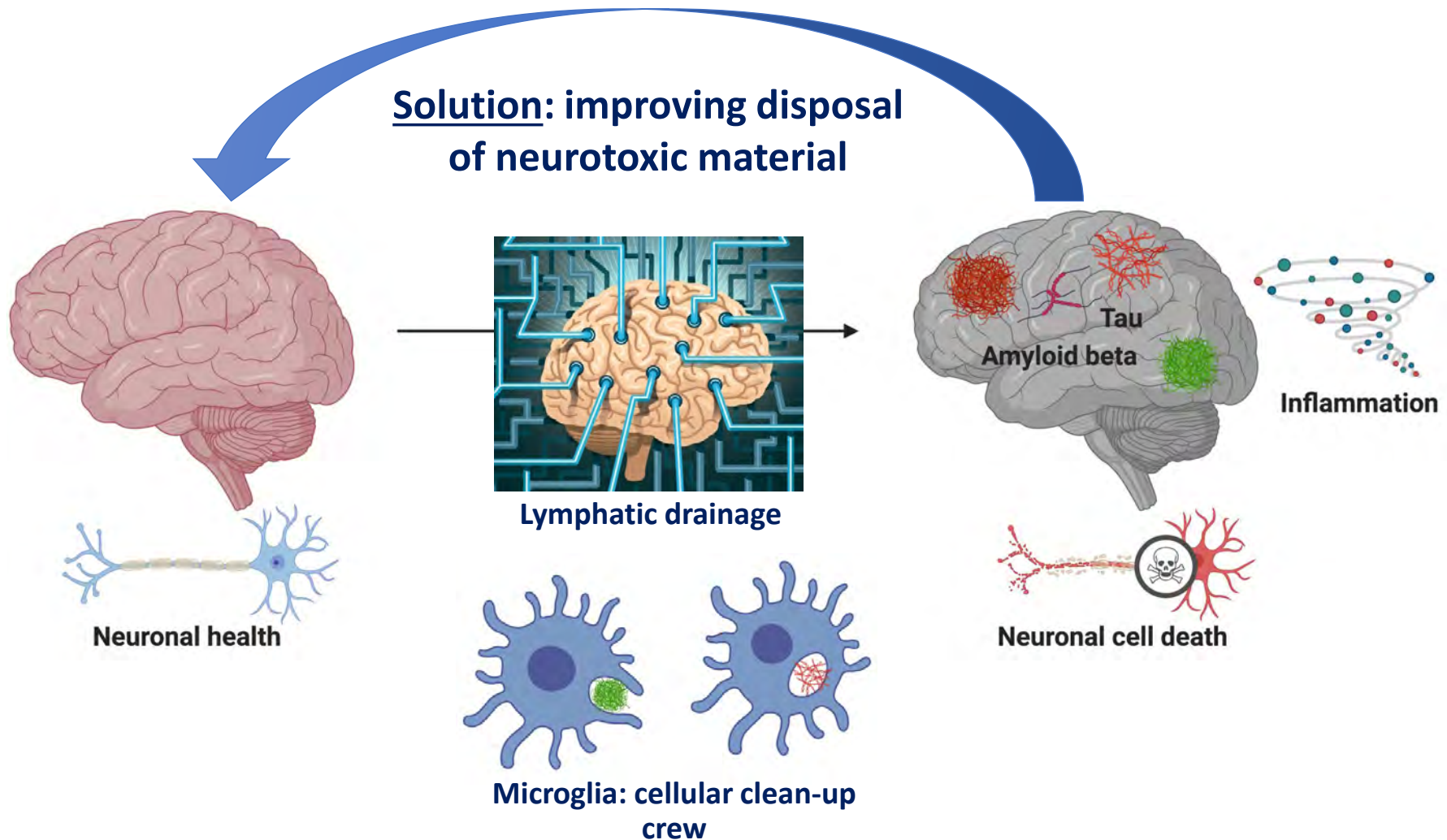


Parkinson's disease



Mental illness

Can we reverse Alzheimer's disease progression by targeting the immune system?



The stars behind the science



**Undergrad Student
Coco Holliday**



**Graduate Student
Catherine Lammert**



**Postdoctoral Fellow
Antoine Louveau**



**MD Resident
Doug Ruhl**



Presentation to the Board of Visitors: Training of a Physician Scientist at UVA

Ashley Bolte

The University of Virginia

06-02-22

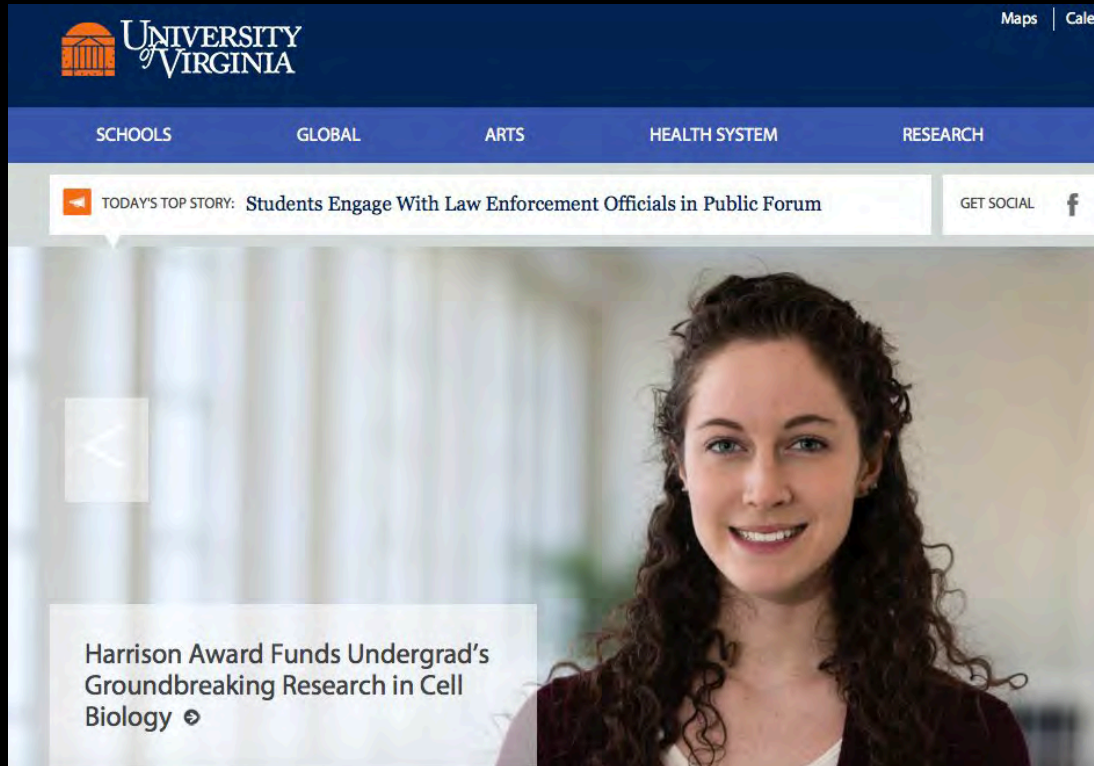
May 2011: Started undergraduate years at UVA



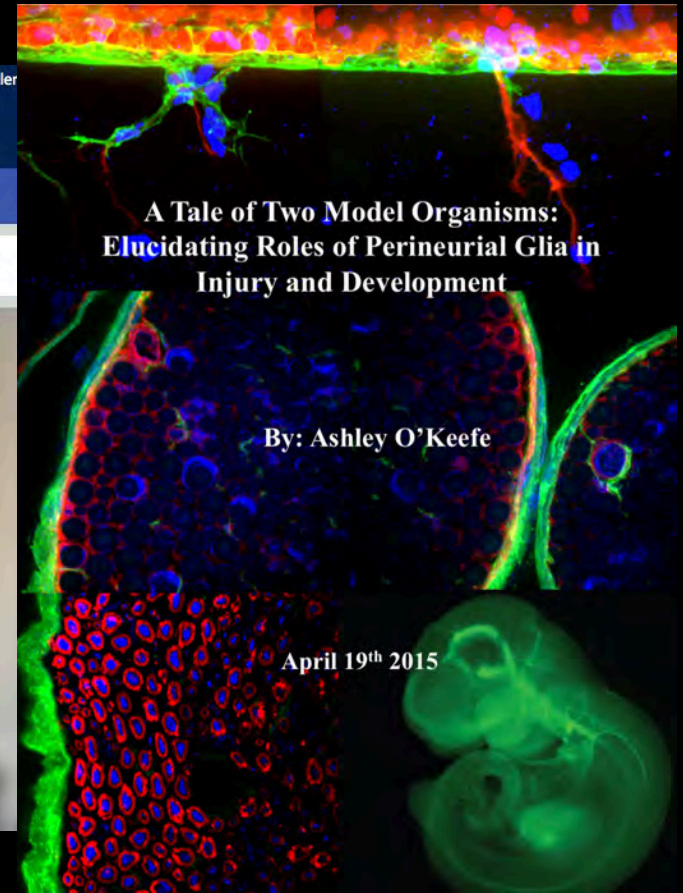


Sarah Kucenas, PhD

May 2015: Graduation from UVA



The screenshot shows the University of Virginia website homepage. At the top left is the UVA logo. The navigation bar includes links for SCHOOLS, GLOBAL, ARTS, HEALTH SYSTEM, and RESEARCH. A "TODAY'S TOP STORY" banner features a photo of a young woman and the headline "Students Engage With Law Enforcement Officials in Public Forum". Below this, another banner for the Harrison Award reads "Harrison Award Funds Undergrad's Groundbreaking Research in Cell Biology".



A Tale of Two Model Organisms:
Elucidating Roles of Perineurial Glia in
Injury and Development

By: Ashley O'Keefe

April 19th 2015

The image is a composite of fluorescence microscopy. The top portion shows a cross-section of a tissue layer with green and red staining. The middle portion shows a similar section with blue nuclei and red staining. The bottom right corner shows a whole-mount view of a larva or embryo with green fluorescence.

July 2016: started UVA MSTP



Ashley Woodard



Dean Kedes, MD, PhD

Brain Immunology and Glia Center



Joined the Lukens lab in April 2018

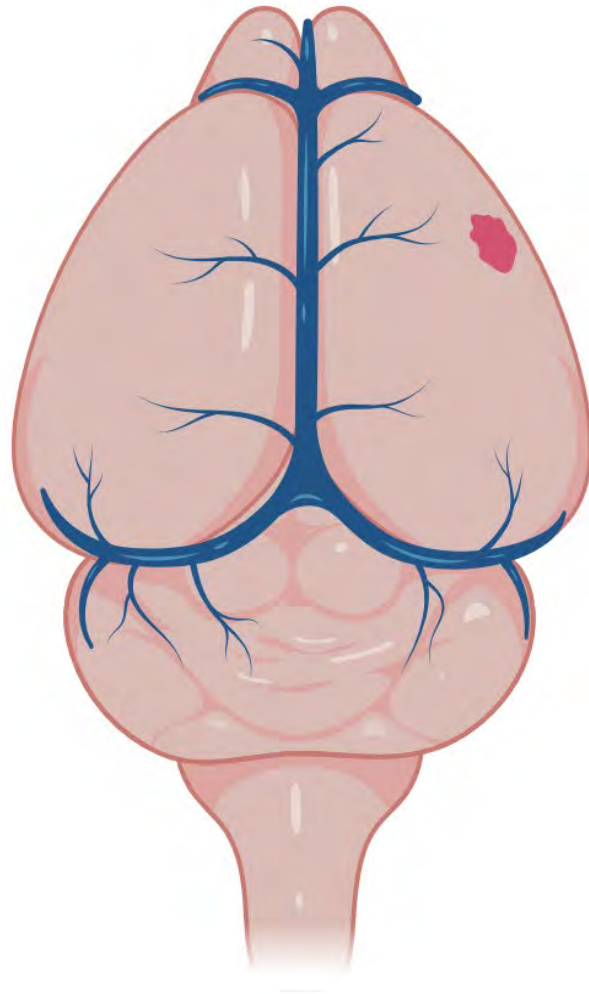


John Lukens, PhD

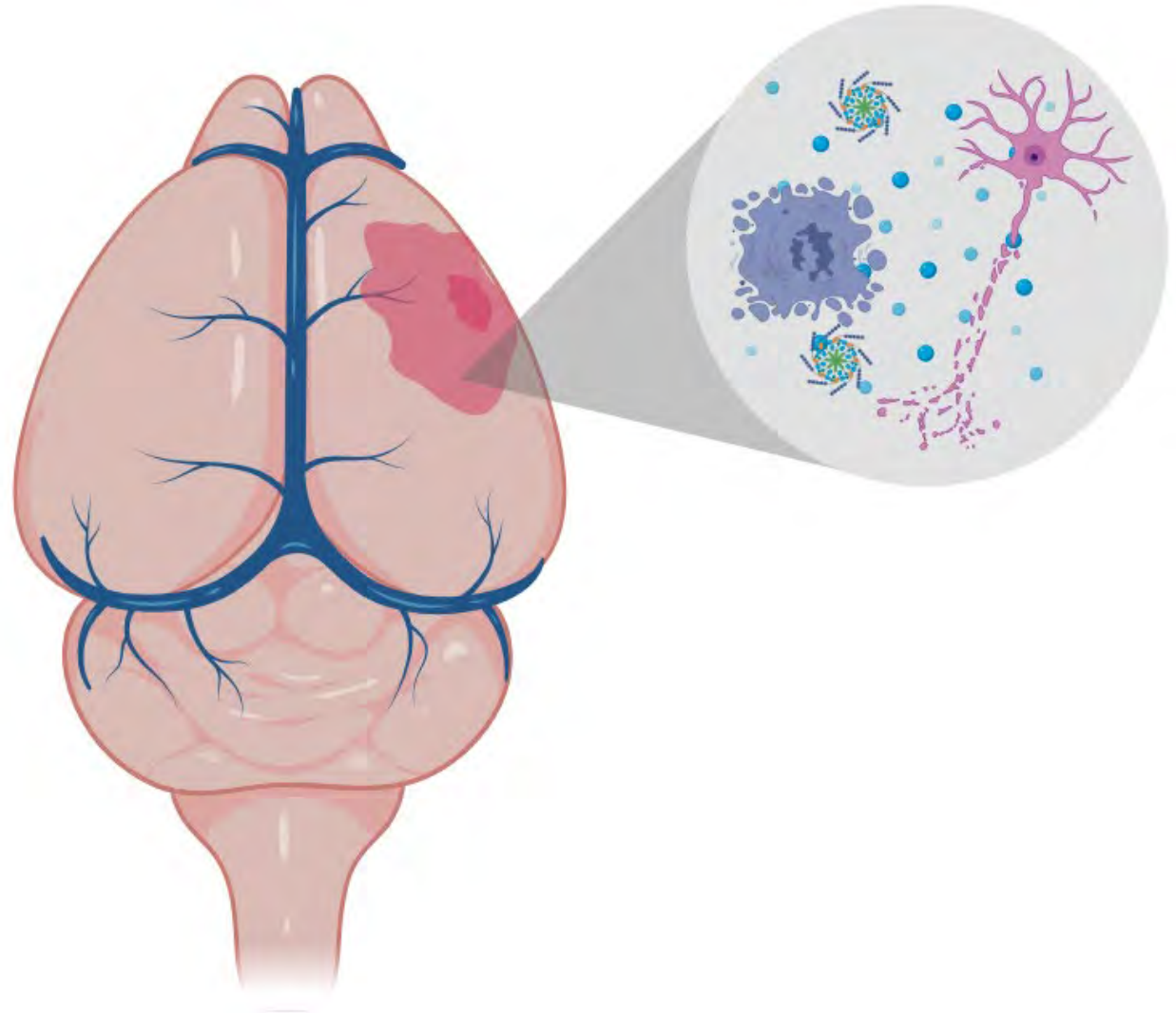


Goals of Traumatic Brain Injury (TBI) Research and Therapy:

Minimize secondary damage



Goals of Traumatic Brain Injury (TBI) Research and Therapy: Minimize secondary damage



Corps et al., JAMA Neurology, 2015

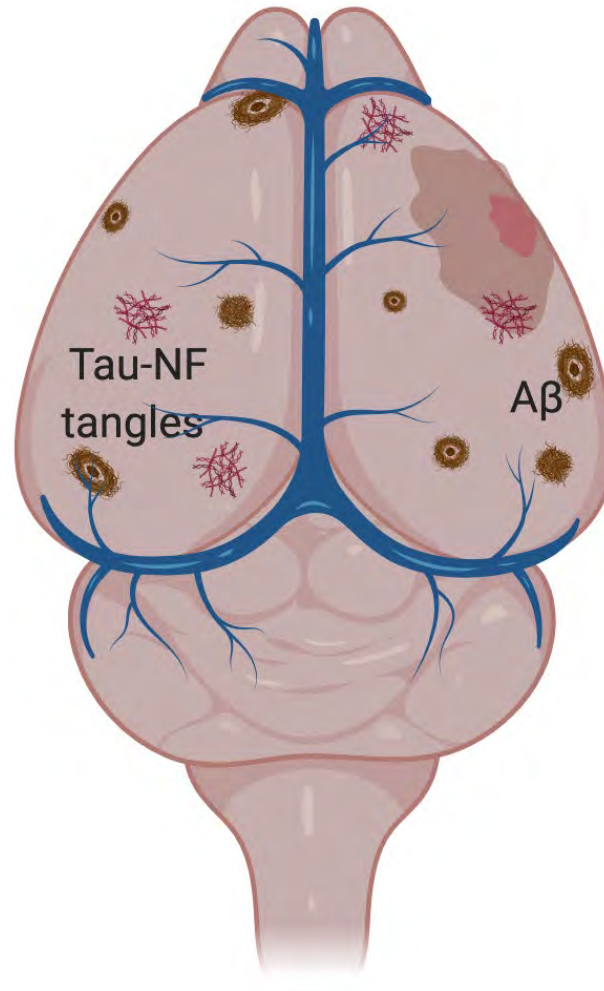
Roth et al., Nature, 2014

McKee et al, Front Immunol, 2016

Goals of TBI Research and Therapy: Prevent Long-Term Sequelae

Increased risk of:

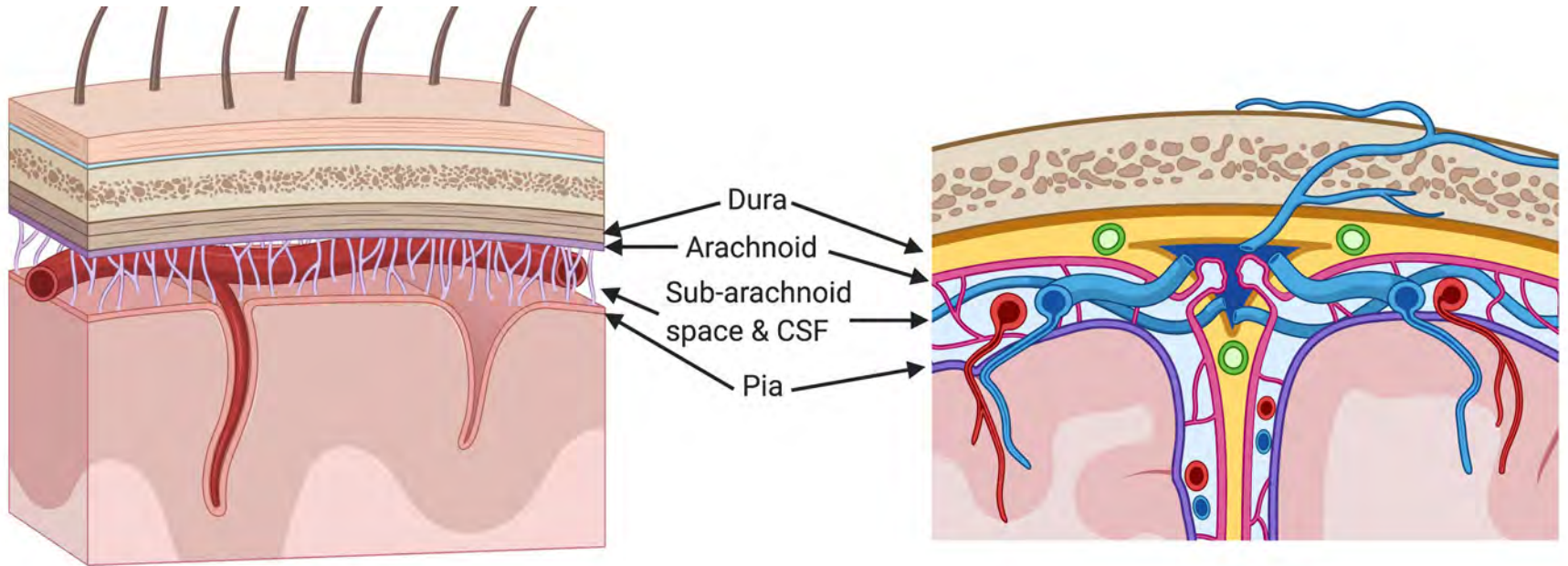
- Anxiety
- Depression
- Alzheimer's disease
- Dementia



Roozenbeek et al., Nat Rev Neurology, 2013

McKee et al, J Neuropathol Exp Neurol, 2009

The Meninges



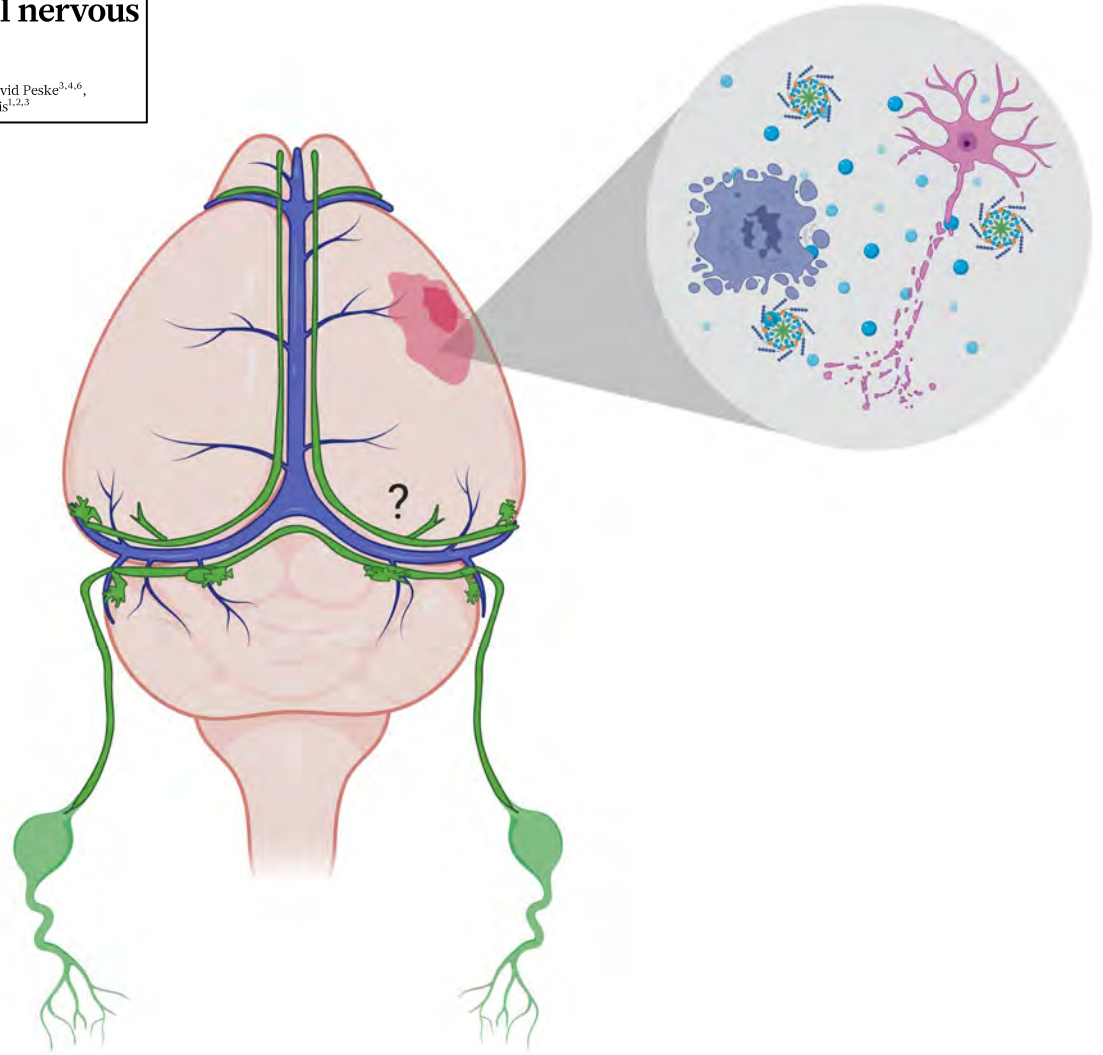
Does TBI impact meningeal lymphatic drainage function?

LETTER

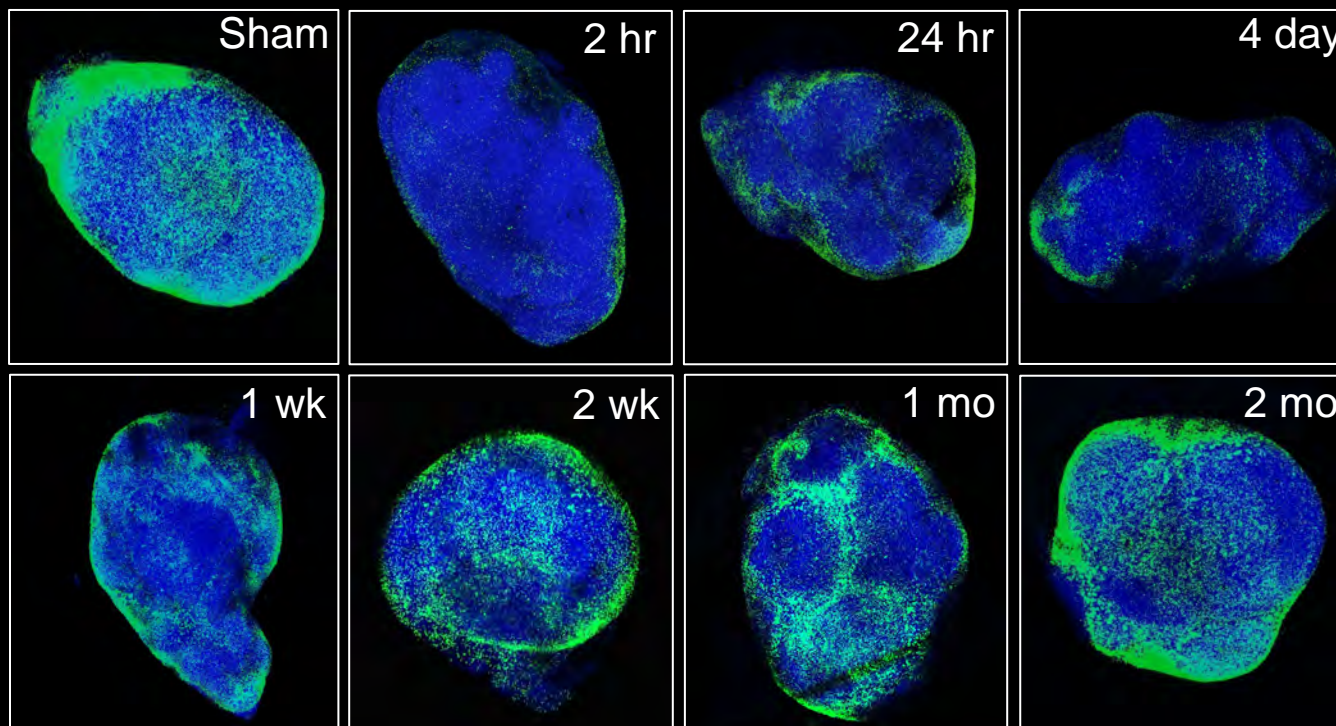
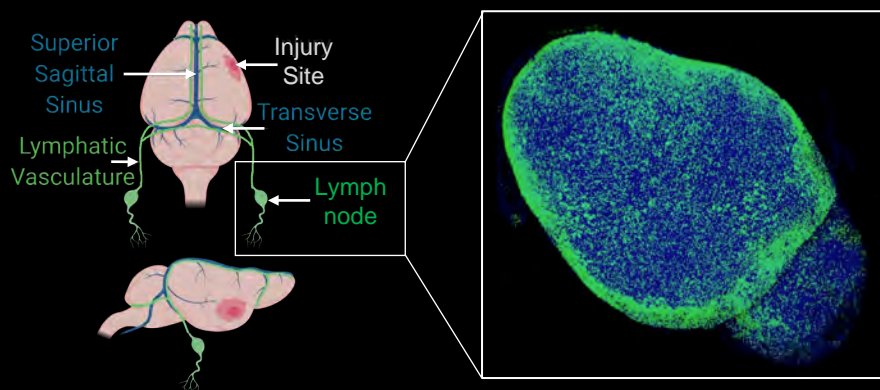
doi:10.1038/nature14432

Structural and functional features of central nervous system lymphatic vessels

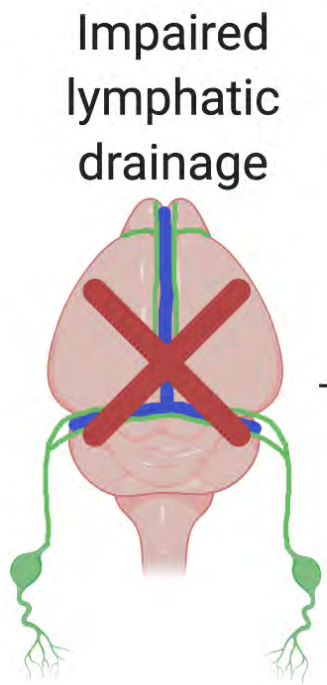
Antoine Louveau^{1,2}, Igor Smirnov^{1,2}, Timothy J. Keyes^{1,2}, Jacob D. Eccles^{3,4,5}, Sherin J. Rouhani^{3,4,6}, J. David Peske^{3,4,6}, Noel C. Derecki^{1,2}, David Castle⁷, James W. Mandell⁸, Kevin S. Lee^{1,2,9}, Tajie H. Harris^{1,2} & Jonathan Kipnis^{1,2,3}



Does TBI impact meningeal lymphatic drainage function?



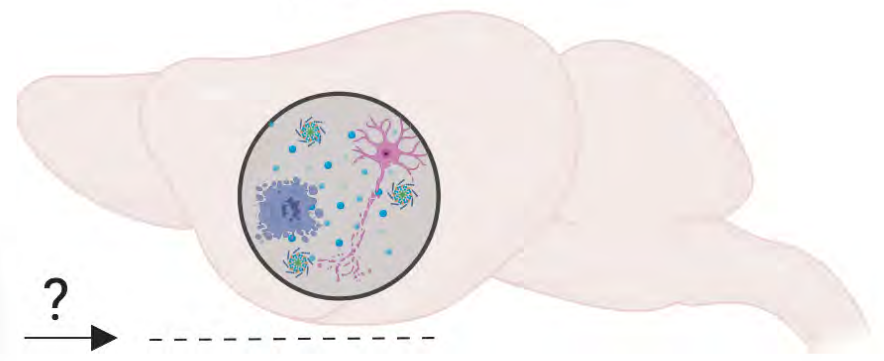
Beads DAPI



TBI

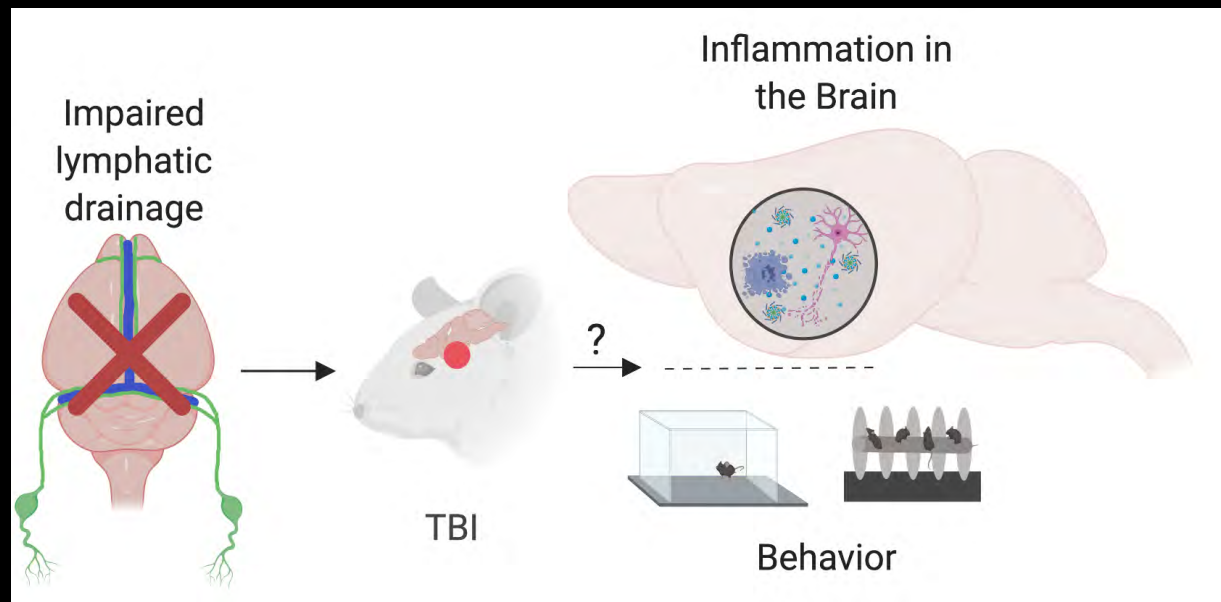
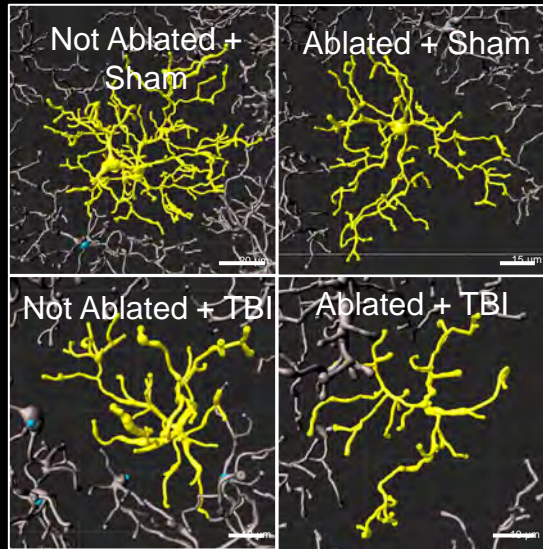


Inflammation in the Brain

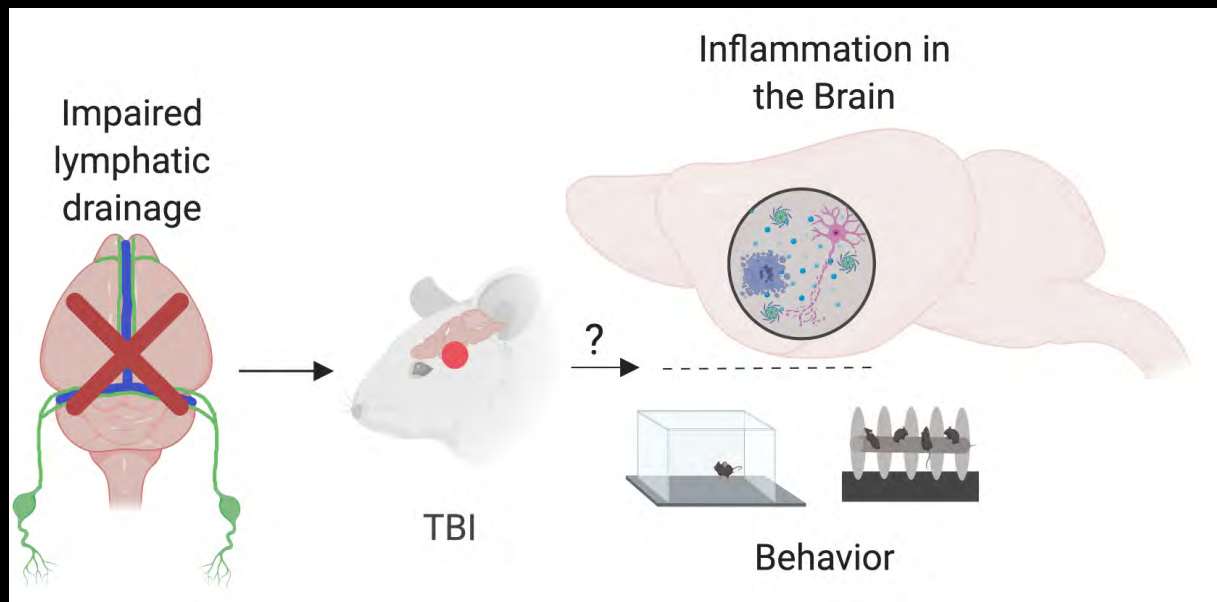
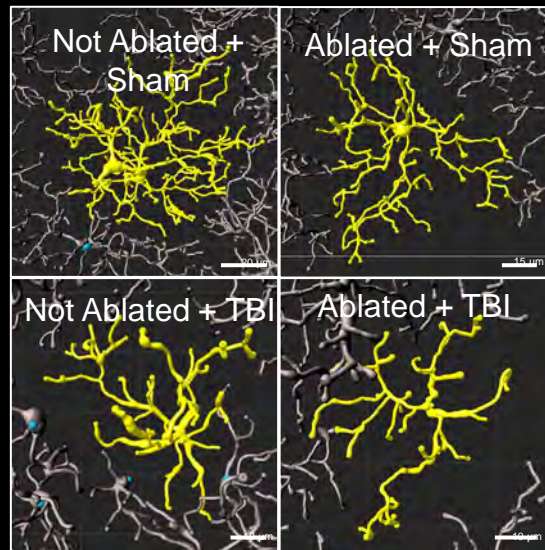


Behavior

Lymphatic dysfunction impairs memory and worsens inflammation



Lymphatic dysfunction impairs memory and worsens inflammation

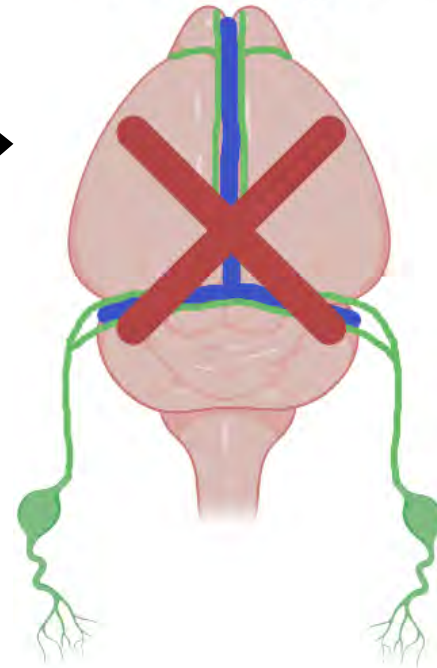




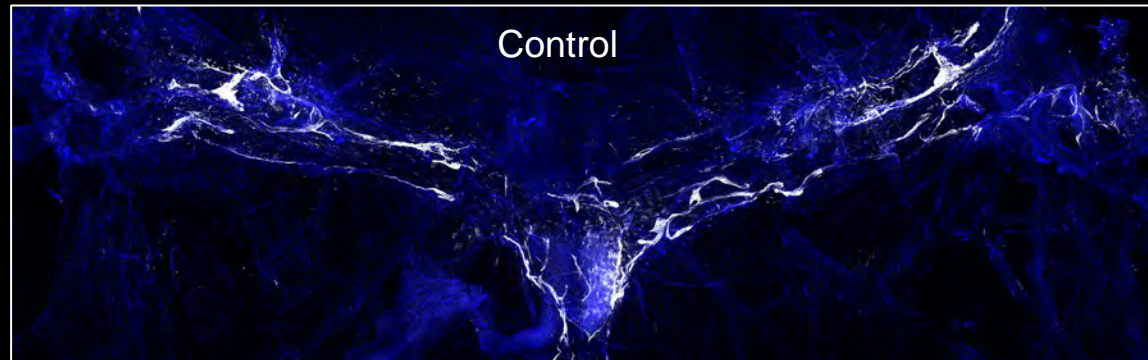
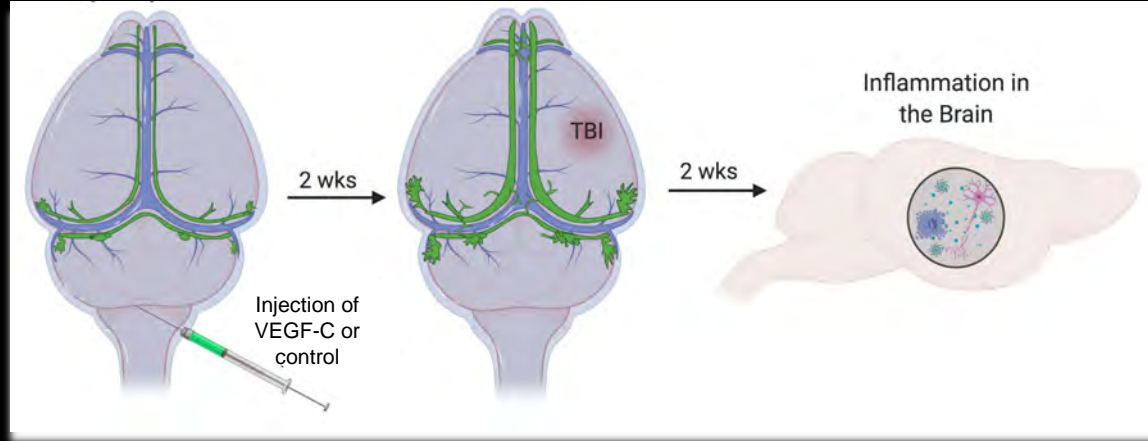
Aged Mouse



Impaired
lymphatic
drainage

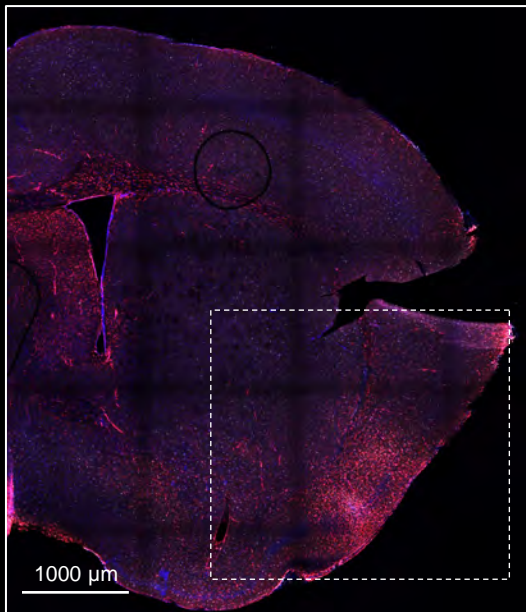


VEGF-C results in lymphatic growth

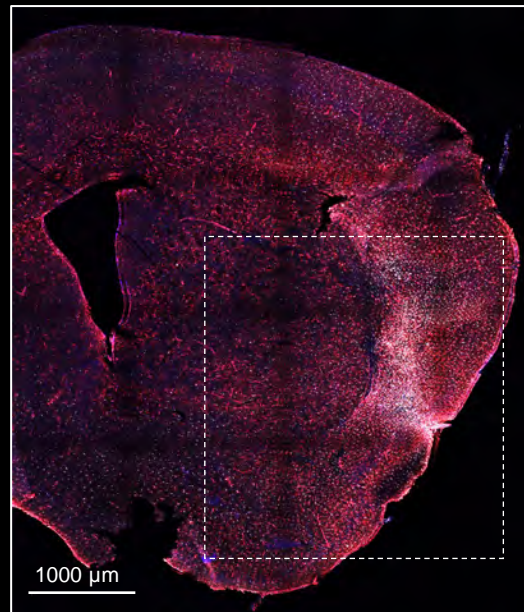


VEGF-C in aged mice decreases neuroinflammation

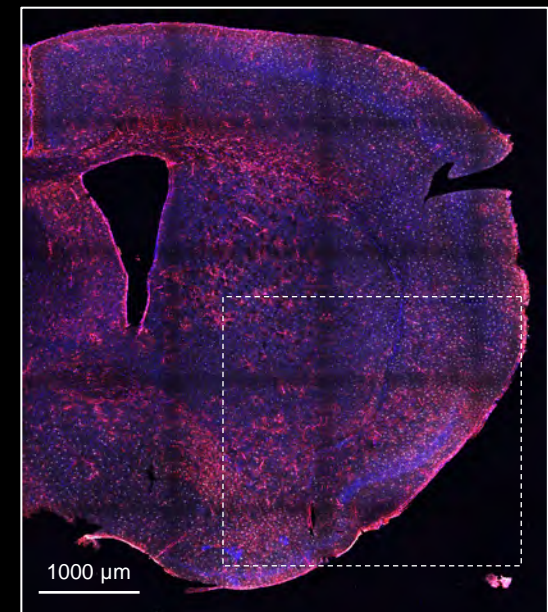
Young + Control + TBI



Aged + Control + TBI



Aged + VEGFC + TBI



Iba1 GFAP DAPI

Article | [Open Access](#) | [Published: 10 September 2020](#)

Meningeal lymphatic dysfunction exacerbates traumatic brain injury pathogenesis

[Ashley C. Bolte](#), [Arun B. Dutta](#), [Mariah E. Hurt](#), [Igor Smirnov](#), [Michael A. Kovacs](#), [Celia A. McKee](#), [Hannah E. Ennerfelt](#), [Daniel Shapiro](#), [Bao H. Nguyen](#), [Elizabeth L. Frost](#), [Catherine R. Lammert](#), [Jonathan Kipnis](#) & [John R. Lukens](#) 

[Nature Communications](#) **11**, Article number: 4524 (2020) | [Cite this article](#)

A



Popular

Latest

The Atlantic

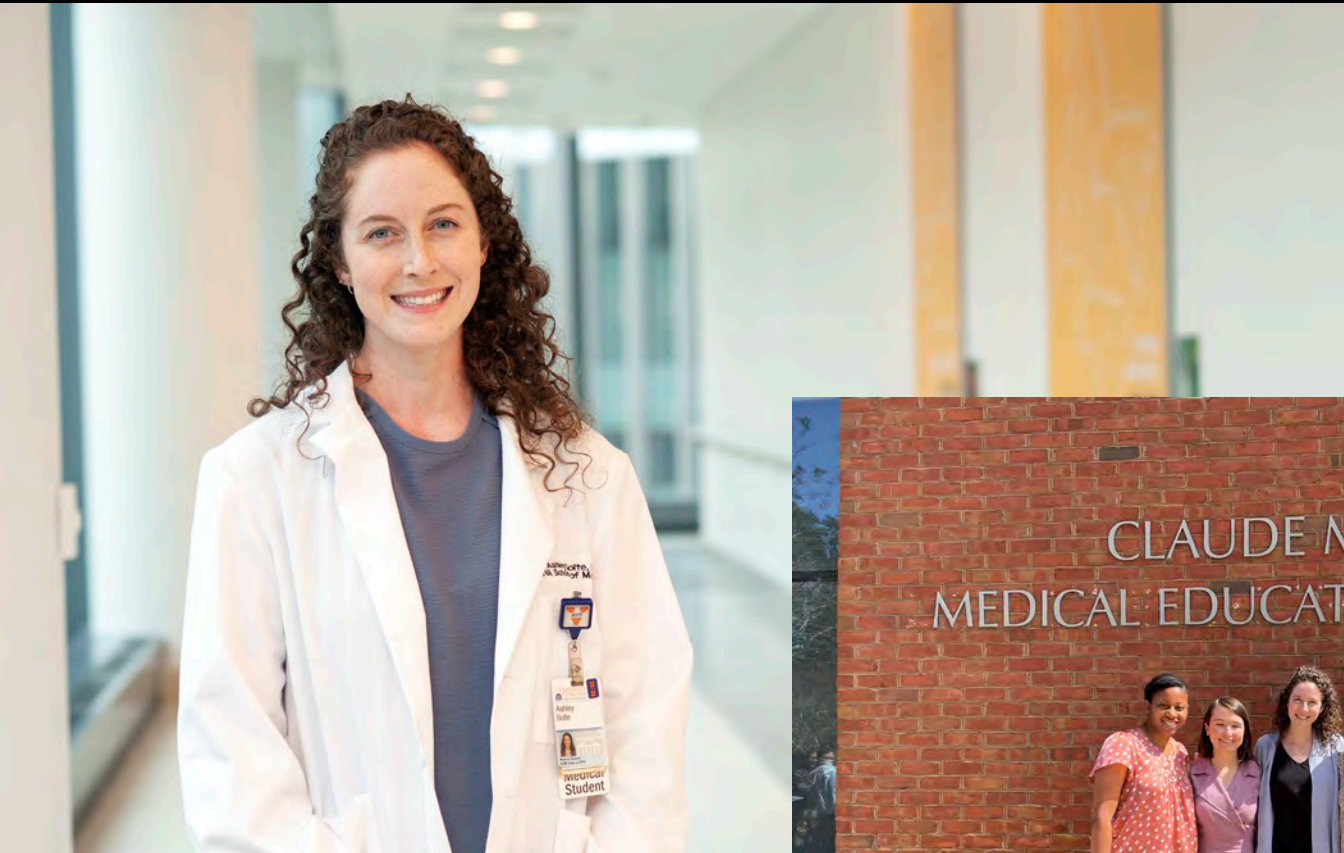


The Good Kind of Brain Drain

Some concussions may linger for months or even years because of damage to vessels that clear waste from the brain.

HELEN SANTORO AND KNOWABLE MAGAZINE **JANUARY 23, 2021**

Returned to medical school February 2021



People who made a difference...



Alex Dalrymple, MD



Glenn Moulder, MD



Brian Uthlaut, MD



Andrew Wolf, MD



Ben Martin, MD



Tushar Chopra, MD



Neeral Shah, MD



Karen Johnston, MD



Laurie Brenner, PhD



Meg Barclay, ACNP



Alexander Millard, MD

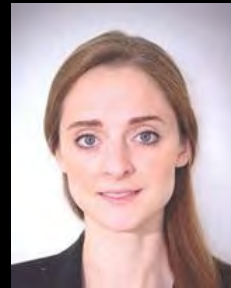


Craig Slingluff, MD

Vision for research as a physician scientist



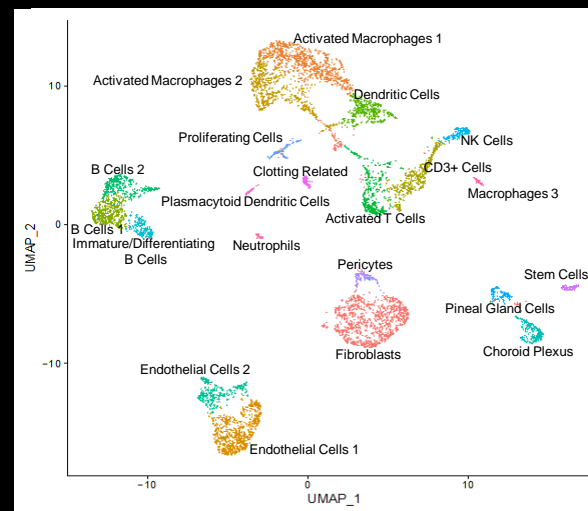
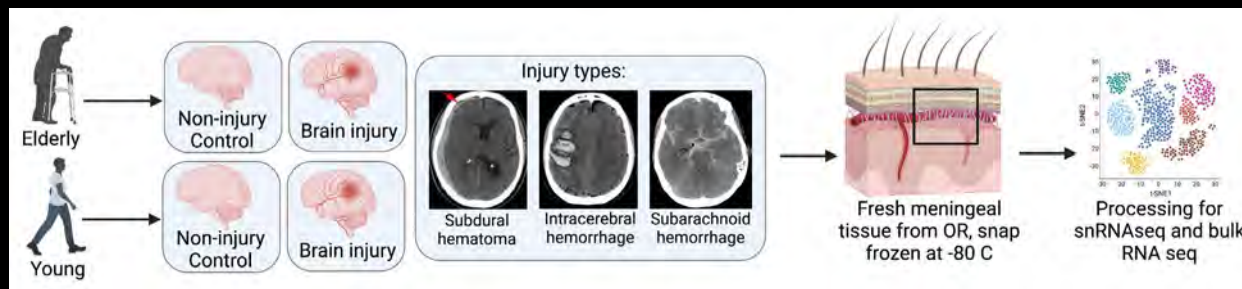
Davis Taylor, MD



Jen Sokolowski, MD PhD



Ryan Kellogg, MD



Lukens Lab Members:

John Lukens
Mariah Shaw
Cat Lammert
Elizabeth Frost
Hannah Ennerfelt
Kristine Zengeler
Daniel Shapiro
Ana Royo Marco
Katherine Bruch

Thank You!

Kipnis Lab:
Igor Smirnov
Sandro Da Mesquita
Jasmin Herz
Morgan Wall

Guertin Lab:

Arun Dutta
Bao Nguyen

Harris Lab:
Mike Kovacs

Committee:
John Lukens (mentor)
Young Hahn (co-mentor)
Loren Erickson
Melanie Rutkowski
Sarah Kucenas

Miller Lab:
Wei Ma

Department of Neurosurgery:

Jen Sokolowski
Davis Taylor
Ryan Kellogg


Funding:

UVA MSTP T32
Immunology Training Program T32
Wagner Fellowship
NIA F30 Fellowship



Department of
Microbiology,
Immunology,
and Cancer Biology



A fluorescence micrograph of a brain section. The image shows various brain structures, including what appears to be the hippocampus and cerebral cortex. The tissue is stained with a blue dye, likely DAPI, which highlights nuclei. There are also several distinct red spots or clusters of staining, which could represent specific protein deposits or cell populations. The overall background is dark, making the blue and red signals stand out.

Targeting the immune system to limit Alzheimer's disease

Coco Holliday

Me



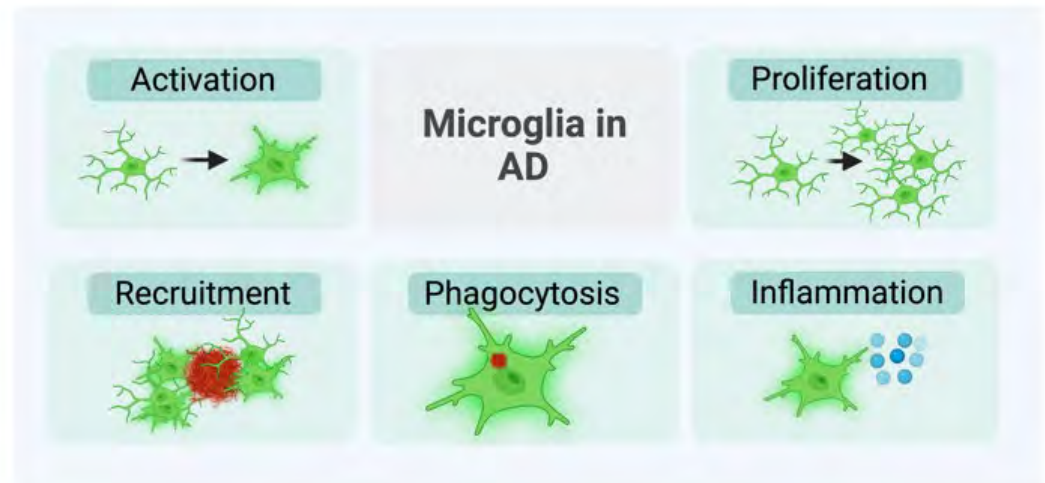
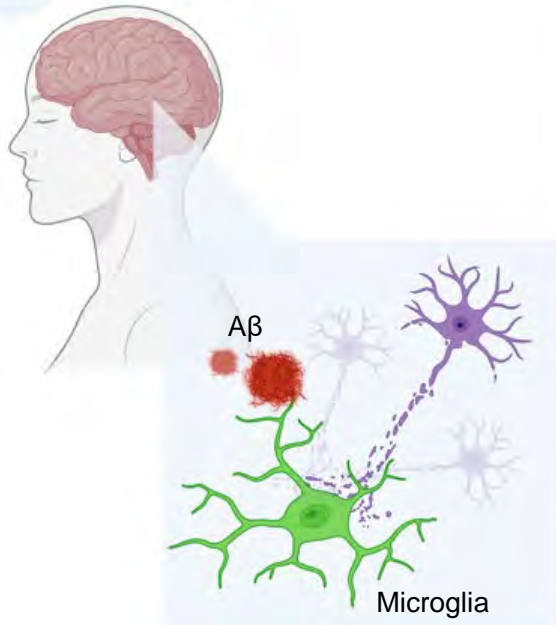
John Lukens



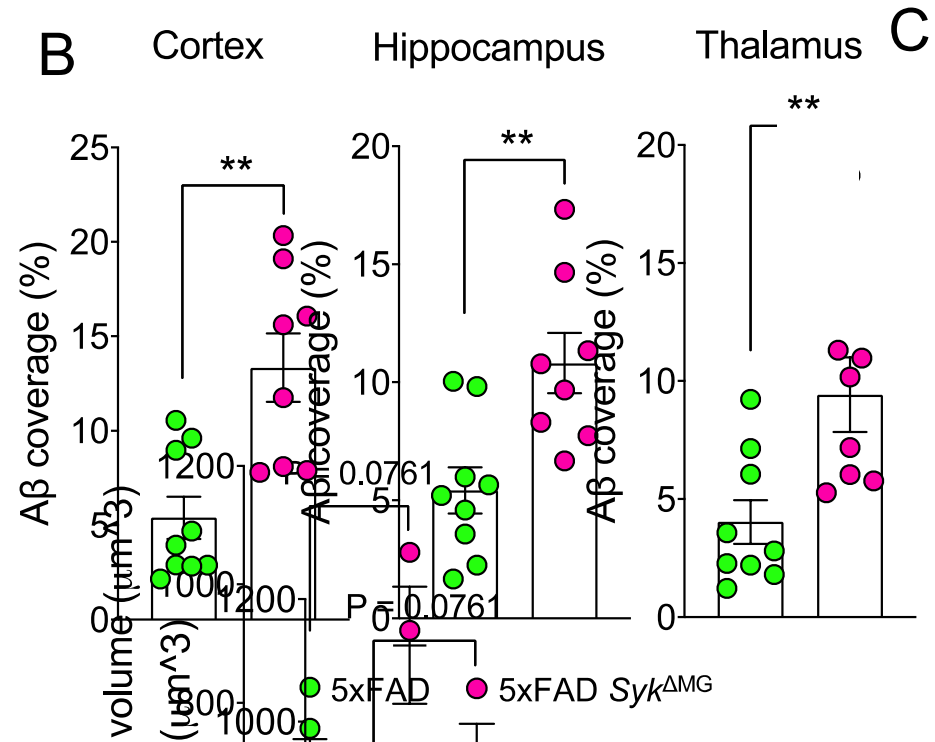
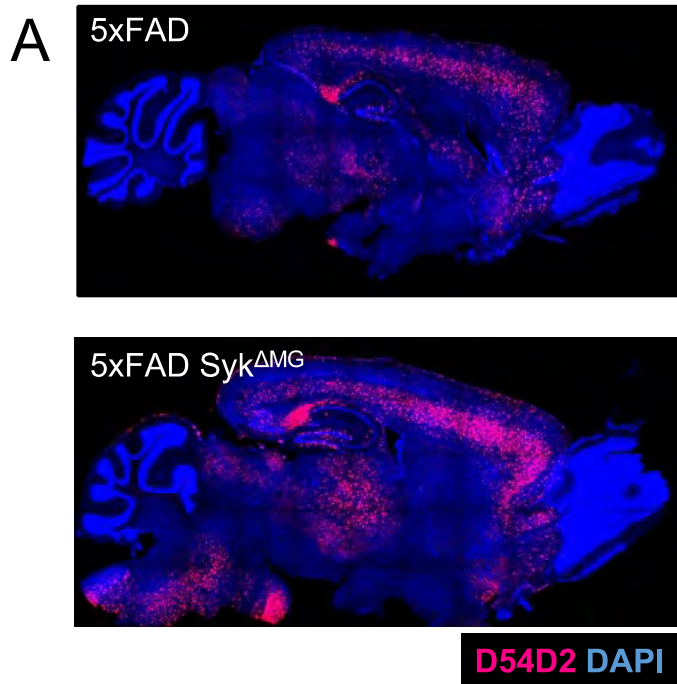
Hannah Ennerfelt

Microglial responses in the Alzheimer's disease (AD) brain

Alzheimer's Disease



Absence of SYK in microglia leads to impaired control of amyloid beta (A β)



C

SYK deficiency also leads to impaired control of the neurotoxic debris that causes multiple sclerosis

