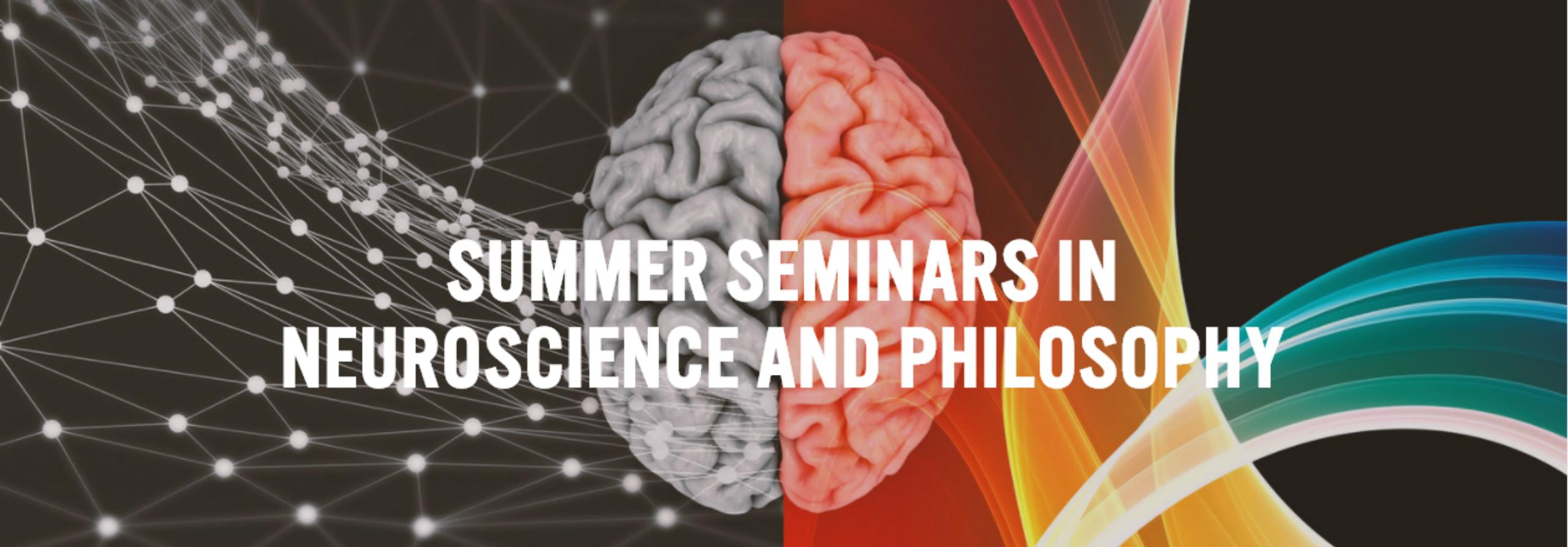


A (Virtual) Hands-On Workshop with the Human Central Nervous System



SUMMER SEMINARS IN
NEUROSCIENCE AND PHILOSOPHY

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Duke University School of Medicine
Duke Institute for Brain Sciences

[SSNAP | 2021]



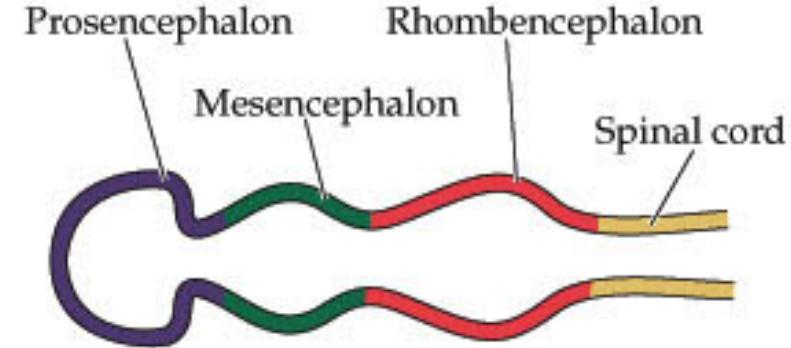
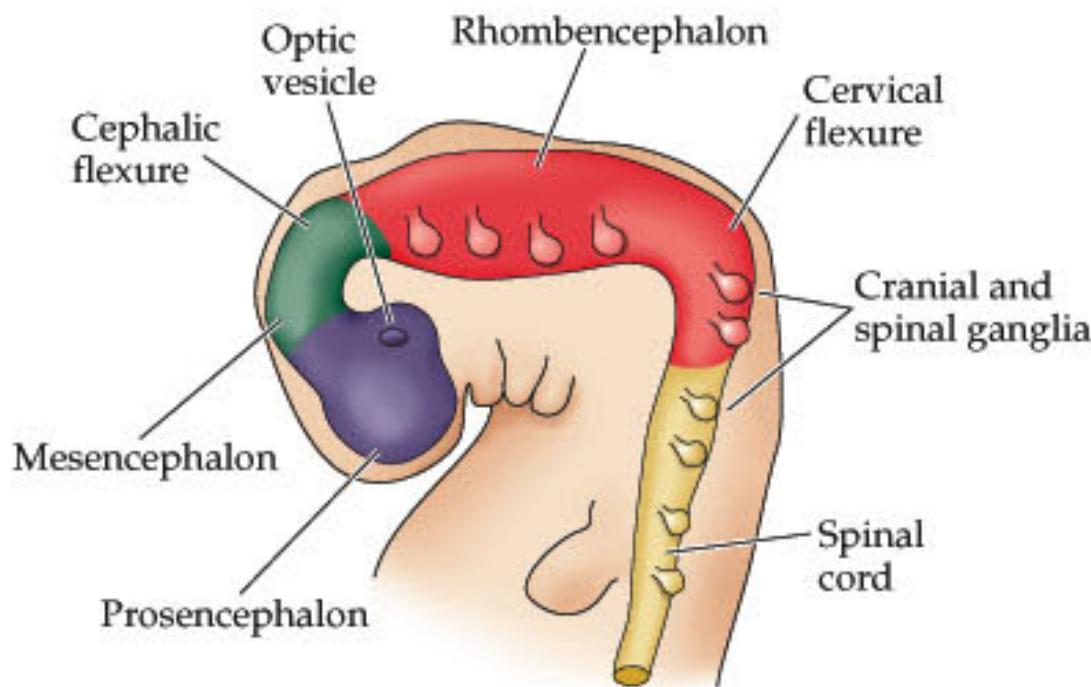
Overview of Workshop

- Your interests!
- The basic brain embryology
- Survey of human brain anatomy
 - Cells of the CNS
 - Organization of brain tissue
 - Surface anatomy
 - Internal anatomy
 - Orientation to laboratory experience
- Encountering human brains!



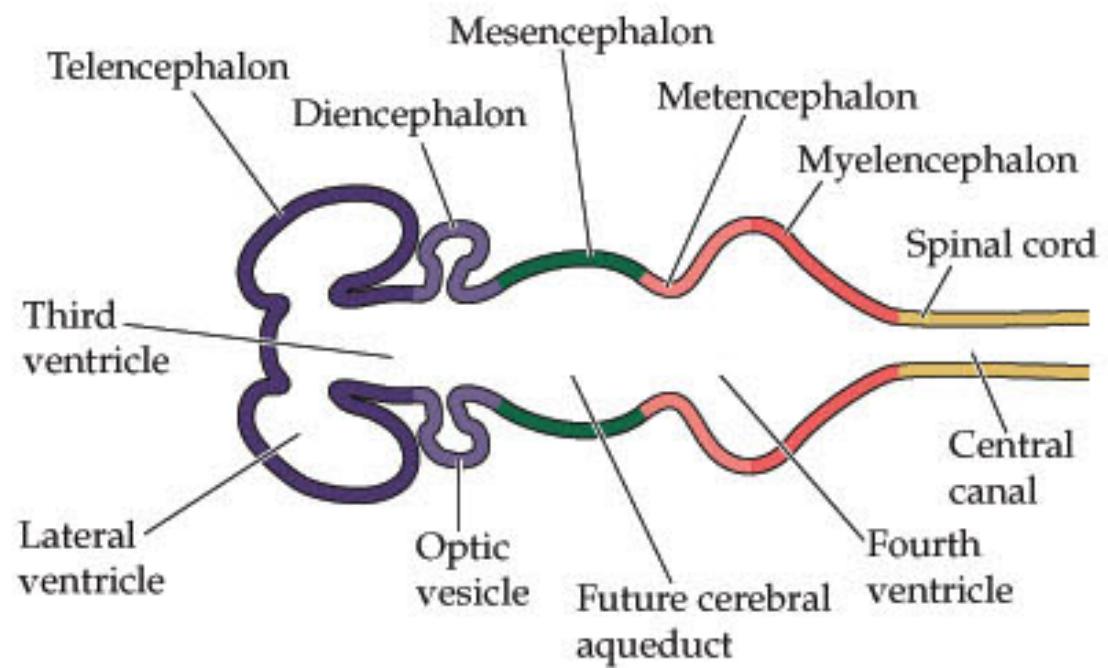
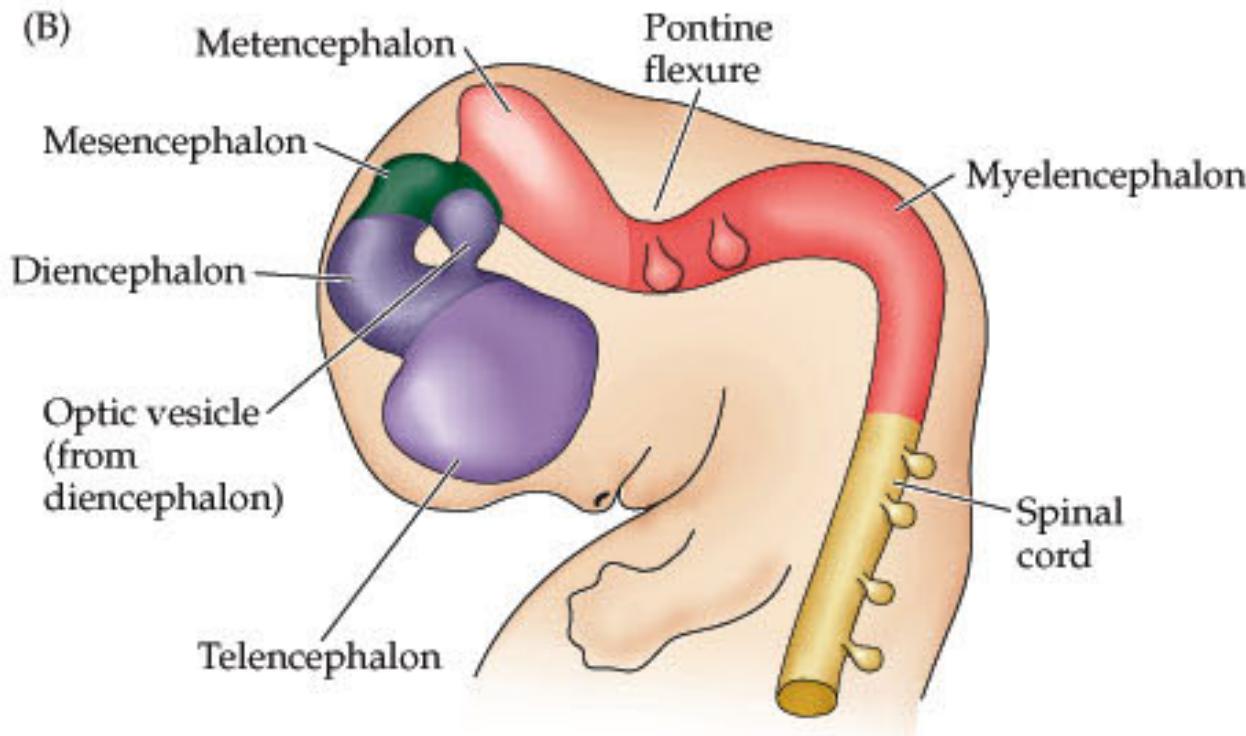
Understanding the basic plan

(A)





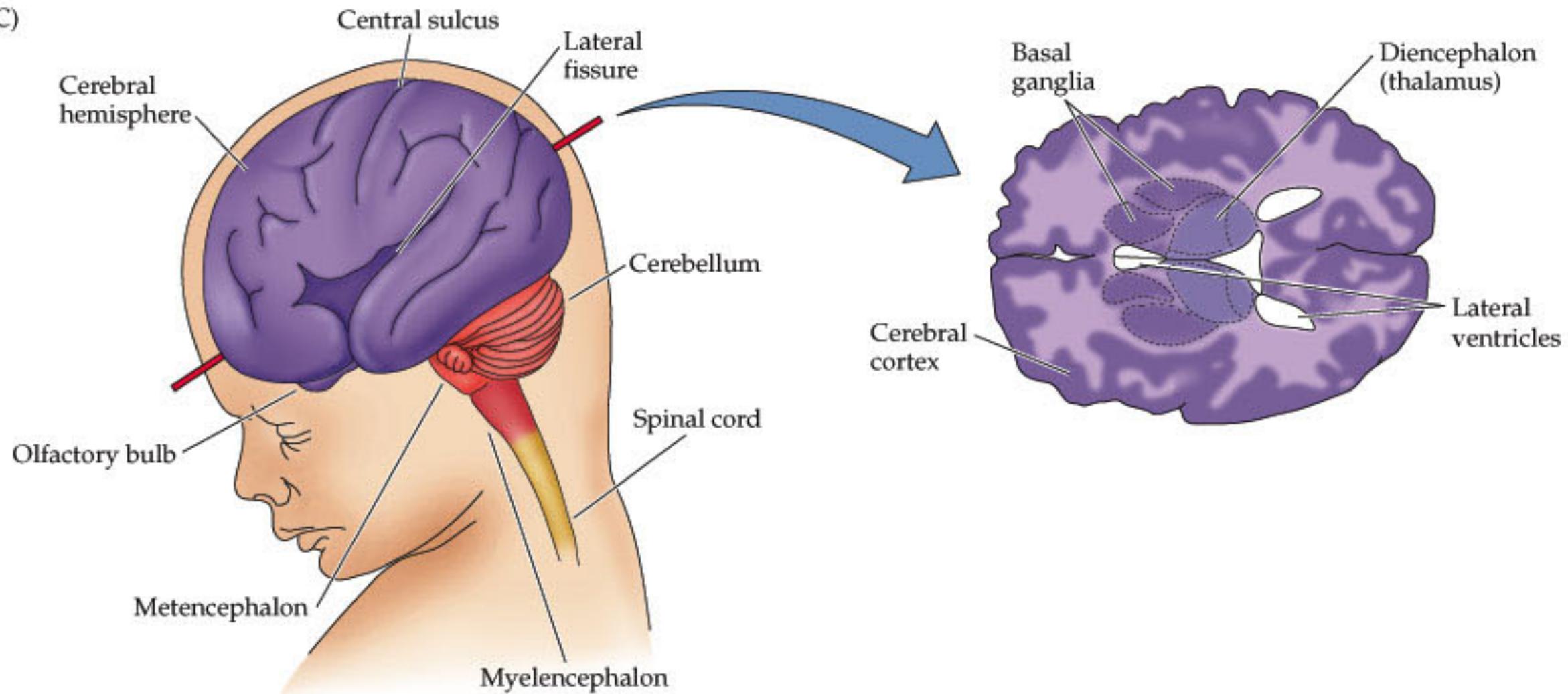
Understanding the basic plan





Understanding the basic plan

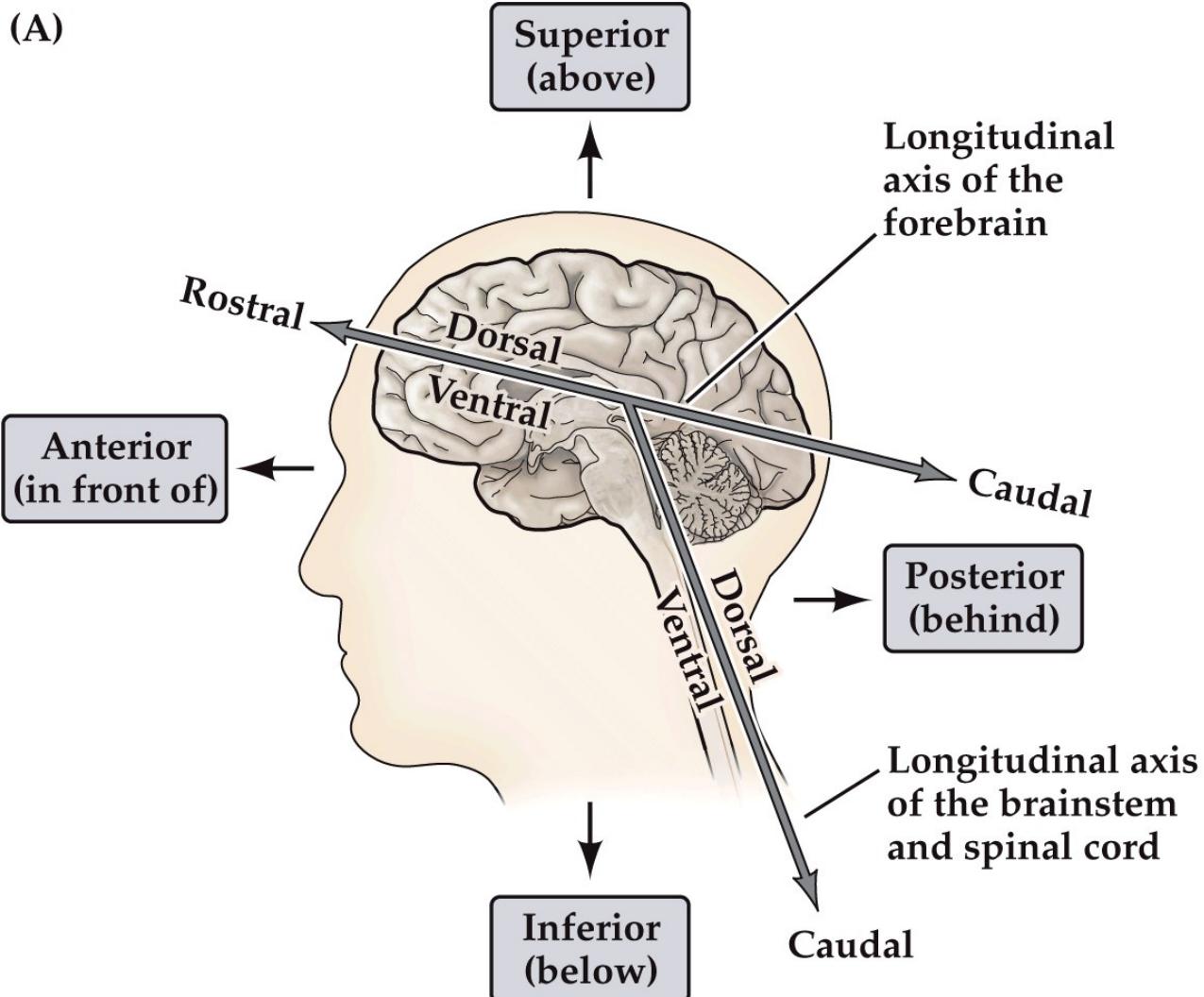
(C)





Anatomical conventions

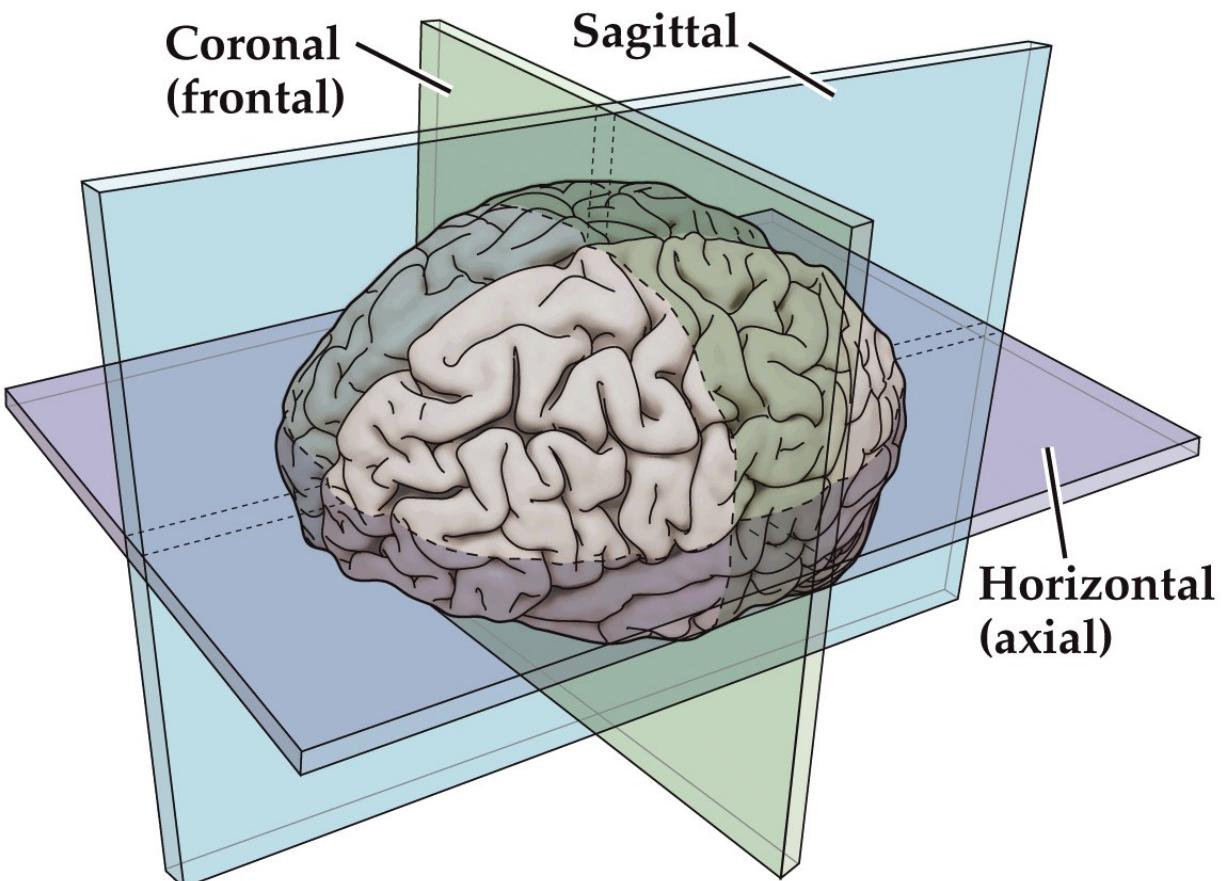
(A)





Anatomical conventions

(B)



Cells of the CNS

Neurons

primary processors of neural signals

Neuroglia

support the electrochemical functions of neurons; modulate synapse formation, axon growth, neural-immune interactions

Vascular endothelium

provides for the supply of blood to brain tissue

Thionine-stained section of human motor cortex demonstrating the presence of Nissl substance (rough ER)
(image by L.E. White)

Functional Microanatomy of Neurons

Input Zone

Conducting Zone

Output Zone

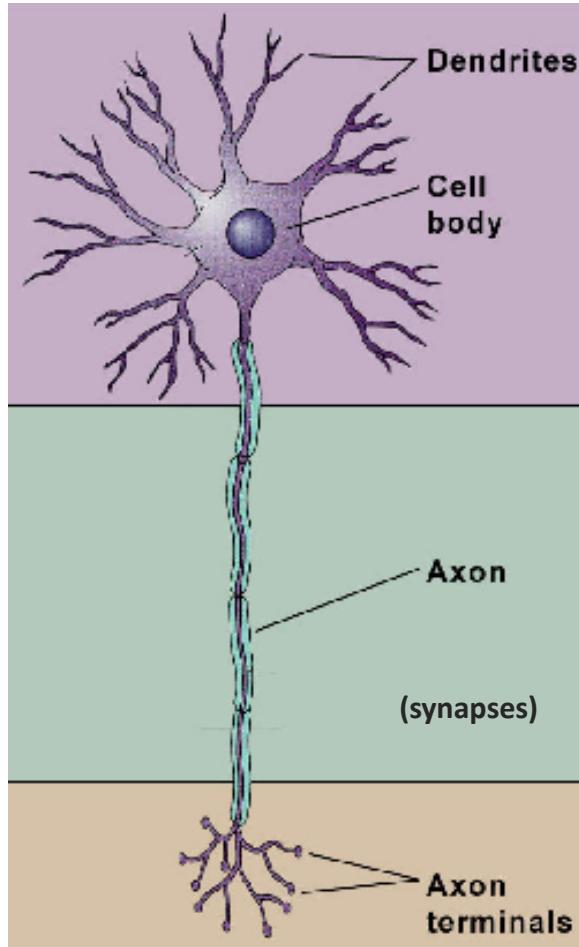
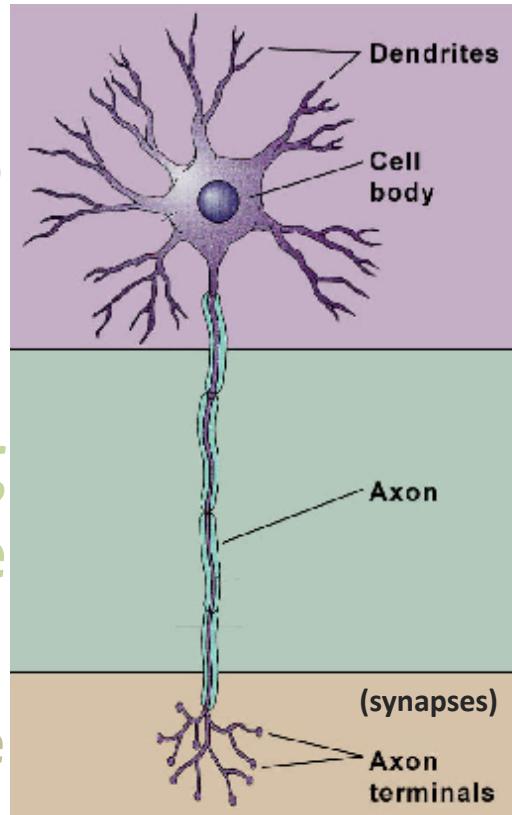


illustration courtesy of S. Mark Williams
Pyramis Studios, Durham NC

Functional Microanatomy of Neurons

Input Zone



Conducting
Zone

Output Zone

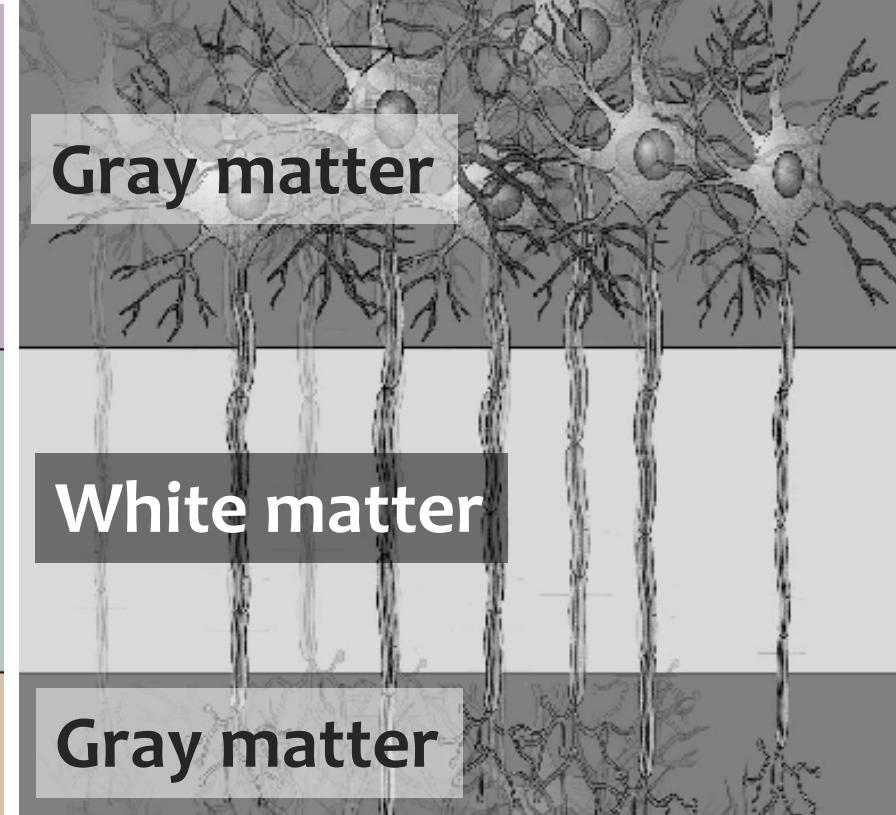
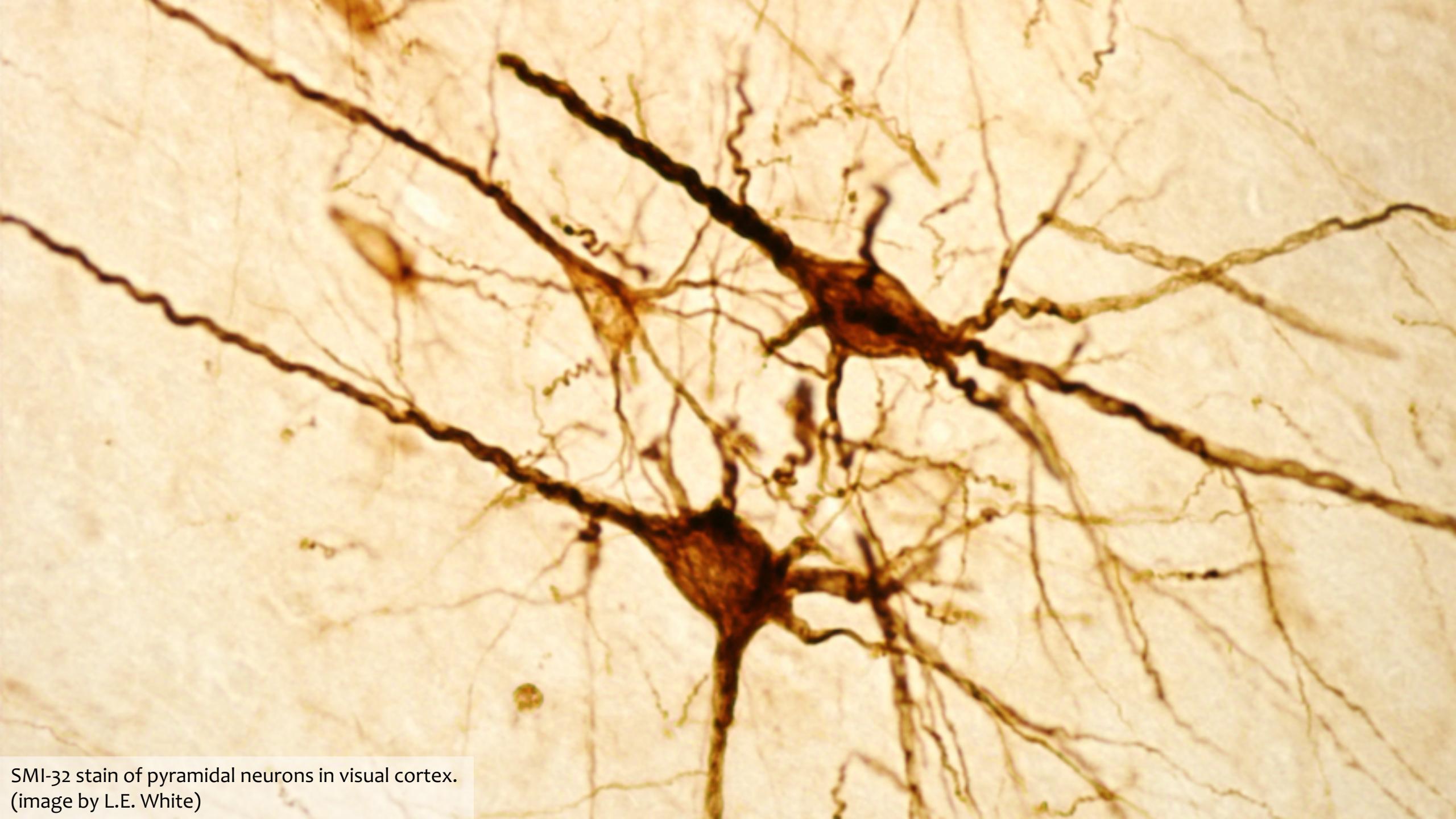
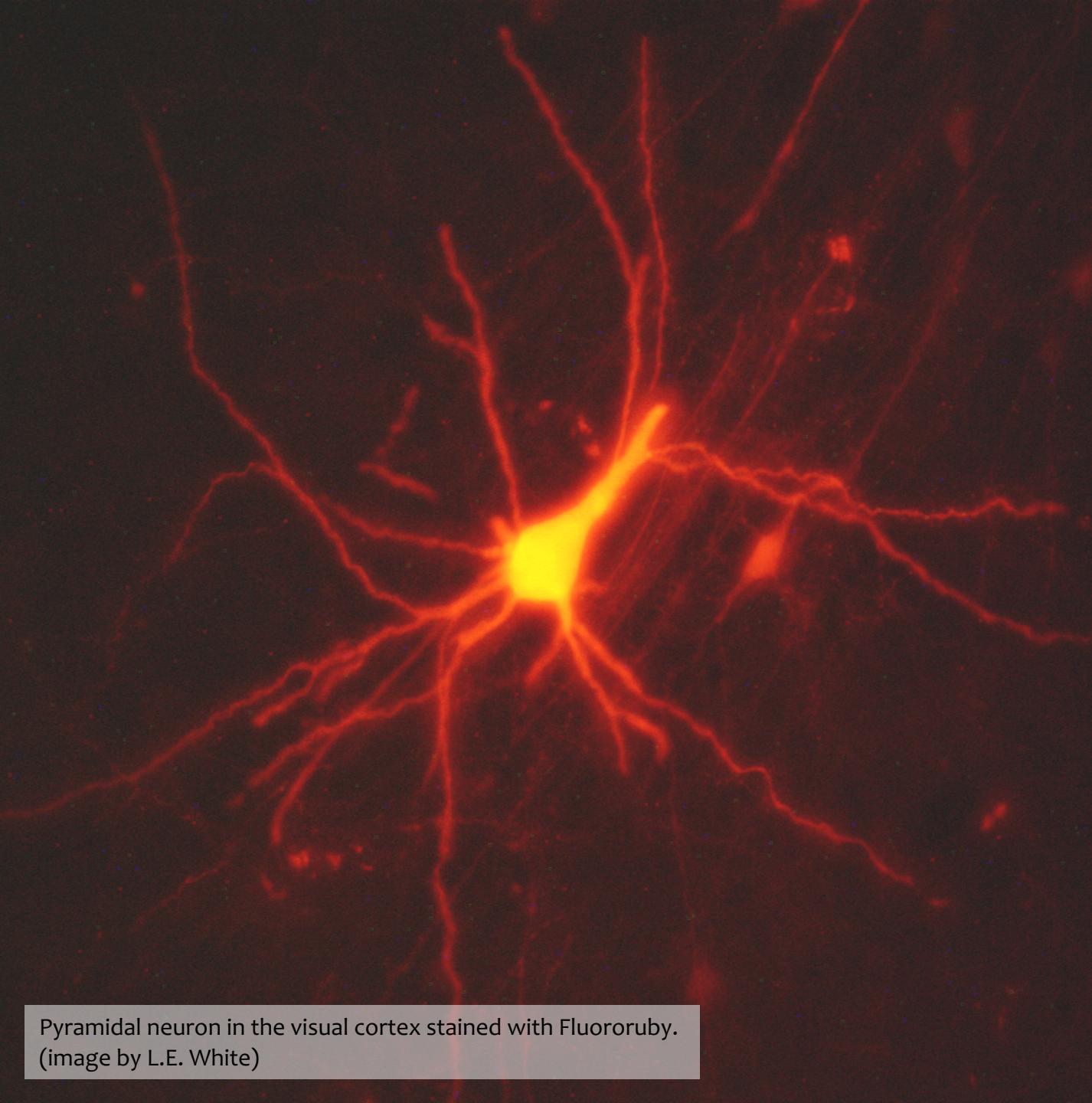


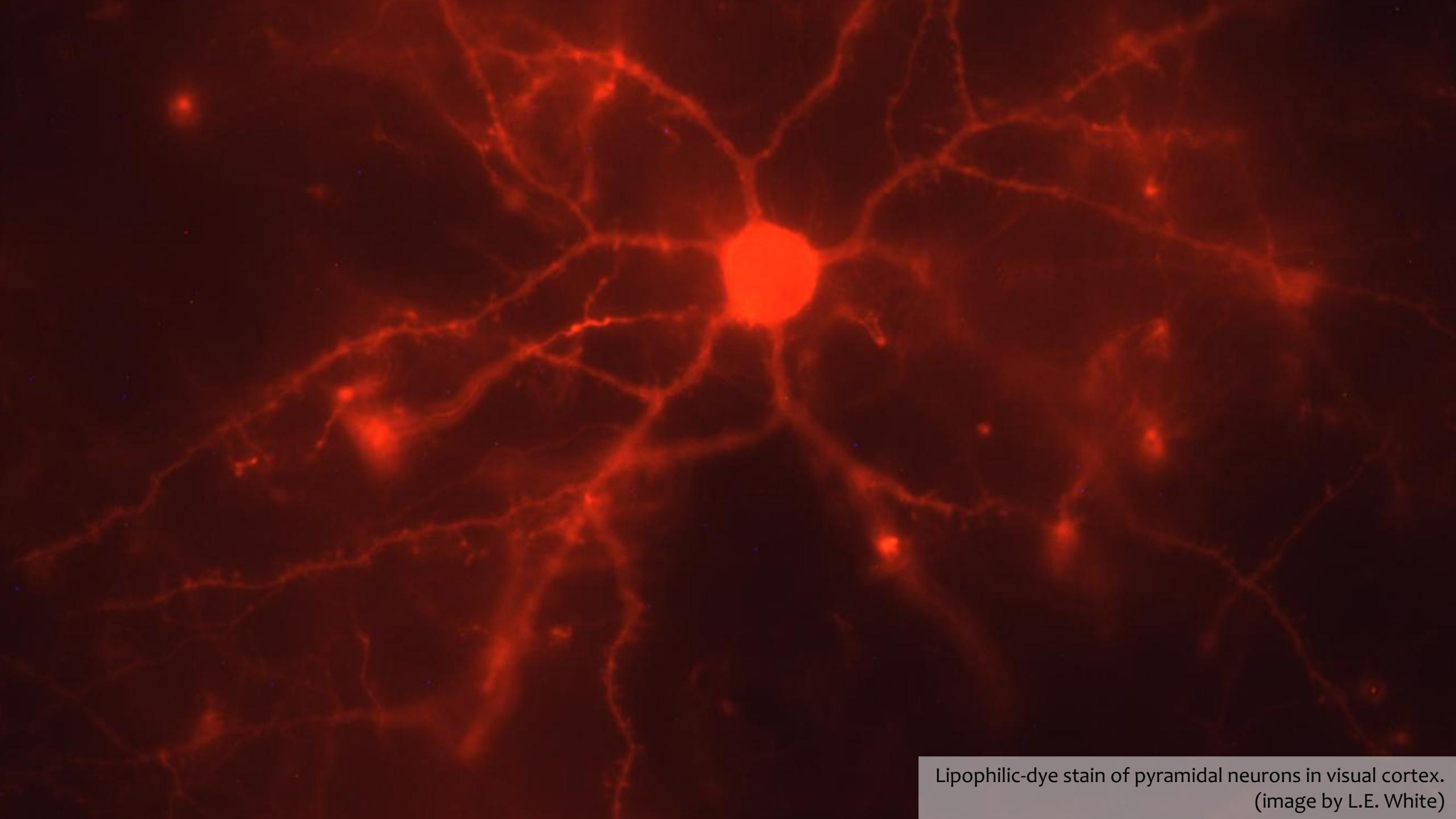
illustration courtesy of S. Mark Williams
Pyramis Studios, Durham NC



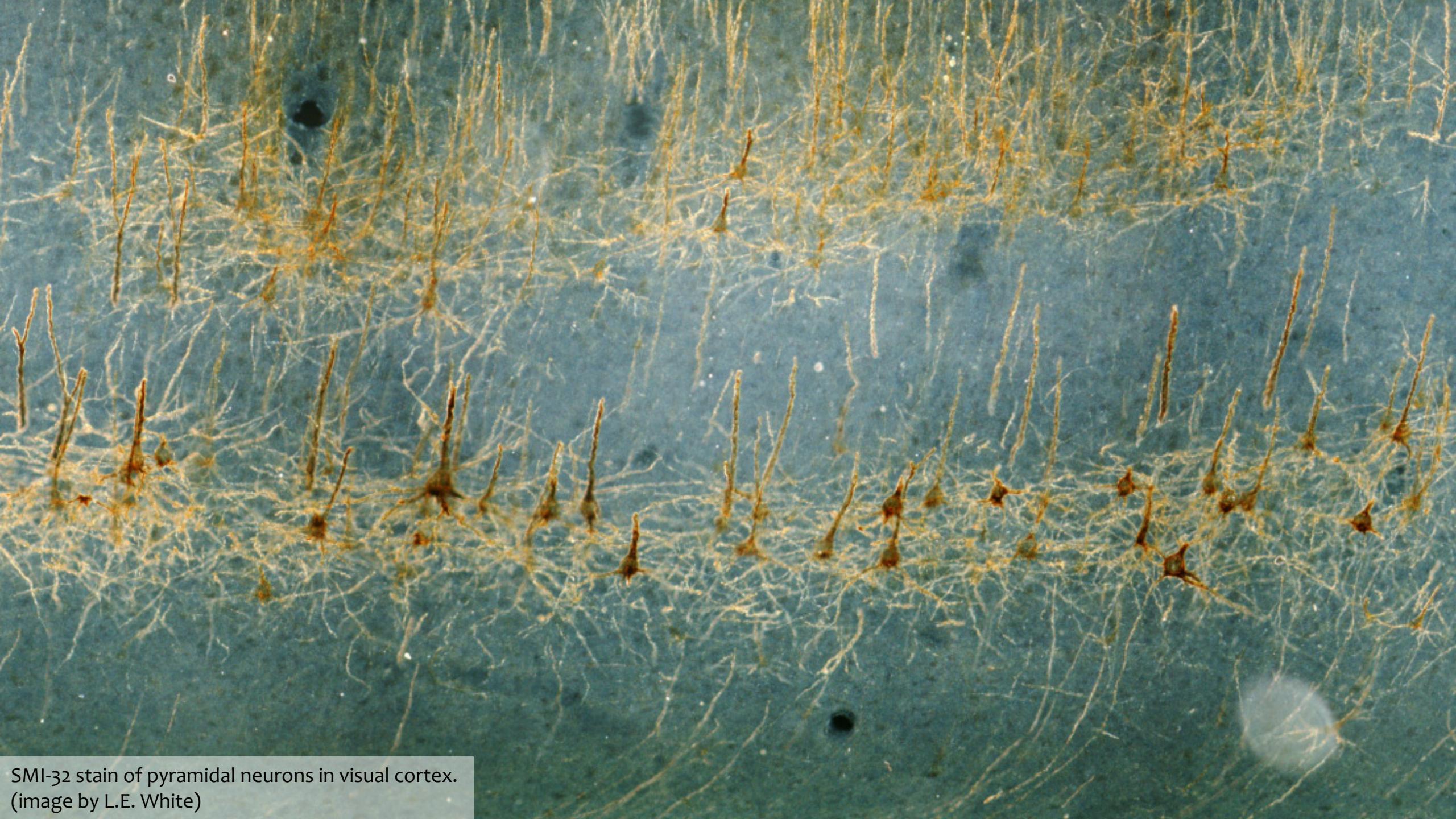
SMI-32 stain of pyramidal neurons in visual cortex.
(image by L.E. White)



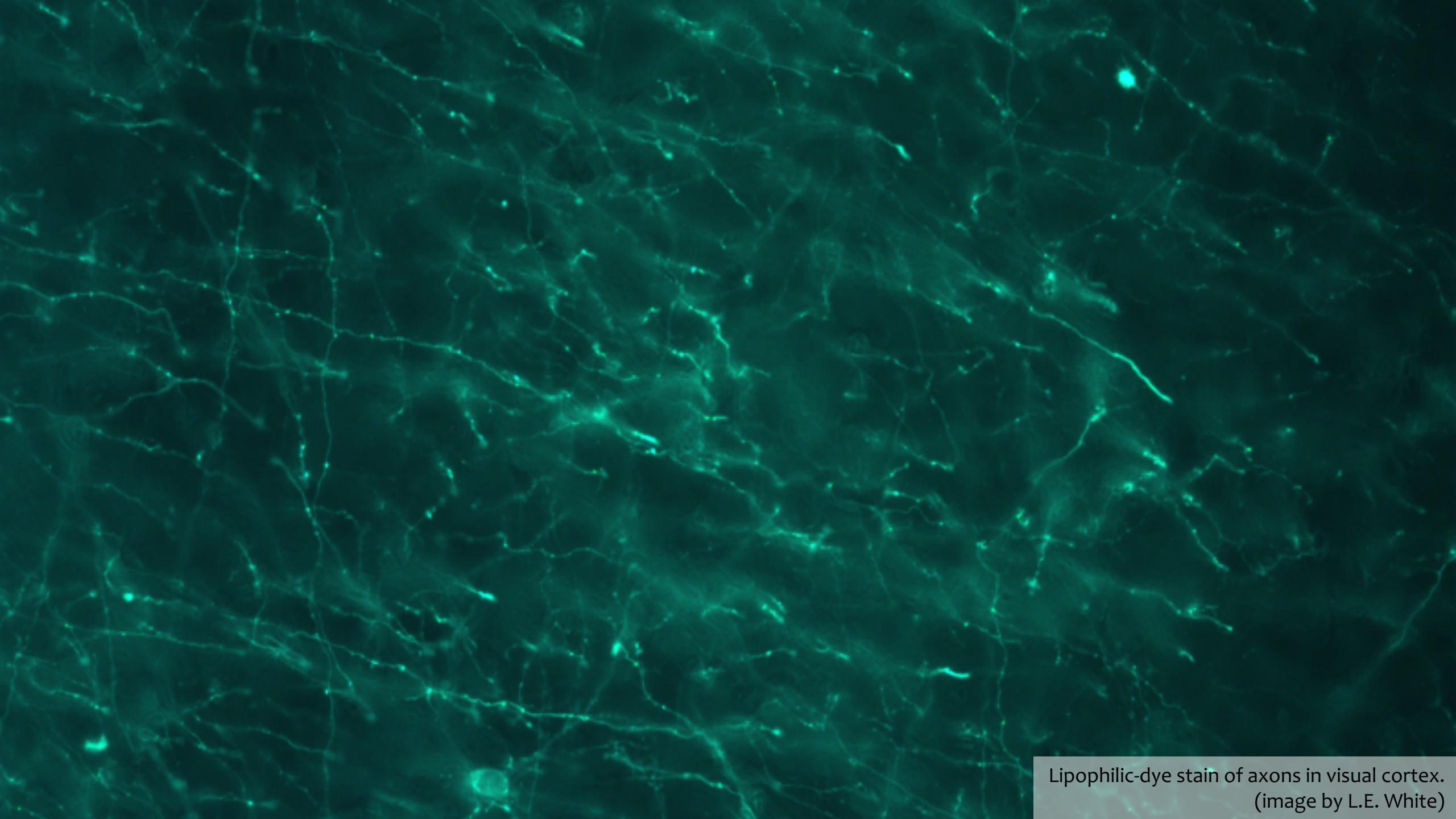
Pyramidal neuron in the visual cortex stained with Fluororuby.
(image by L.E. White)



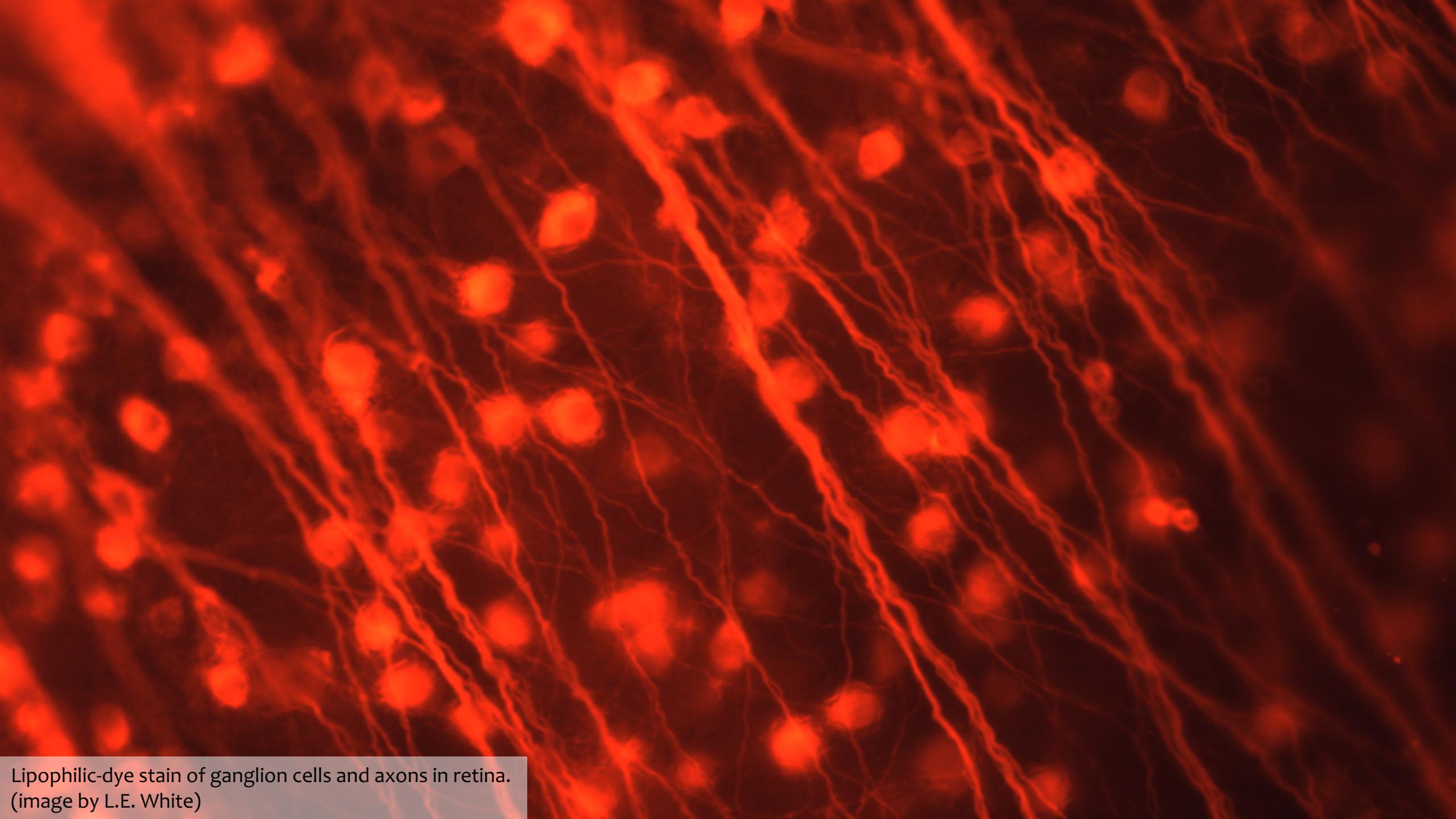
Lipophilic-dye stain of pyramidal neurons in visual cortex.
(image by L.E. White)



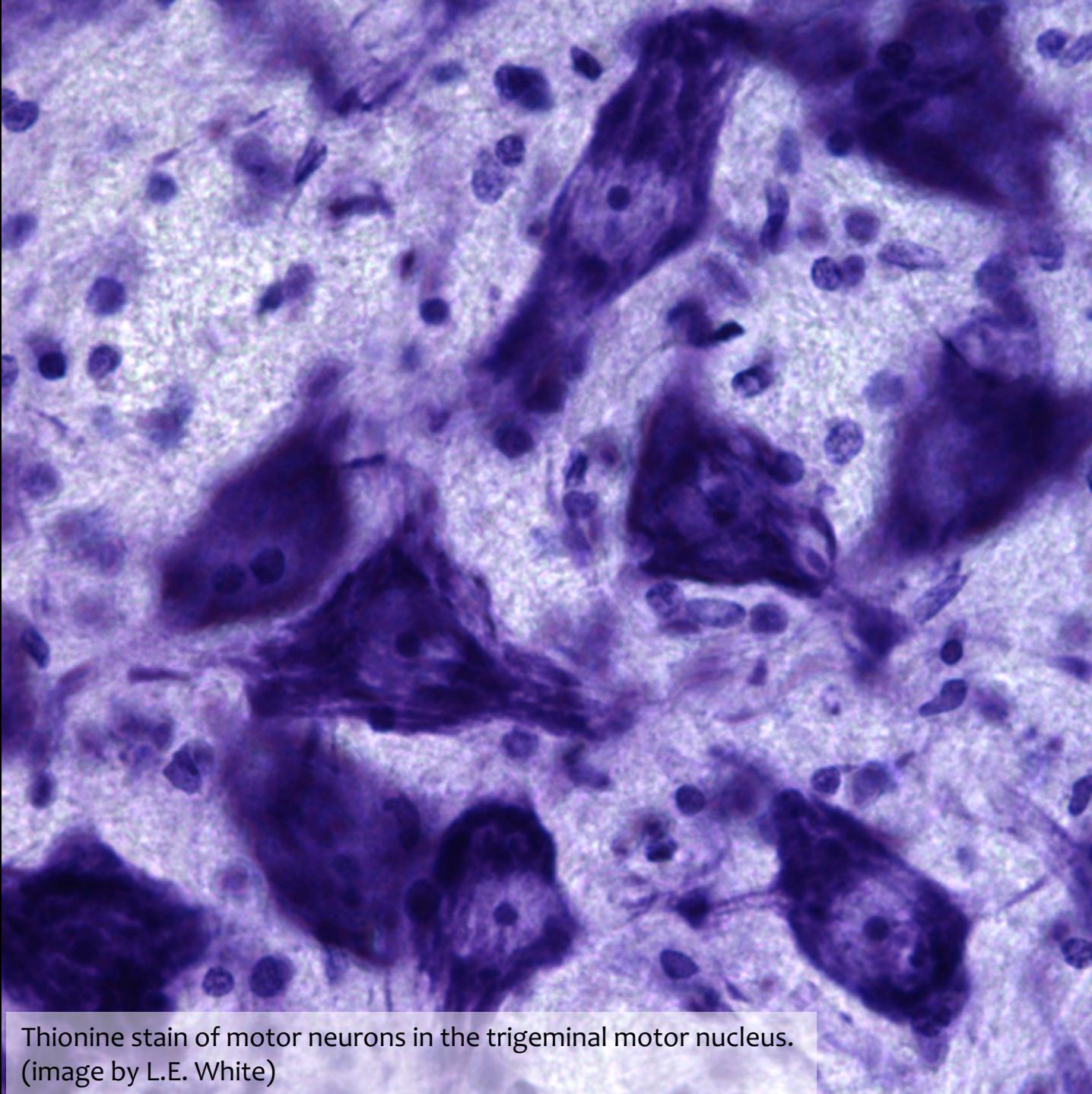
SMI-32 stain of pyramidal neurons in visual cortex.
(image by L.E. White)



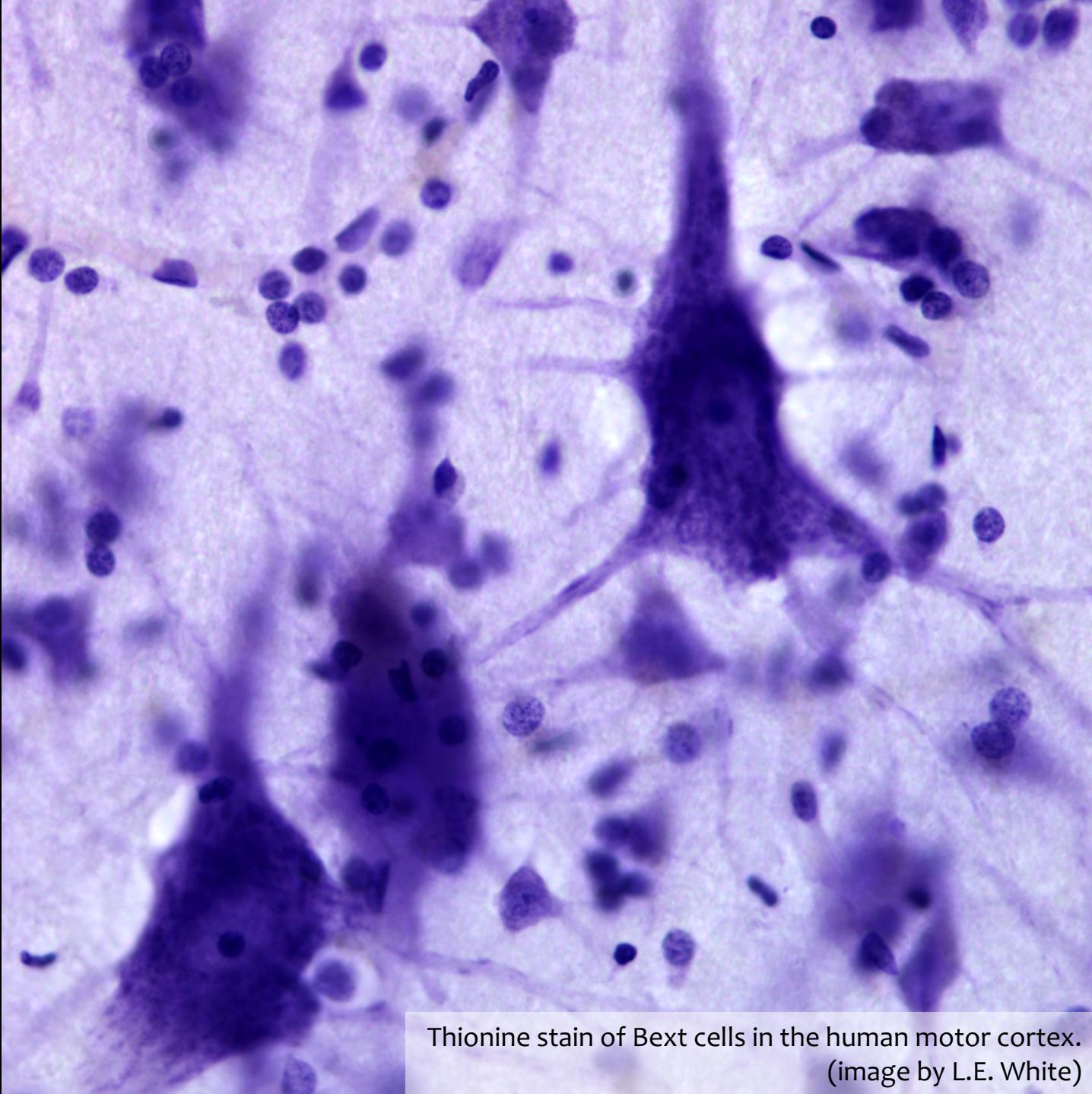
Lipophilic-dye stain of axons in visual cortex.
(image by L.E. White)



Lipophilic-dye stain of ganglion cells and axons in retina.
(image by L.E. White)



Thionine stain of motor neurons in the trigeminal motor nucleus.
(image by L.E. White)



Thionine stain of Bext cells in the human motor cortex.
(image by L.E. White)

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Orientation preference map in galago visual cortex
(image by L.E. White)



Learning Resources



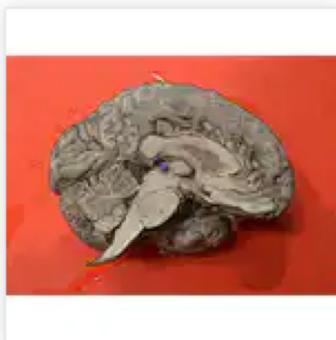
Sylvius 4 Online

An Interactive Atlas and Visual Glossary of Human Neuroanatomy

S. Mark Williams • Leonard E. White



Learning Resources



Understanding the Brain: The Neurobiology of Everyday Life

The University of Chicago

Course



4.9 (1,881) | 190K students

 Beginner



Medical Neuroscience

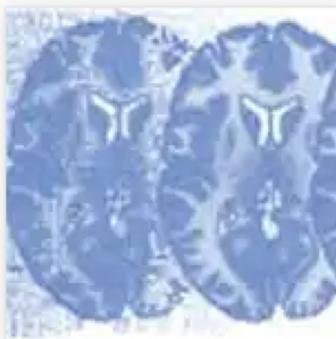
Duke University

Course



4.9 (2,199) | 230K students

 Advanced



Neuroscience and Neuroimaging

Johns Hopkins University

Specialization



4.6 (2,508) | 86K students

 Intermediate