

Letting Knowledge Serve
through interdisciplinary
neuroscience, art, and a
few extra brains!



Noggin @ Boise State

**Northwest
Noggin**

nwnoggin.org



Jeff Leake



jleake@pdx.edu

Jeff Leake, M.A., artist and instructor in Psychology and University Studies, Portland State University; President, co-founder and Arts Coordinator of NW Noggin.



Bill Griesar



griesar@pdx.edu

Bill Griesar, Ph.D., Teaching Assistant Professor, Portland State University; co-founder and Neuroscience Coordinator of NW Noggin; Affiliate Graduate Faculty, OHSU.

NWNOGGIN



nwnoggin.org

**Arts integrated neuroscience
outreach for K-12 & community**



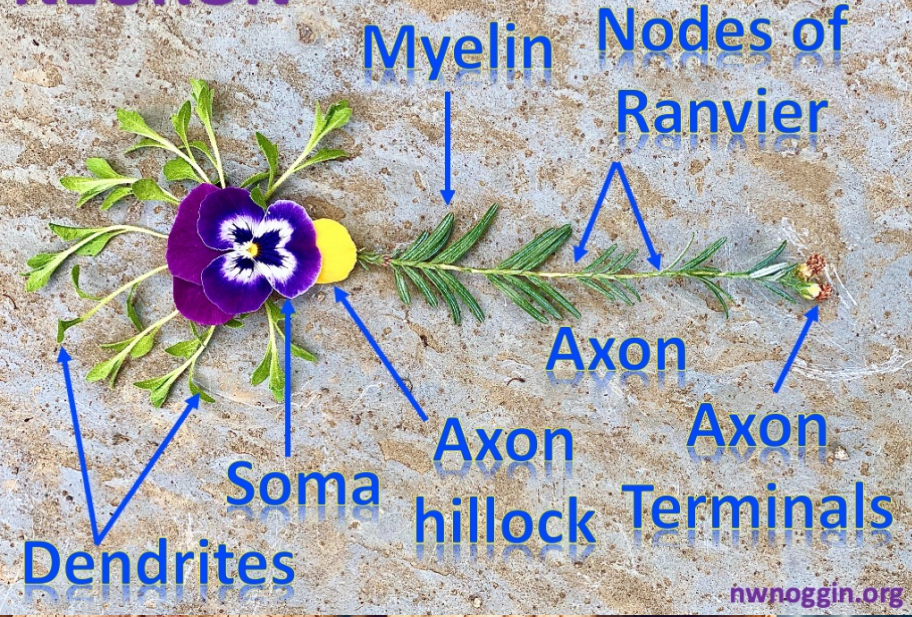
**ELEVEN YEARS!
ALL VOLUNTEER (everyone)
65,000+ community members**



Art & Brains!




NEURON



nwnoggin.org





Sleep
Anxiety
Depression
ADHD
Autism
Development
Perception
Gender
Drugs
Memory
Language
Racial Bias

*What you do
has relevance
GO PLACES*



We all pay for research



Greater understanding
More support for research
Increased participation
Less confirmation bias
New directions
FUN!

Connections matter

BUILD NEW CONNECTIONS



- **Academic priority K-12, urban/rural communities, tribal majority schools**
 - Not always well-funded, or valued, often ignored, subjected to standardized testing that primarily benefits others. Complex brain development underway, unacknowledged diversity, racism, bias, police brutality, mental health,...
- **Young graduate researchers, undergraduates (Portland State University, OHSU,...)**
 - *How does my research relate to the world? How can I explain it? Where can I go from here?*
- **Houseless youth (p:ear), incarcerated youth (MacLaren/Coffee Creek Correctional Facilities)**
 - *“It’s like people see me as an object, not as a human being”*
- **Artists: Painters, Dancers, Storytellers, Musicians, Poets**
 - *How does my work relate to other fields? How do I connect with new audiences?*
 - *How is my practice influenced and enriched by discoveries about the brain?*
- **Community organizations**
 - TRIO, Area Health Education Centers (AHECs), American Brain Coalition,...
- **Area businesses (BioGift, Intel, Fort George Brewery, Portland Art Museum)**
 - *How can we better connect with everyone in our community?*
- **Members of the public**
 - *Why are my taxes spent on research? Art? What are we discovering? Making?*



**Oh the places
you'll go!**

Why art & brains..?

- Motivation, engagement, **empathy**
- Exploration, creativity, **INNOVATION**
- **Personal relevance of STEAM material**



Build your own mouse line!



N.W. Noggin
@NWNoggin

Building a #rosehipneuron in
#pipecleaners 🧡 #nwnoggin 🧠🎨
#sciart #scicomm 🦋
nwnoggin.org/2018/08/31/ros...



To see other people



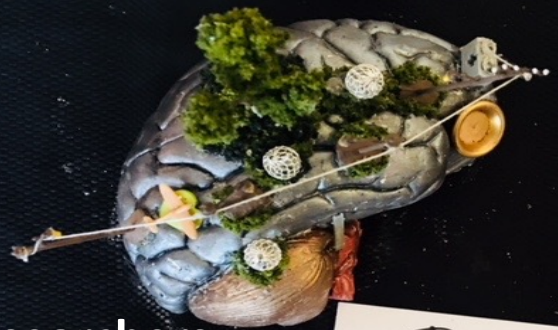
HOMELESSNESS & THE BRAIN

Thurs, Oct 19th
10am - 1pm



p:ear

Researchers
Clinicians
Policy makers
Houseless youth



Bunny:
"we are all
connected"

p:ear mentor gallery
338 NW 6th Ave

nwnoggin.org pearmentor.org

STREET KIDS
ART
NEURO-
SCIENCE

Rural Outreach

TO GO PLACES!

Siletz, Amity &
Willamina, OR
Pop: 4,000

Davenport, WA
Pop: 1,700

La Grande, OR
Pop: 13,000

Heppner & Lone, OR
Pop: 1,240

Meservy
Meadows,
OR Pop: ~40

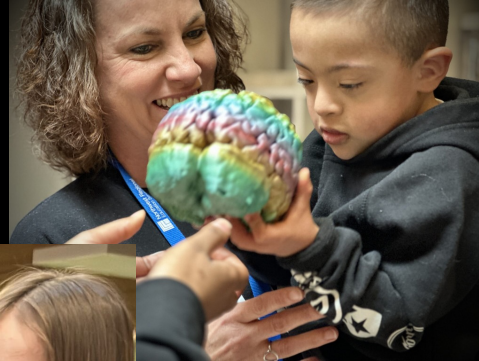


Synapses, Stories and Song!



Tribal majority schools

Noggin + TRIO



Oregon Coast Spring, 2023

Noggin + TRIO

Noggins on the Coast

Community
Connections

NOGGINS ON THE OREGON COAST 23

Y Dormitory, Astoria

nwnoggin.org



Community!



Art!

Fort George Brewery, Astoria



Rosebriar Mansion, Astoria

*Clatsop Community College
TRIO Program*

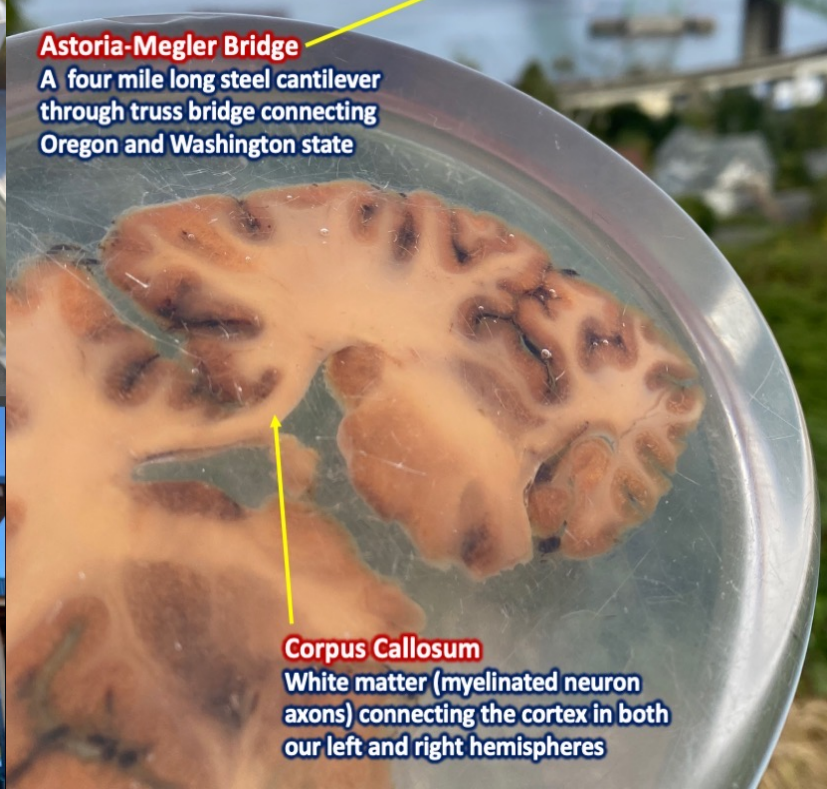


Brains!

Astoria Coop



*Peter Pan
Market, Astoria*



Astoria-Megler Bridge

A four mile long steel cantilever
through truss bridge connecting
Oregon and Washington state

Corpus Callosum

White matter (myelinated neuron
axons) connecting the cortex in both
our left and right hemispheres

THANK YOU FOR SUPPORTING
ART/NEUROSCIENCE OUTREACH!





N.W. Noggin
@NWNoggin

“What causes that feeling of #paralysis as you’re falling asleep? Does #daylightsavingstime affect sleep? Why is #sleep important for #brains? What brings on #nightmares?”

#nwnoggin @ #astoriaoregon high school
🎨👉 nwnoggin.org/event/noggins-...

#outreach #allvolunteer ❤️



N.W. Noggin
@NWNoggin

“Can you get a #concussion in your #entericnervoussystem or #microbiome? Is the #brain like a computer? What part of the brain is involved w/#rhythm & making your foot tap? Do you ever see a brain that’s smooth?”



N.W. Noggin
@NWNoggin

“I saw #mycelium in the forest and it looks like #brain cells 🍄! I think my #brain learns through stories” 🤗
🧠👉🐼🤗! Yes ❤️

Some of the deepest insights and questions from #preK today 😊😊

#nwnoggin #oregoncoast 🐦🌊👉👉
nwnoggin.org/event/noggins-...



N.W. Noggin
@NWNoggin

“Does #alcoholism run in families? How does smoking cigarettes affect the brain? What about #cannabis? What happens in your #brain if you have #ADHD? #DID? Why are drugs more dangerous for kids?”

GREAT QUESTIONS @ Seaside Middle School 🧠👉
😊👉 nwnoggin.org/event/noggins-...




Neuroscience & Law

To listen, learn, empower & make change



Youth get visual, hands-on experience with the brain

NW Noggin, a neuroscience outreach nonprofit, reached out to youth at MacLaren Youth Correctional Facility this week to teach about brain development.

 Lindsay Keefe on January 24, 2019



MacLaren Youth Correctional Facility



At SfN conferences



Posters, art of neuroscience *and...*



Public School visits

Public outreach and connection

And also to Capitol Hill

More connections: Congressional office visits
Congressional Neuroscience/STEAM briefing

“Bipartisan”
neuron



Research should inform policy

NOGGINFEST!

Music, art, research,
brains, all ages, FREE

Noggin Fest 2023

SCHEDULE OF EVENTS

4:00 - 6:00pm

Art and BRAINS!

6:00 - 8:25pm

NOAH MILMAN, Oregon Health & Science University

"Loss of sleep when its needed most - Consequences of persistent developmental sleep disruption: Lessons from prairie voles"

6:30 - 6:55pm

LO 910

7:00 - 7:25pm

AUSTIN SCHURCKE, Oregon Health & Science University

"Brains In a Dish: What Cortical Organoids can Teach us about Brain Development, Pliability, and Evolution"

7:30 - 7:55pm

CAFE MEASLES

8:00 - 8:25pm

KOKANNE BAIN-BALES AND BLAKE LEE, Oregon State University

"Brain biology: What sheep and mice neurons are teaching us about our own reproductive axis"

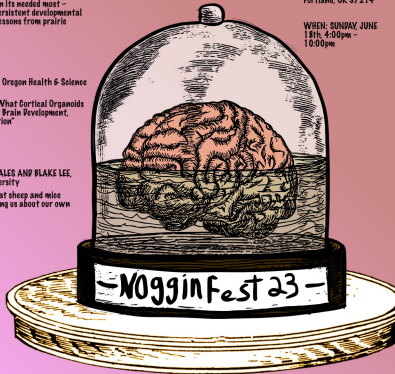
8:30 - 8:55pm

WOLF

JOIN US: This is the largest student-run, accessible, public celebration of music, art and interdisciplinary neuroscience in the Pacific Northwest! And it's FREE!

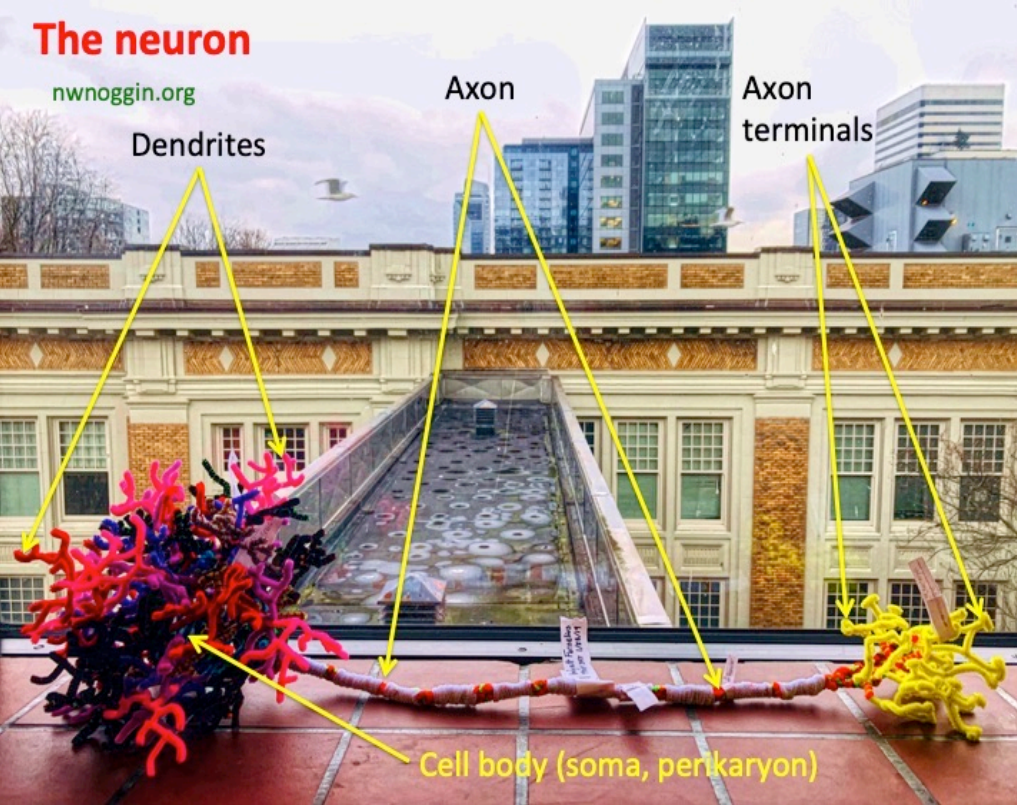
WHERE: Honey Latta Cafe, 1089 SE Main St, Portland, OR 97214

WHEN: SUNDAY, JUNE 18th, 4:00pm - 10:00pm



The neuron

nwnoggin.org



MAKE YOUR OWN: Details @ nwnoggin.org

Pipe cleaner brain cells!

Making a pipe cleaner neuron...

1. Start with a good amount of (colorful) pipe cleaners, I have 20 here.



2. Create the soma or cell body by linking several pipe cleaner hoops together.



3. Attach dendrites to your soma by wrapping them around the soma pipe cleaners.



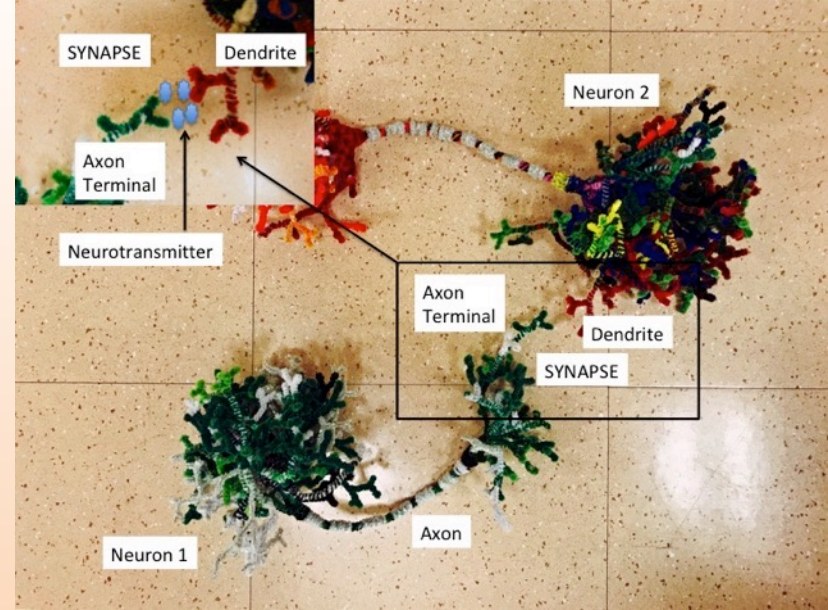
4. Attach axon terminals to the other end of your axon.



5. Wrap myelin around your axon.



6. Create a nucleus for your soma by wrapping two pipe cleaners around each other. Attach your nucleus inside your soma. You have a neuron!



MAKE CONNECTIONS

MAKE ART



Neurons are a type of brain cell

The majority of neurons share some basic features

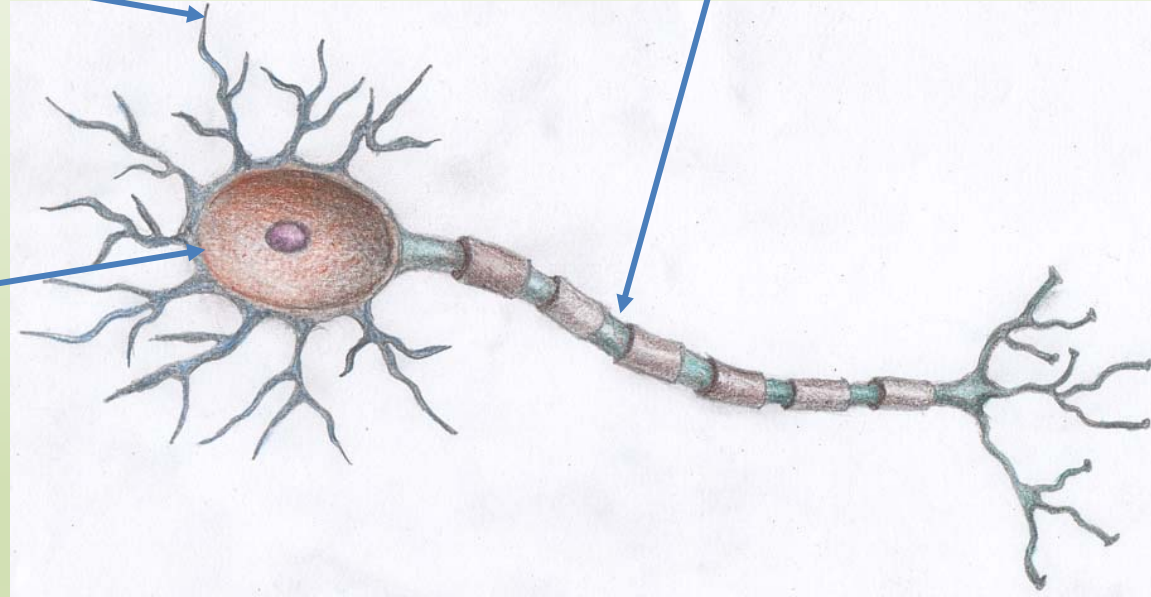
Dendrites

(Receive input from other neurons at gaps called **synapses**)

Cell Body

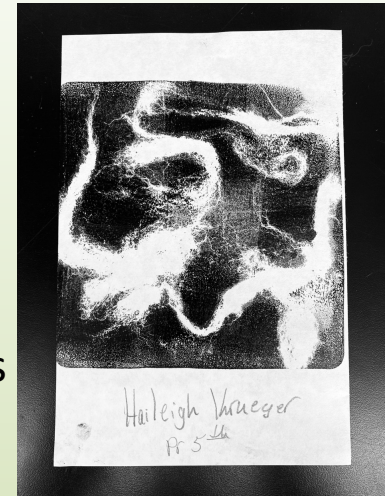
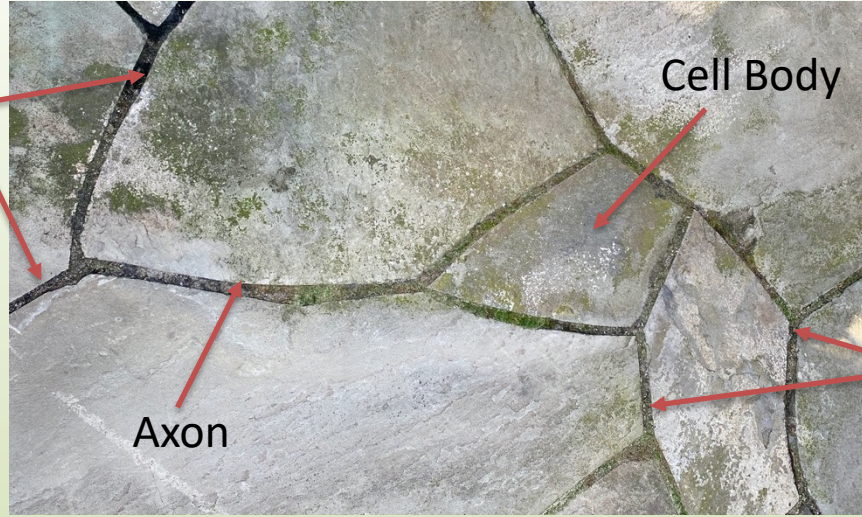
(or Soma, location of **nucleus** and cell **DNA**)

Axon (Carries electric message)



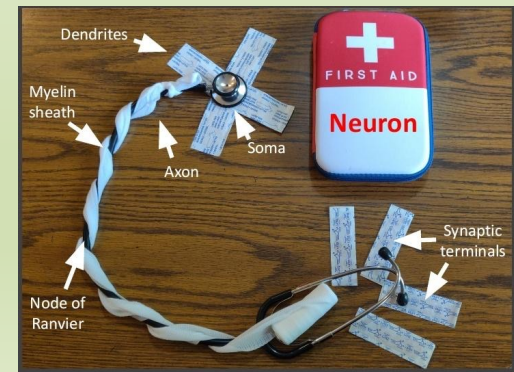
Found Object Brain Cells

Take a look around you, what things do you see that share those structures?



Can you construct a neuron out of things that you find?

What things for you represent the function of a neuron? Or the function of specific parts of a neuron? Do those things have personal meaning, or say something about you?



Seaweed Neuron

Dendrites



Cell body (or soma)

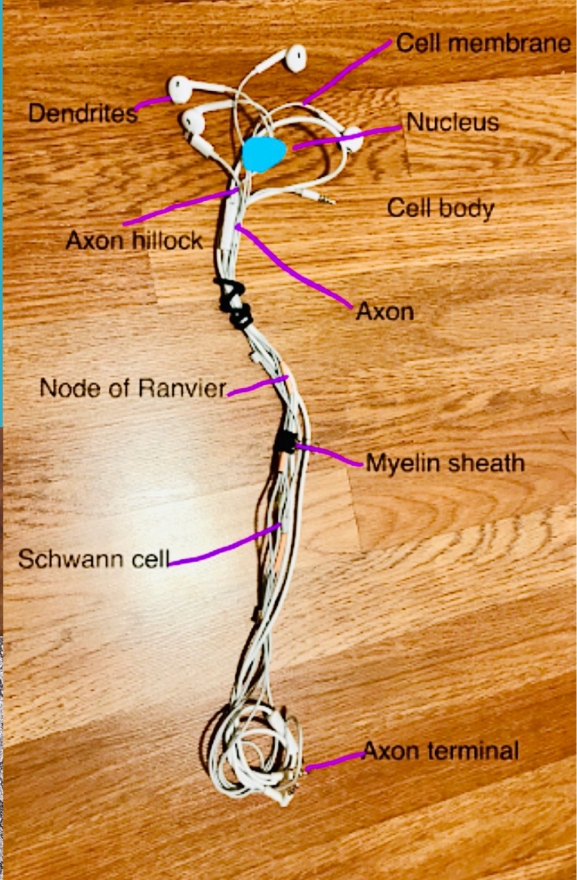
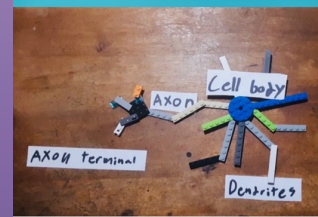
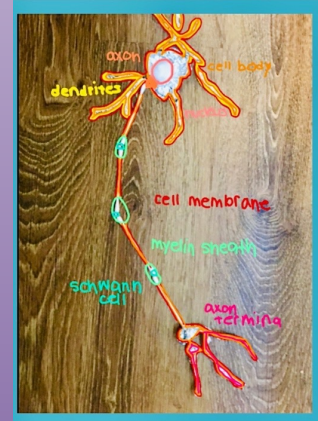
Axon

Axon Terminals

From Plage des Chevrets in St-Coulomb in Northern Brittany, France

By Leigh Wilson, Kings College London

#showusyourbraincell



#showusyourbraincell

Neuron



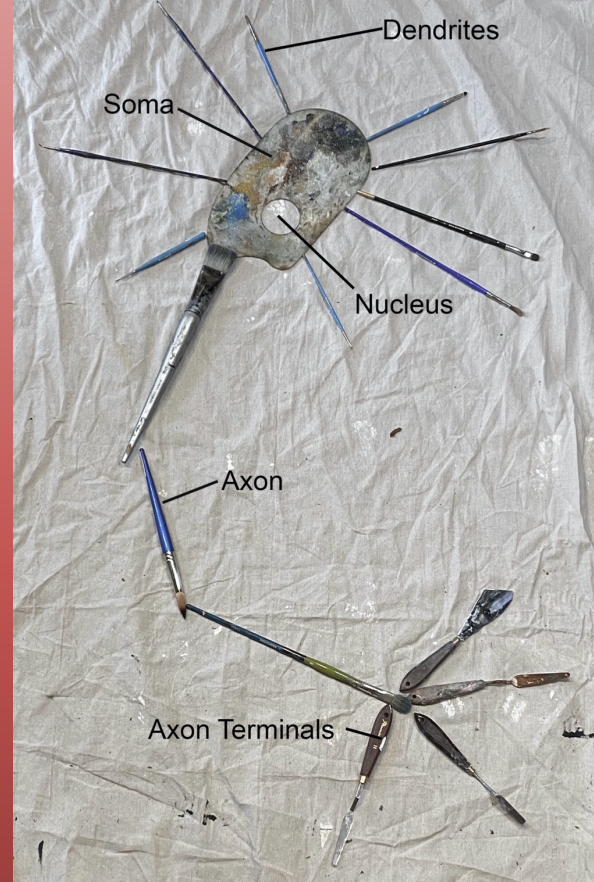
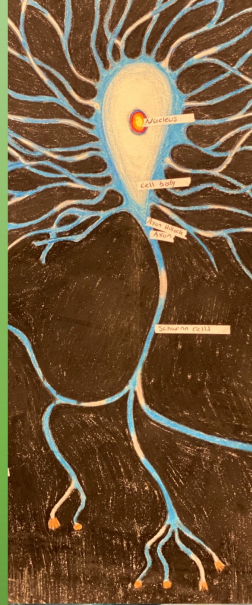
Dendrites

Soma

Axon

Axon terminals

#showusyourbraincell



Dendrites

Soma

Nucleus

Axon

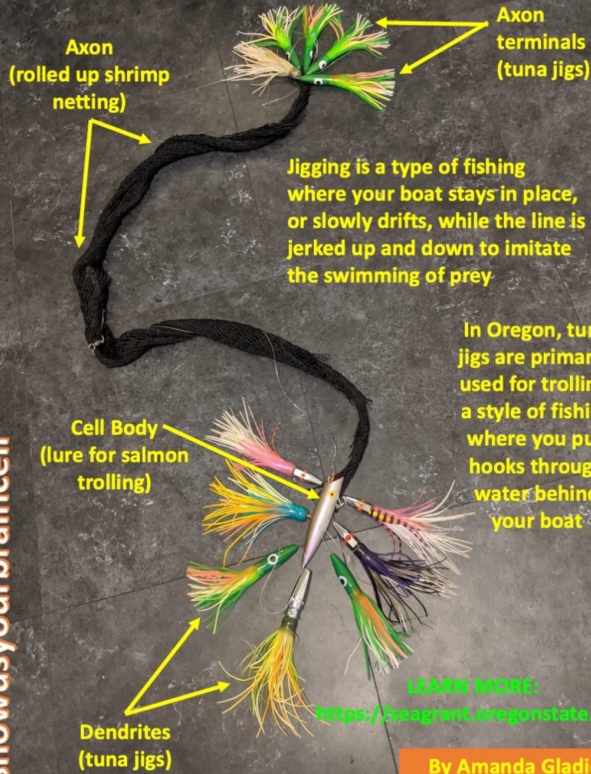
Axon Terminals



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Tuna Jig Neuron

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Jigging is a type of fishing where your boat stays in place, or slowly drifts, while the line is jerked up and down to imitate the swimming of prey

In Oregon, tuna jigs are primarily used for trolling, a style of fishing where you pull hooks through water behind your boat

LEARN MORE
<https://Seagrant.oregonstate.edu>

By Amanda Gladics,
Oregon Sea Grant, OSU

Serotonin Flow



By Sai Kiersarsky

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ANY BRAIN CELLS
Astrocyte
Pyramidal neuron
Photoreceptor
Inner hair cell
Nociceptor
Cerebellar granule cell
Meissner's corpuscle

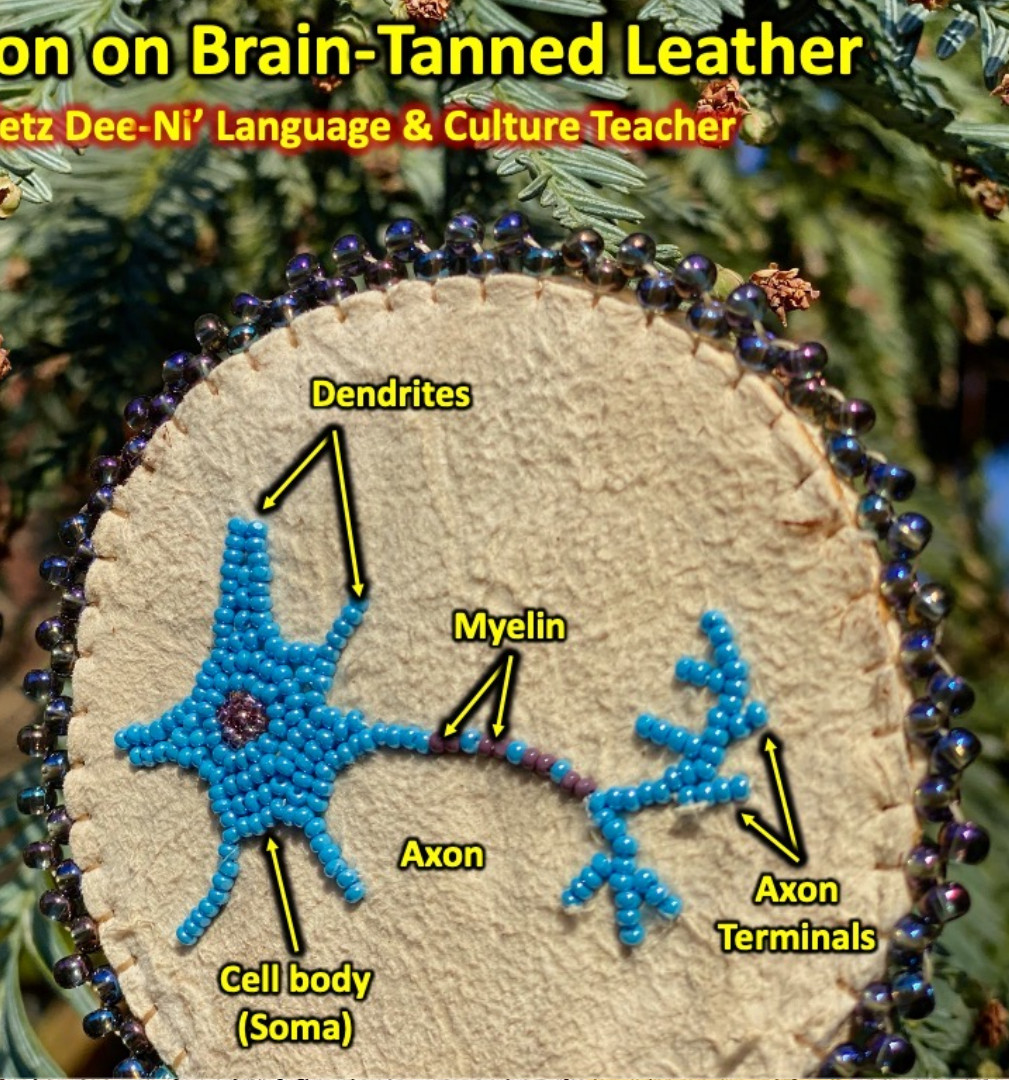


Beaded Neuron on Brain-Tanned Leather

By Theresa Smith, Siletz Dee-Ni' Language & Culture Teacher

"Every animal has enough brains to tan its own hide"

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nwnoggin.org





#showusyourbraincell

#showusyourbraincell

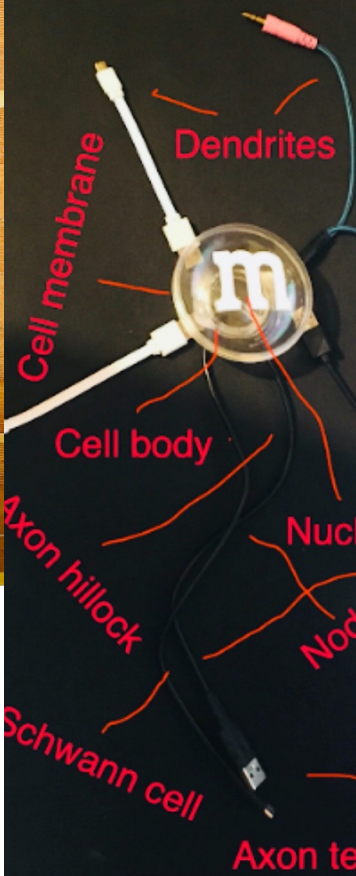
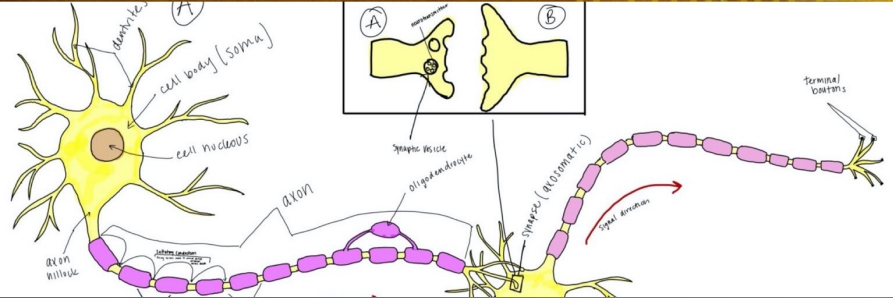
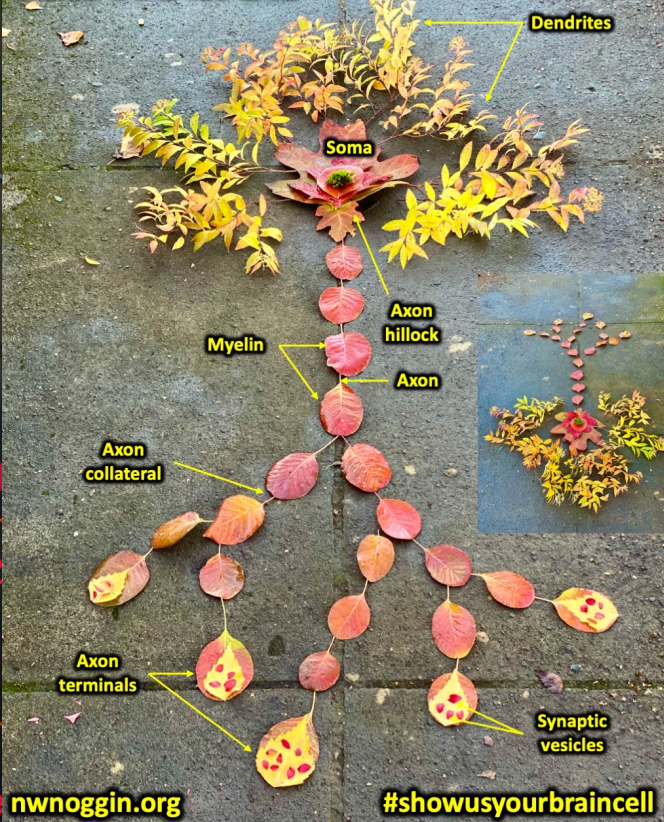
Gorgeous hand-crafted photoreceptors by artist Darrin Lane

nwnoggin.org

Neuron from the coat rack



Fall Neuron



Axon terminals nwnoggin.org

#showusyourbraincell

#showusyourbraincell

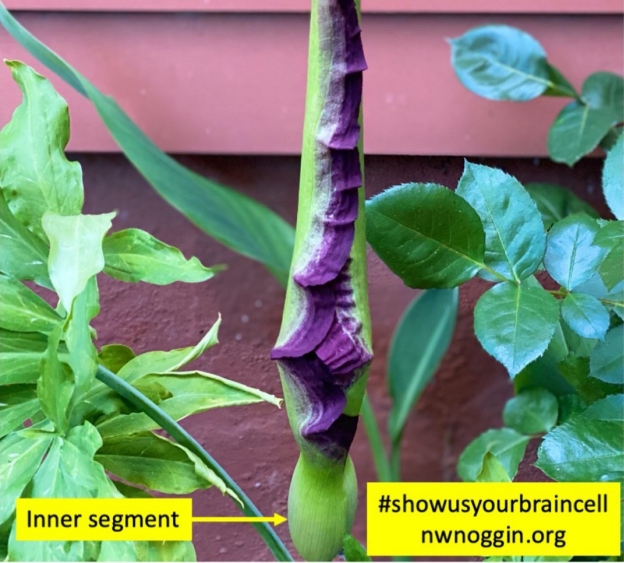
Dracunculus Vulgaris

Smells like rotting flesh
Pollinated by flies

Or...retinal cone cell?

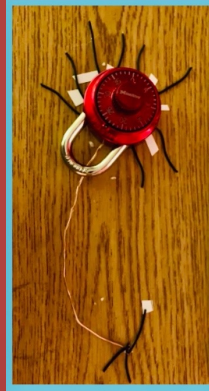
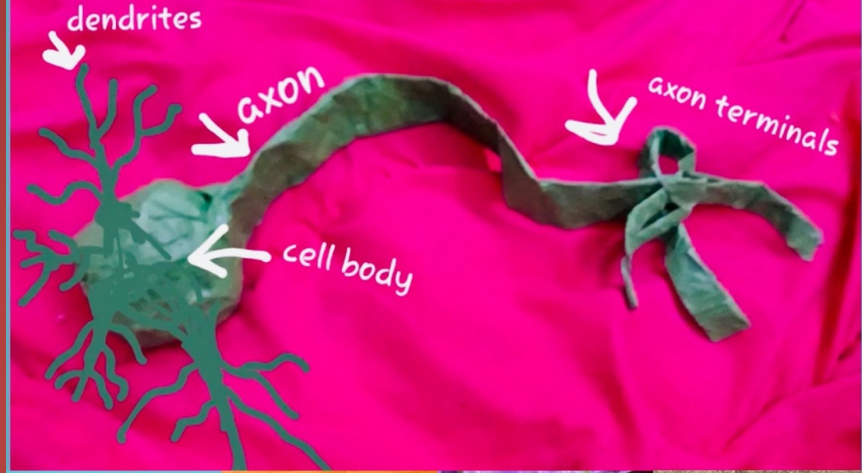
Membranous disks
(sites of photopigment)

Outer segment



Inner segment

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Taste afferent

Taste afferents are arranged like sections of an in **taste buds** on your tongue, with tiny **microvilli** poking out of **taste pores** for detecting chemicals (**tastants**) in food.



nwnoggin.org



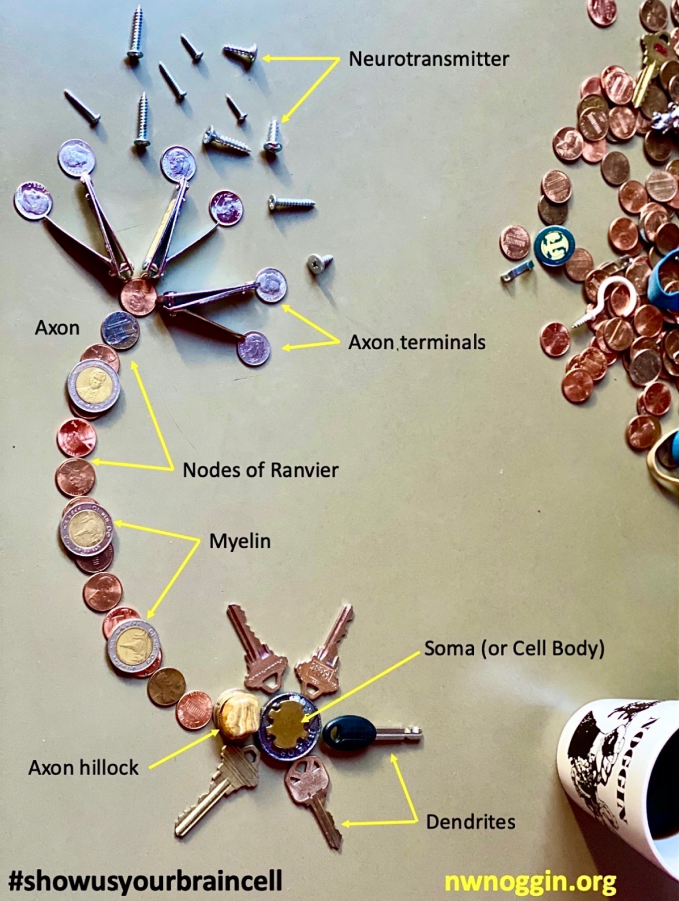
Microvilli
Site of receptor proteins that bind chemicals you can taste (tastants)

Nucleus

#showusyourbraincell

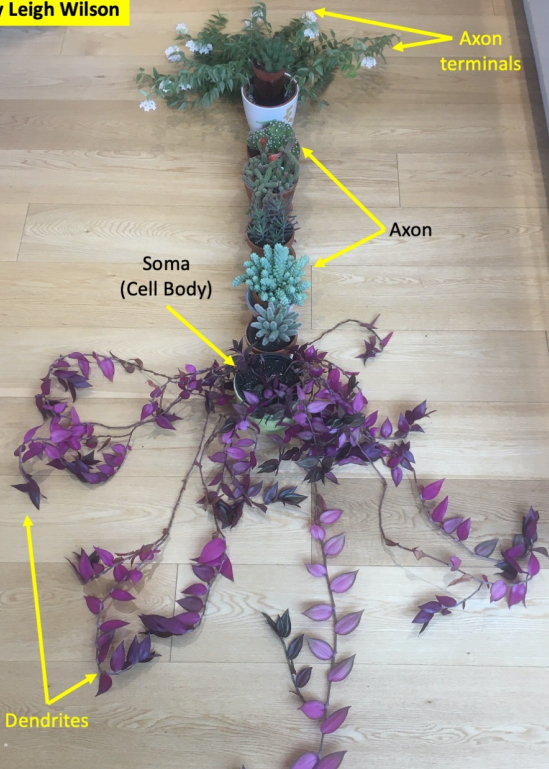


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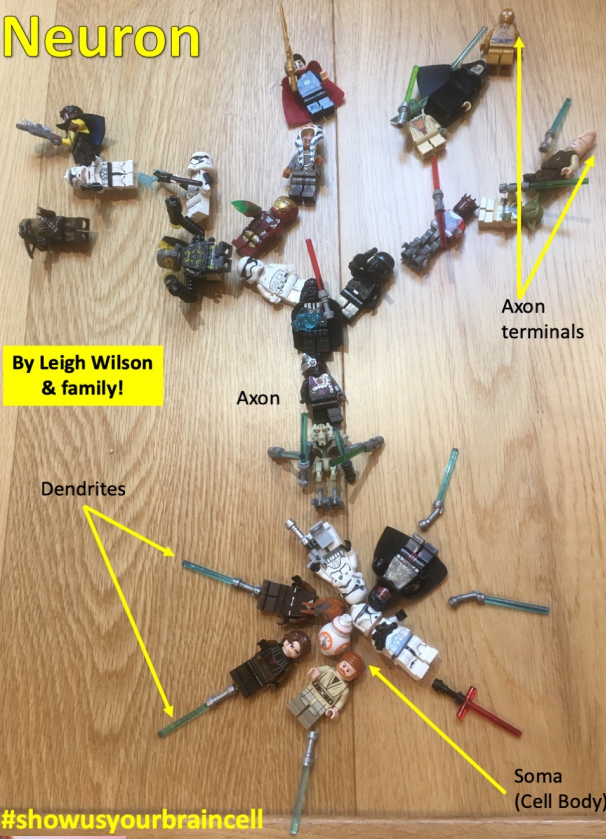
By Leigh Wilson



Neuron

#showusyourbraincell

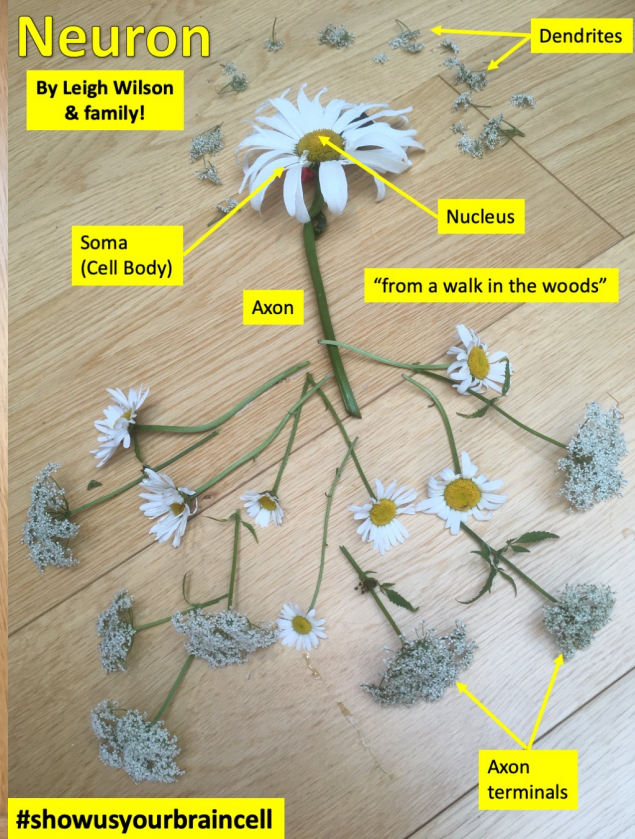
Neuron



By Leigh Wilson & family!

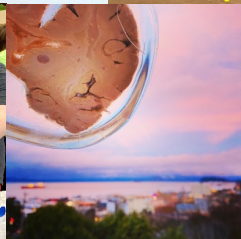
#showusyourbraincell

Neuron



By Leigh Wilson & family!

#showusyourbraincell



#showusyourbraincell

Tear Gas Neuron

Portland Police collaborated with white nationalist gangs & used chemical weapons of war on citizens

Portland Police, county sheriffs, Oregon state troopers, federal DHS officers & armed members of regional hate groups **attacked Portlanders & press** with tear gas & impact munitions **for more than *5* months in 2020.**

Chemicals in tear gas cause and worsen respiratory ailments

Portland Police Bureau officers used force "more than 6,000 times" during "crowd-control events" from 5/29 - 11/15 -U.S. Department of Justice

These dendrites are clips from CS gas canisters deployed by the Portland Police, **under Police Commissioner & Mayor Ted Wheeler**, against people protesting ongoing racism and police violence against BIPOC Americans.

Portland, OR 2020

nwnoggin.org

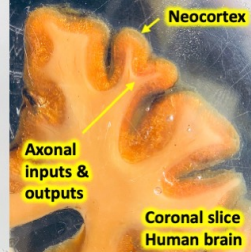
#showusyourbraincell



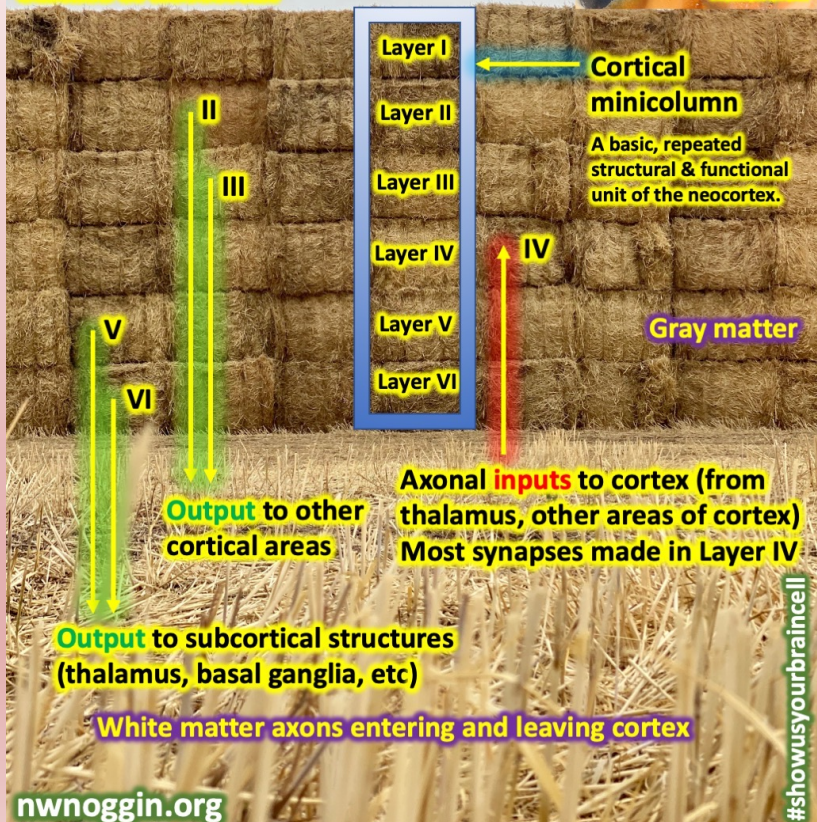
#showusyourbraincell

NEOCORTEX

From straw bales in Union County, Oregon



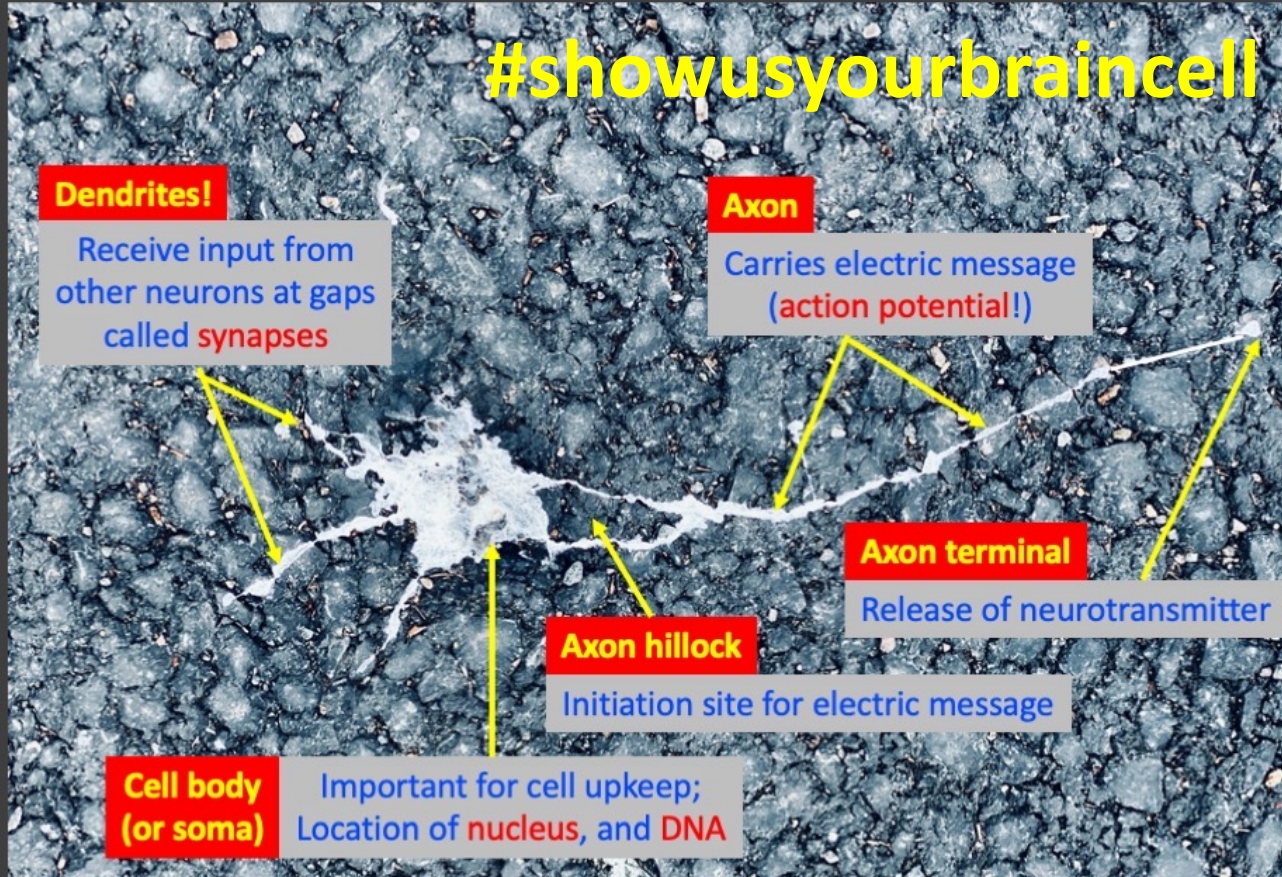
Surface of neocortex



#showusyourbraincell

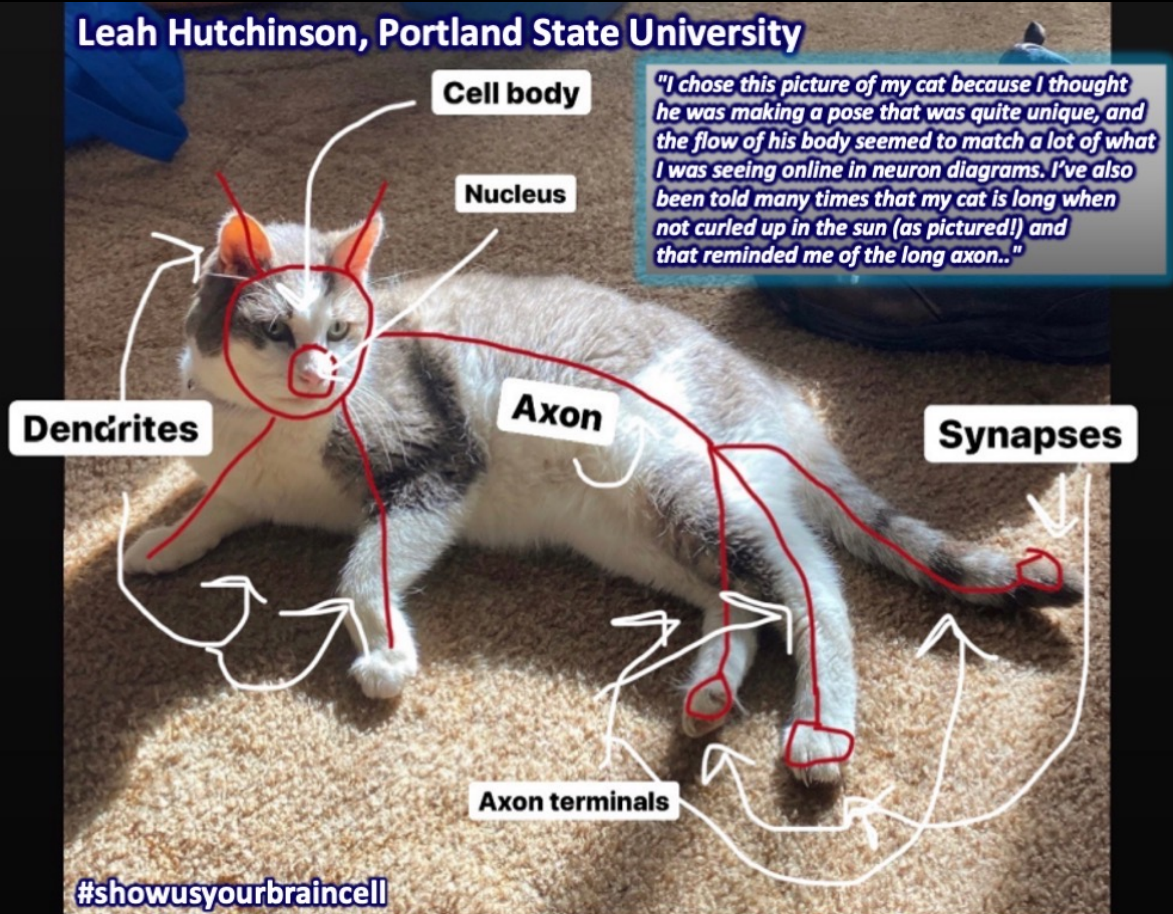
You can find neurons everywhere!

#showusyourbraincell



Everywhere!

Leah Hutchinson, Portland State University



"I chose this picture of my cat because I thought he was making a pose that was quite unique, and the flow of his body seemed to match a lot of what I was seeing online in neuron diagrams. I've also been told many times that my cat is long when not curled up in the sun (as pictured!) and that reminded me of the long axon.."

#showusyourbraincell

Ready for the Hersenolympiade!

SATURDAY, 2/12
2:15pm CET/5:15am Pacific!



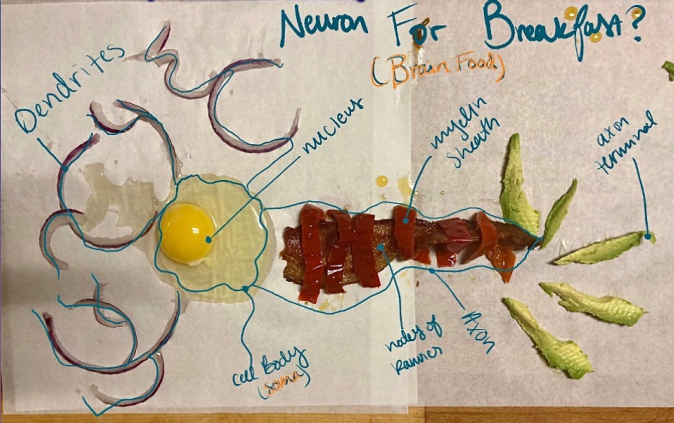
Northwest Noggin will discuss (and exhibit!) real brains, art and the intersection between the two. Join us to make your own found object brain cells and discover how the arts and neuroscience offer compelling insights into who we are.

DUTCH NEURON
By Austin Howard

nwnoggin.org

#showusyourbraincell

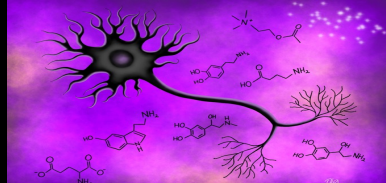
Victoria Peterson, Portland State University



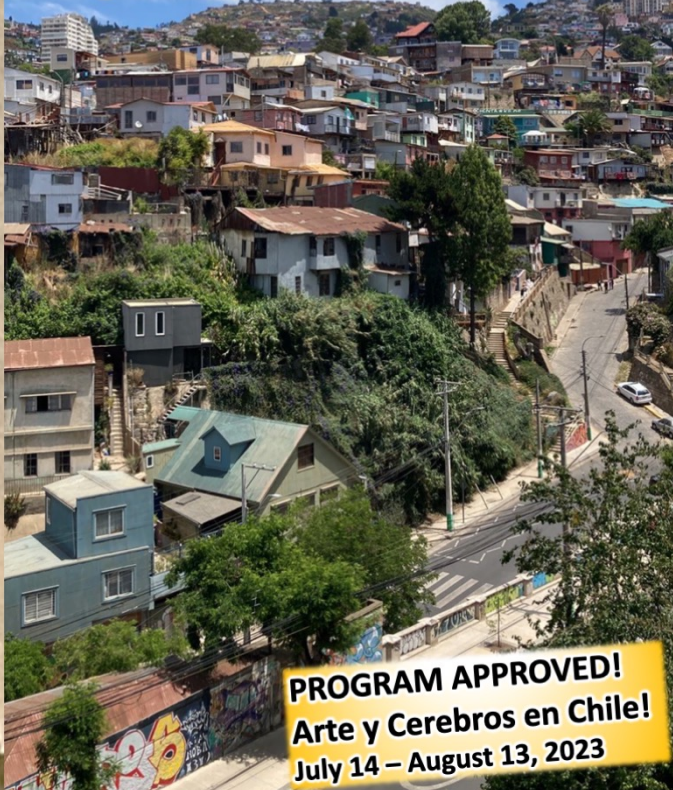
"I've always kind of thought the Soma of a neuron looked like a cracked open egg, which I spend a LOT of time looking at because I work at a cafe where we make a lot of egg sandwiches..."

#showusyourbraincell

Make your own – AND SHARE!



DID YOU KNOW that Phineas Gage lived in Valparaíso, Chile, after his infamous accident?! He drove a stagecoach from Valpo to Santiago and clearly recovered some frontal lobe function.



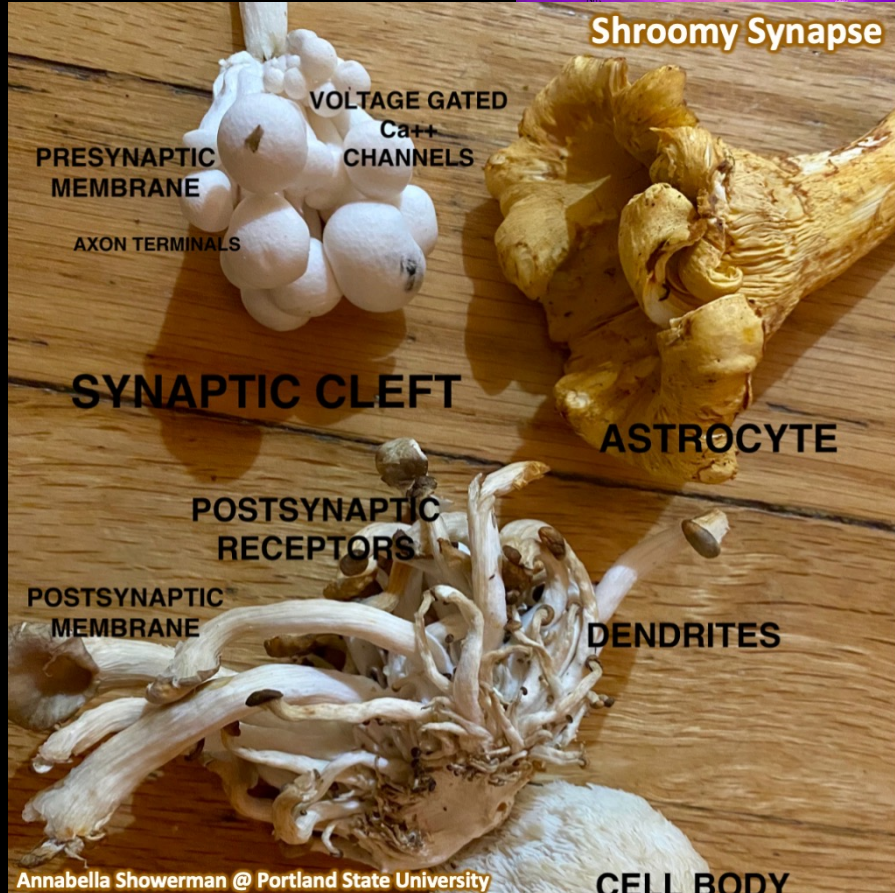
The bar that shot through the skull!

The skull



PROGRAM APPROVED!
Arte y Cerebros en Chile!
July 14 – August 13, 2023

#showyourbraincell



Annabella Showerman @ Portland State University