



Alzheimer's Disease: An Introduction

Anna Faul, PhD, Executive Director

Joseph G. D'Ambrosio, PhD, Director of Health Innovation and Sustainability

Sam Cotton, MSSW, Program Manager

Pretest

Apple

Pen

Tie

House

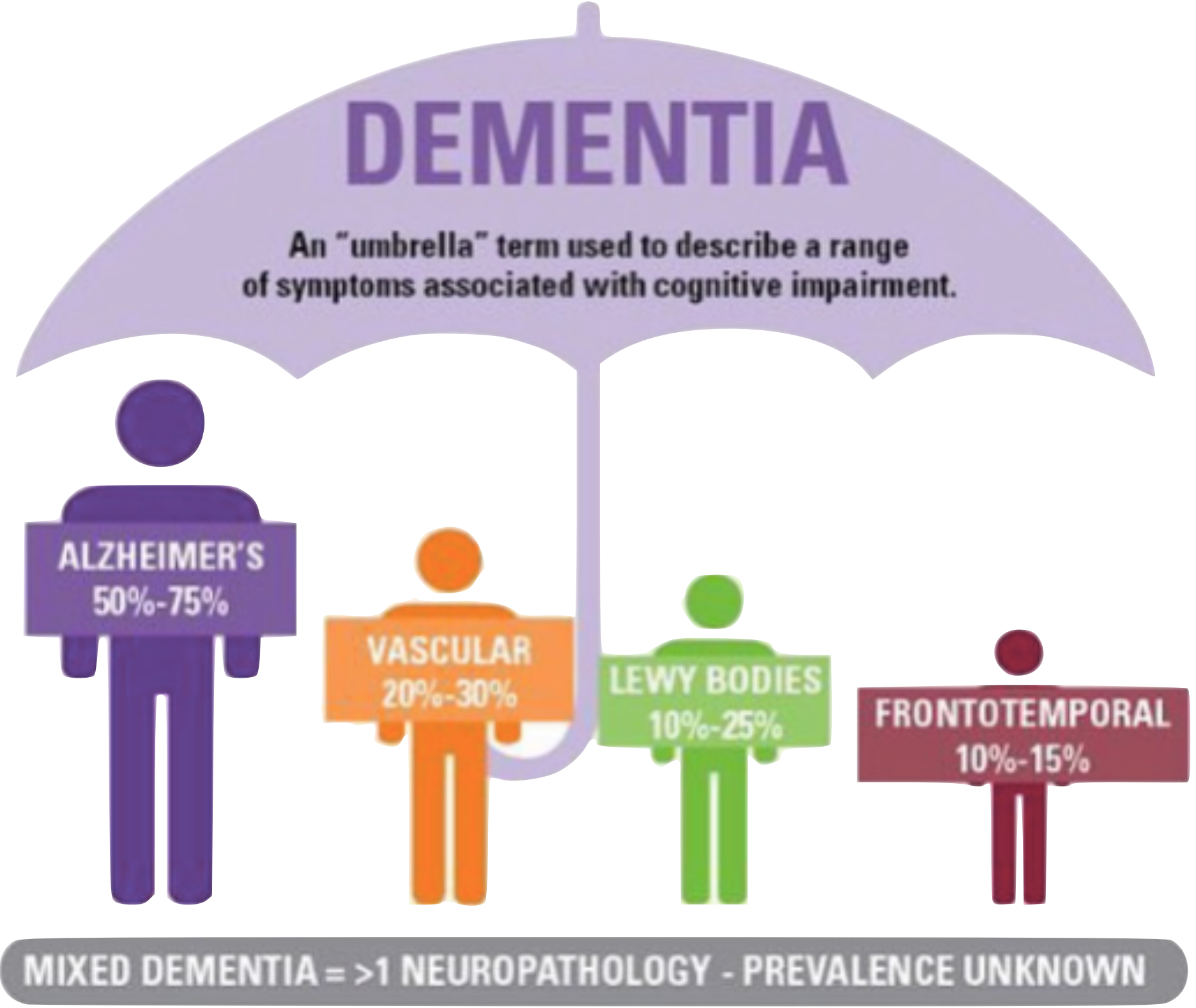
Car

What is Alzheimer's disease?

Alzheimer's Disease is an irreversible, progressive brain disease that slowly destroys memory and thinking skills

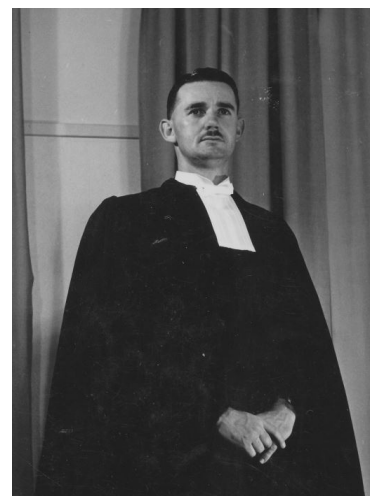


What's the difference between Dementia & Alzheimer's disease ?





The Faces of Alzheimer's Disease





Alzheimer's disease by the numbers

40 million individuals
world wide have Alzheimer's
disease.



Alzheimer's disease by the numbers

By 2050, an estimated
150 million
individuals will have Alzheimer's
disease.



Alzheimer's disease by the numbers

In the United States,
\$200 billion is spent on caregiving
for Alzheimer's disease
each year.



Alzheimer's disease by the numbers

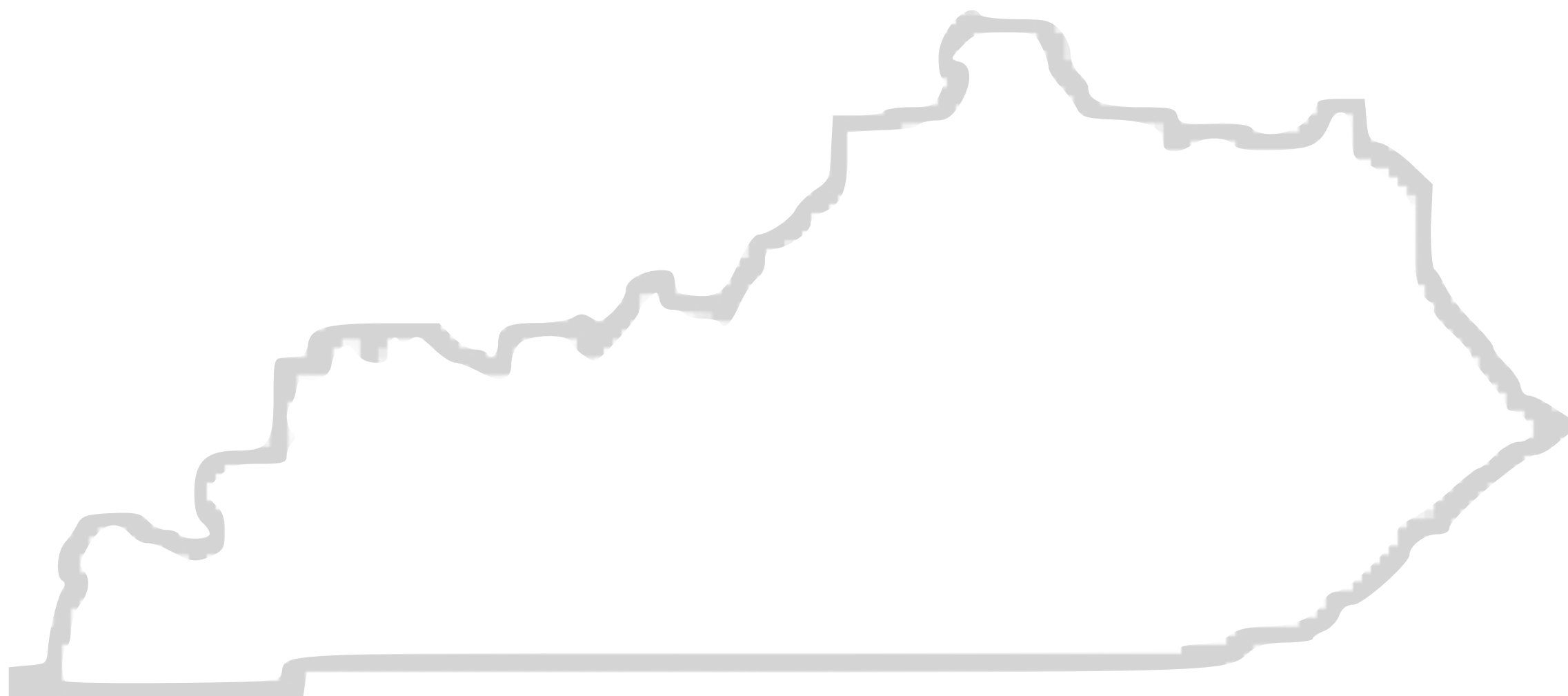
Alzheimer's disease is the **6th**
leading cause of death in the
United States.



Alzheimer's disease by the numbers

Alzheimer's disease kills more individuals each year than breast cancer and prostate cancer combined.

According to the Alzheimer's Association (2012), the projected number of individuals with Alzheimer's disease is estimated to increase by **26.5%** over the next ten years, from **68,000 to an estimated 86,000 individuals** living with Alzheimer's disease.

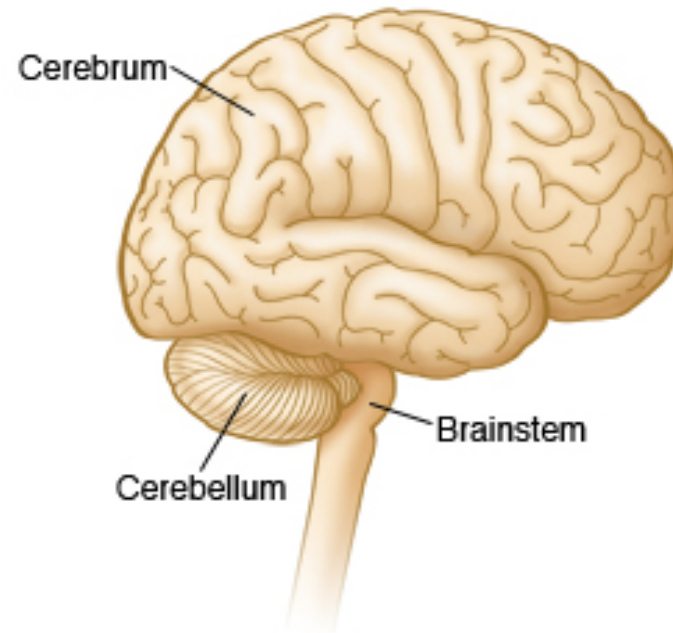


The Human Brain: A Hub of Communication



Brain Basics

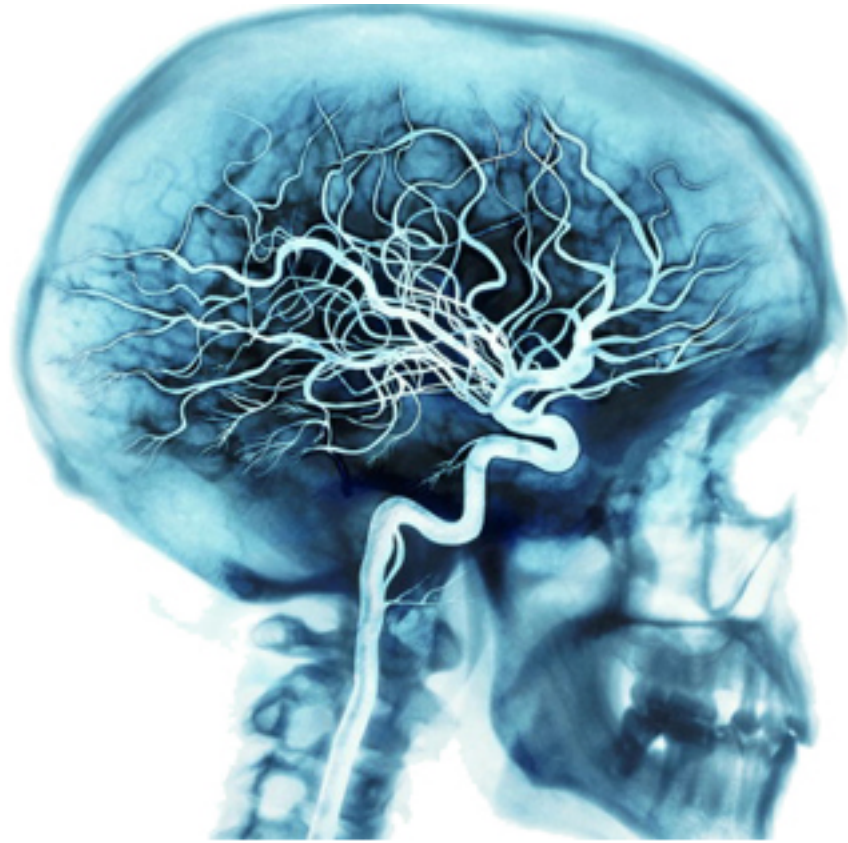
The human brain weighs around **3 pounds** and makes up about **2%** of our body weight.



It consists of **3 main parts**: the cerebrum, cerebellum & the brain stem.

The **cerebrum** is involved in remembering, problem solving, thinking, and feeling; also coordinates movement. The **cerebellum** controls coordination and balance. The **brain stem** connects the brain to the spinal cord and controls automatic functions such as breathing, digestion, heart rate and blood pressure.

Brain Basics Continued



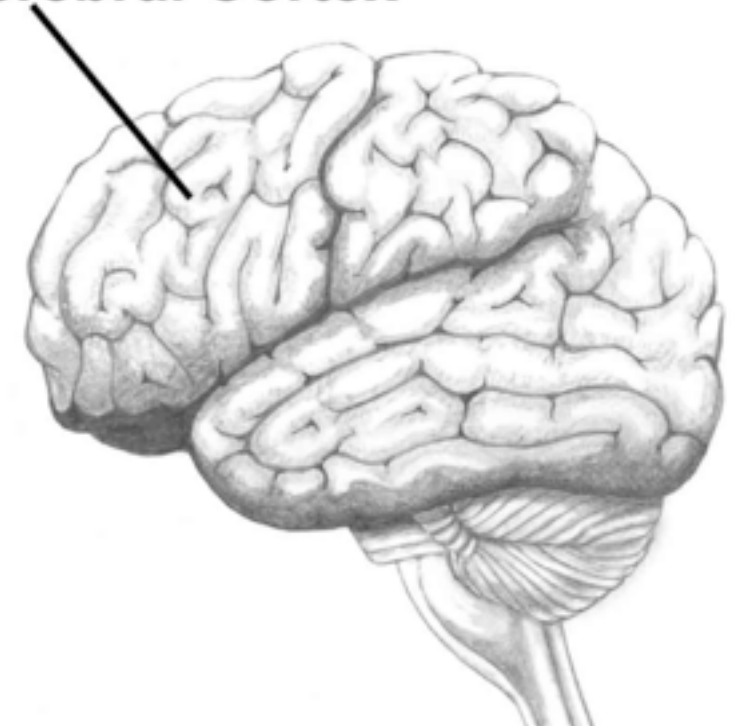
Artery and Vessel Network

With each heartbeat, arteries carry about 20 to 25 percent of your blood to your brain, where billions of cells use about 20 percent of the oxygen and fuel your blood carries.

Cortex, “Thinking Wrinkles”

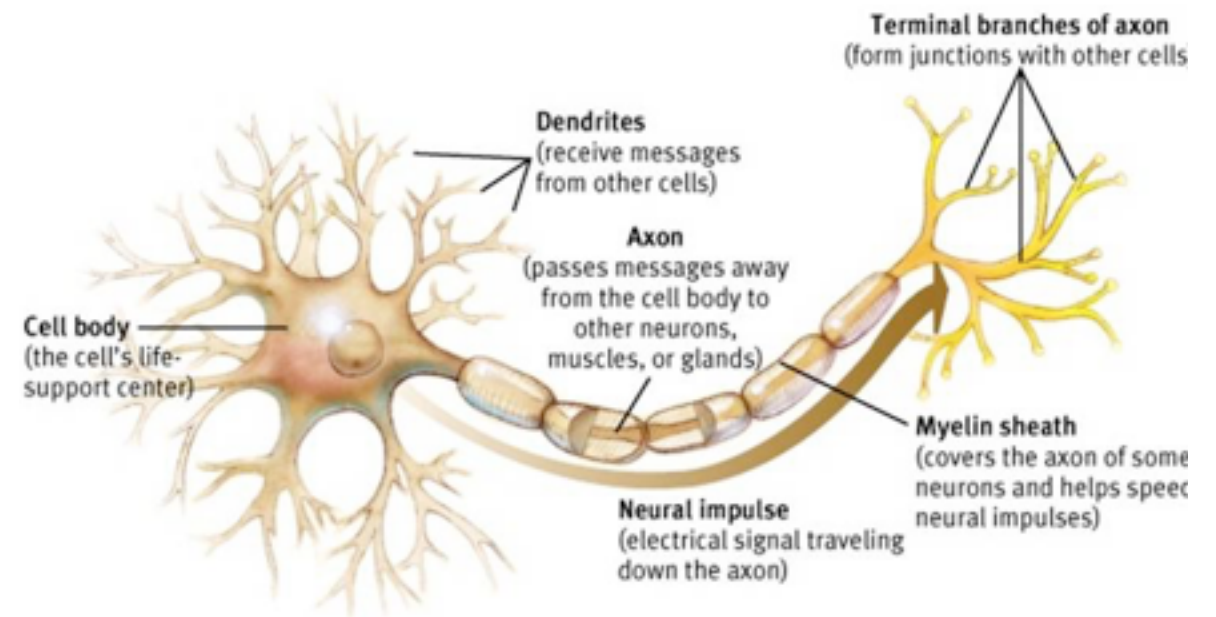
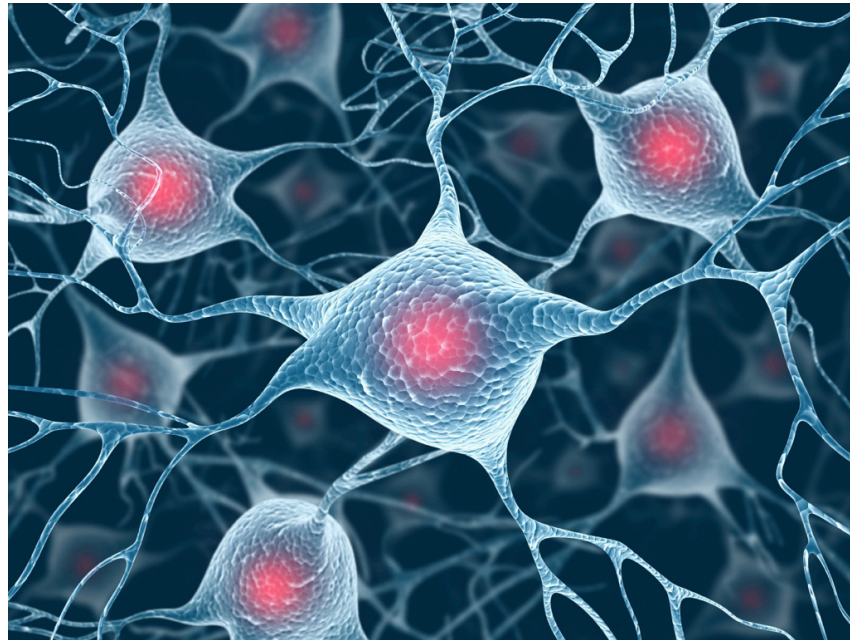
Your brain's wrinkled surface is a specialized outer layer of the cerebrum called the cortex. Specific regions of the cortex: interpret sensations, generate thoughts, form and store memories.

Cerebral Cortex



Neurons, the real MVP of the Brain

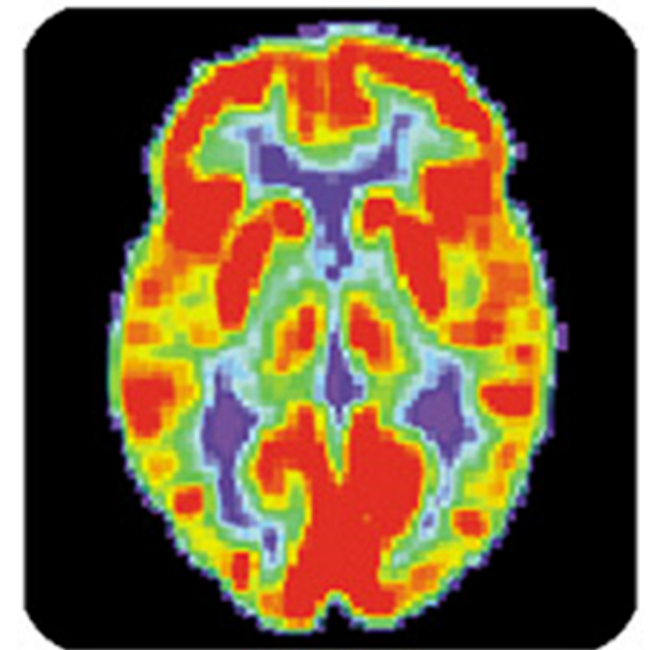
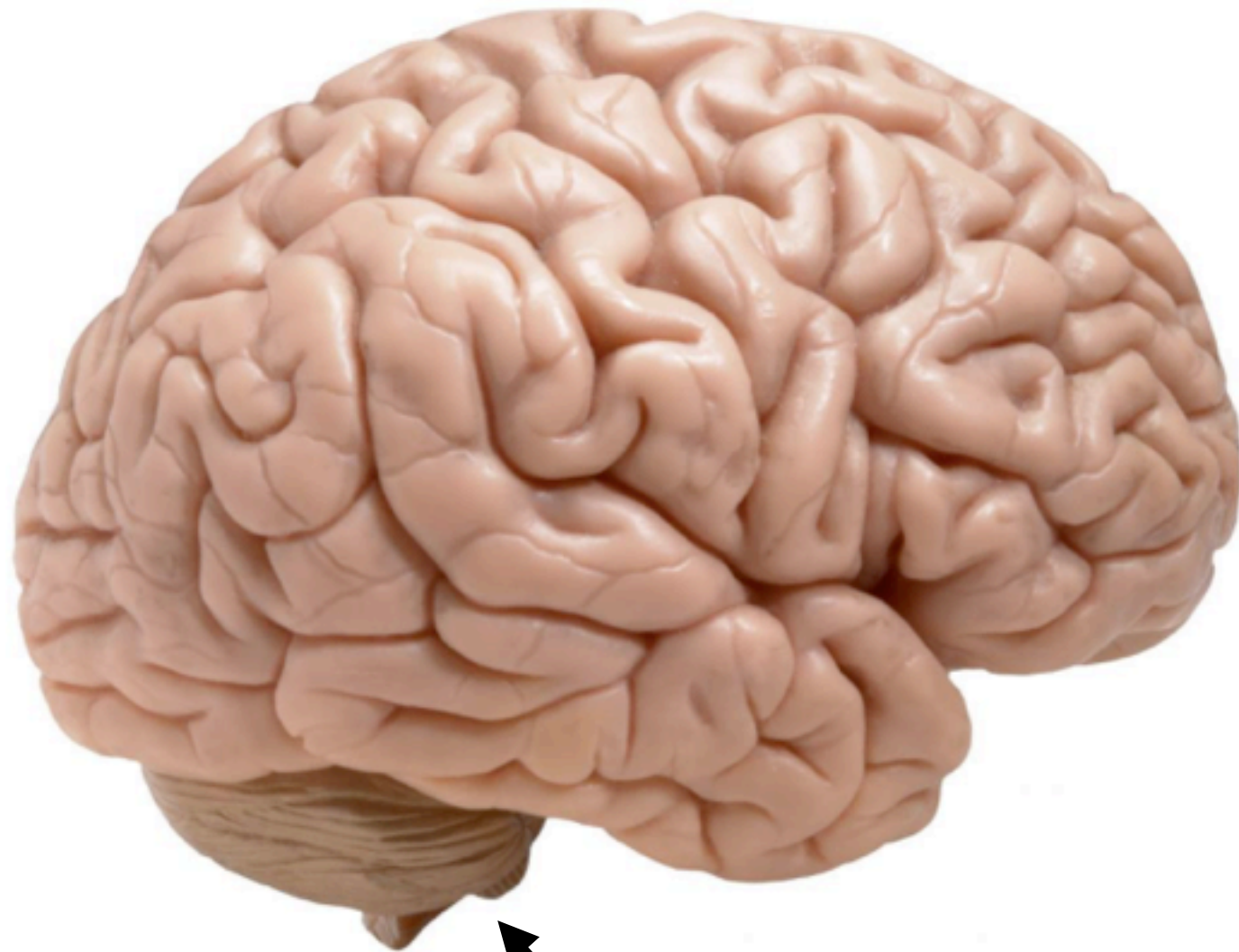
The brain has **billions** of neurons, each with an axon and many dendrites.



The ultimate relay team: Dendrites receive information from other cells and bring the information to the neuron. Axons carry that information away from the neuron.

To stay healthy, neurons must communicate with each other, carry out metabolism, and repair themselves.

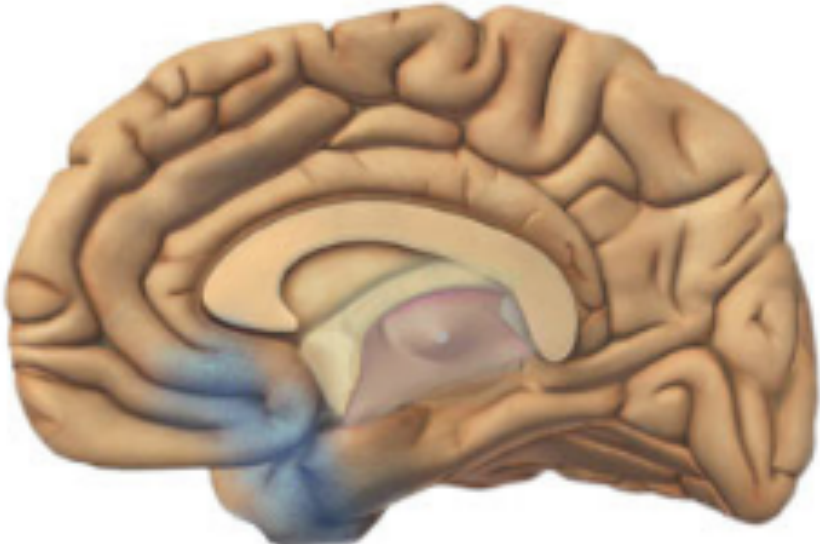
All this complex communication is taking place within here:



Healthy brain

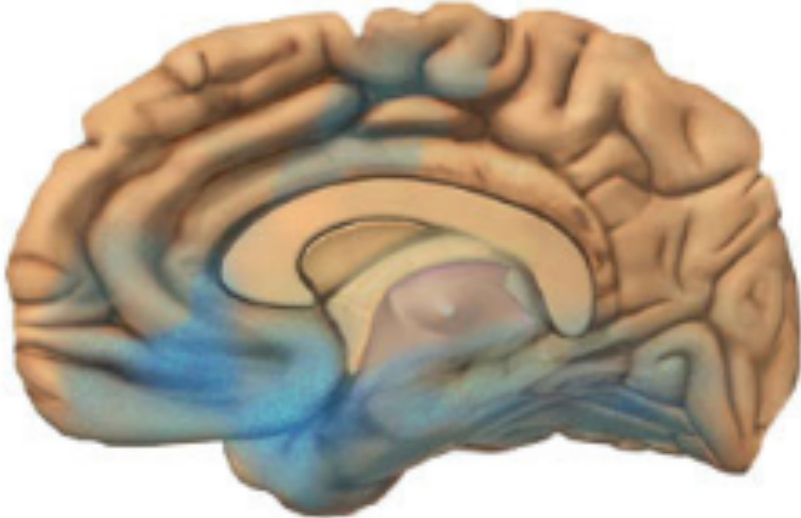
Alzheimer's disease

Preclinical Alzheimer's disease



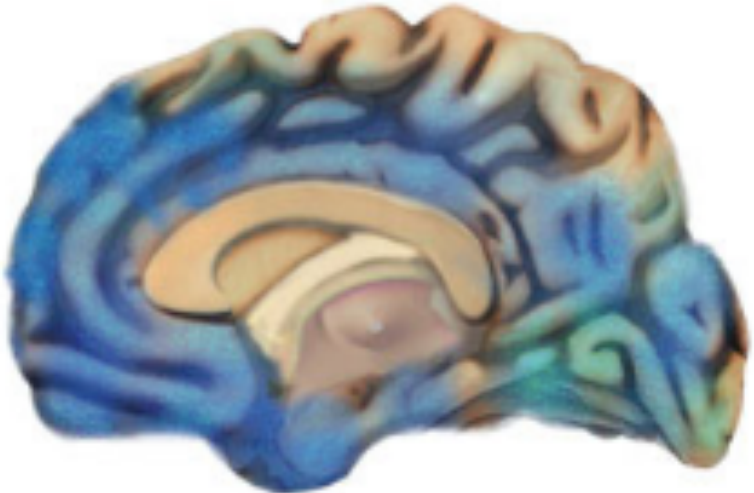
As AD progresses, neurofibrillary tangles spread throughout the brain (shown in blue). Plaques also spread throughout the brain, starting in the neocortex.

Mild to moderate Alzheimer's disease



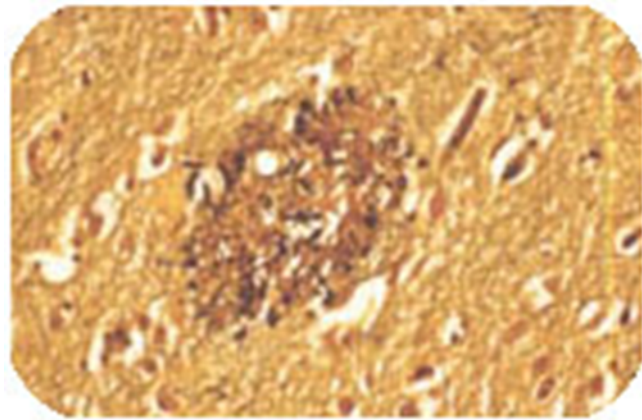
By the final stage, damage is widespread and brain tissue has shrunk significantly.

Severe Alzheimer's disease



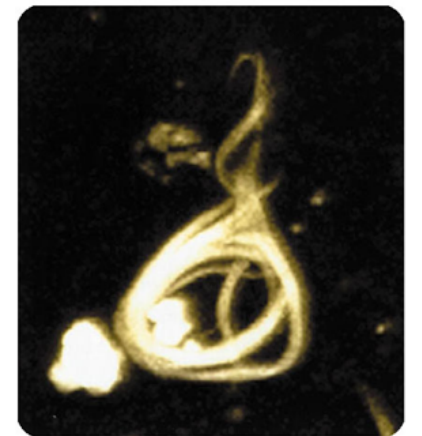
Plaques and Tangles: The Hallmarks of Alzheimer's Disease

The brains of people with AD have an abundance of two abnormal structures:

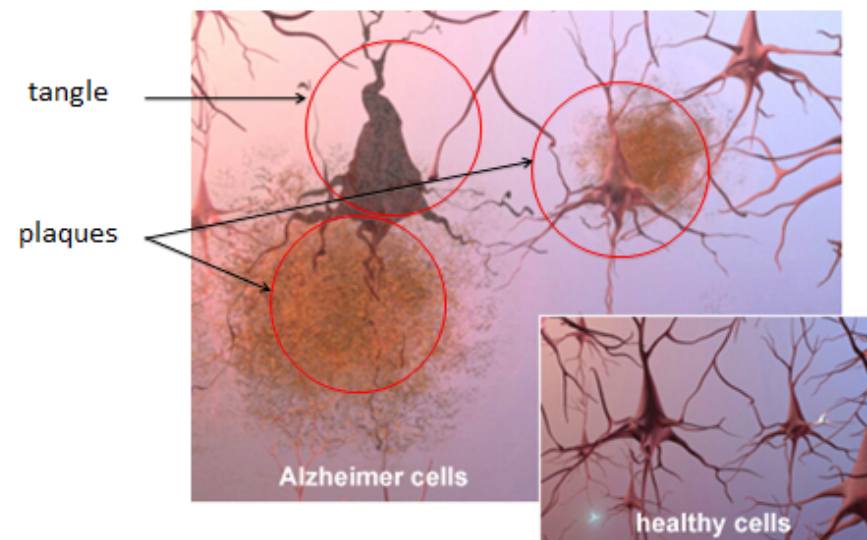


Beta-amyloid plaques, which are dense deposits of protein and cellular material that accumulate outside and around nerve cells.

Neurofibrillary tangles, which are twisted fibers that build up inside the nerve cell



Another view:



Causes?

There are 3 primary hypothesis regarding the cause of Alzheimer's disease.

1

Cholinergic hypothesis

2

Amyloid hypothesis

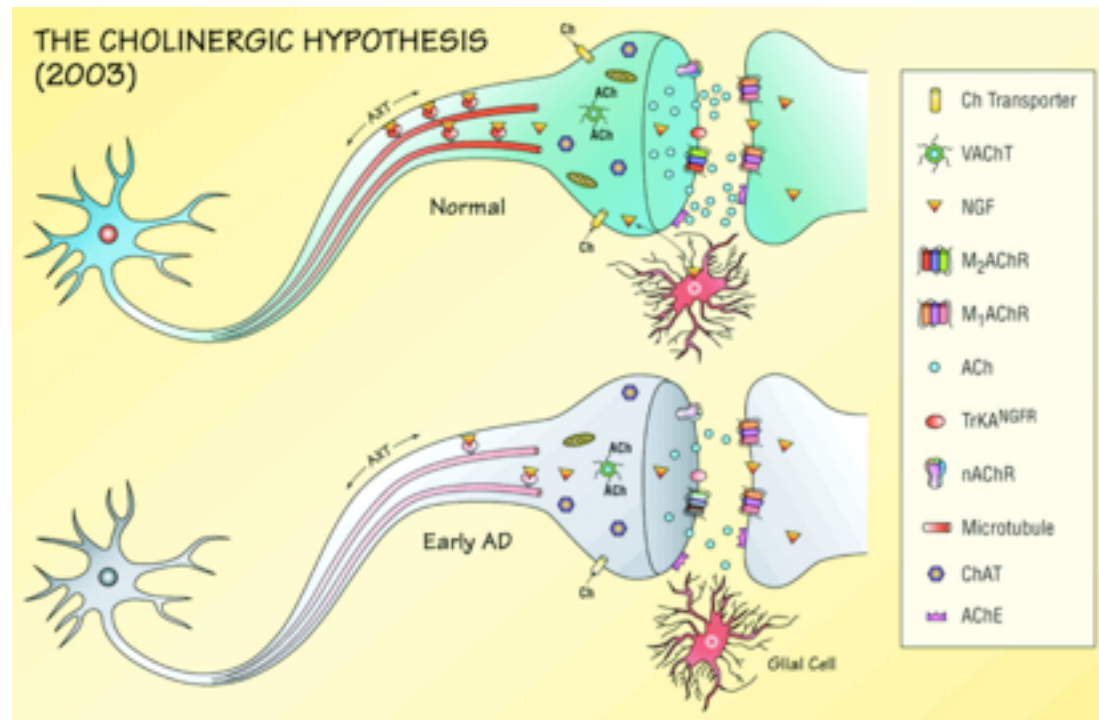
3

Tau hypothesis

1

Cholinergic hypothesis

This theory posits that AD is caused by reduced synthesis of acetylcholine.



Acetylcholine acts as a neurotransmitter in the brain, carrying *messages*.

Destruction of these neurons causes disruptions in distant neuronal networks (perception, memory, judgment).

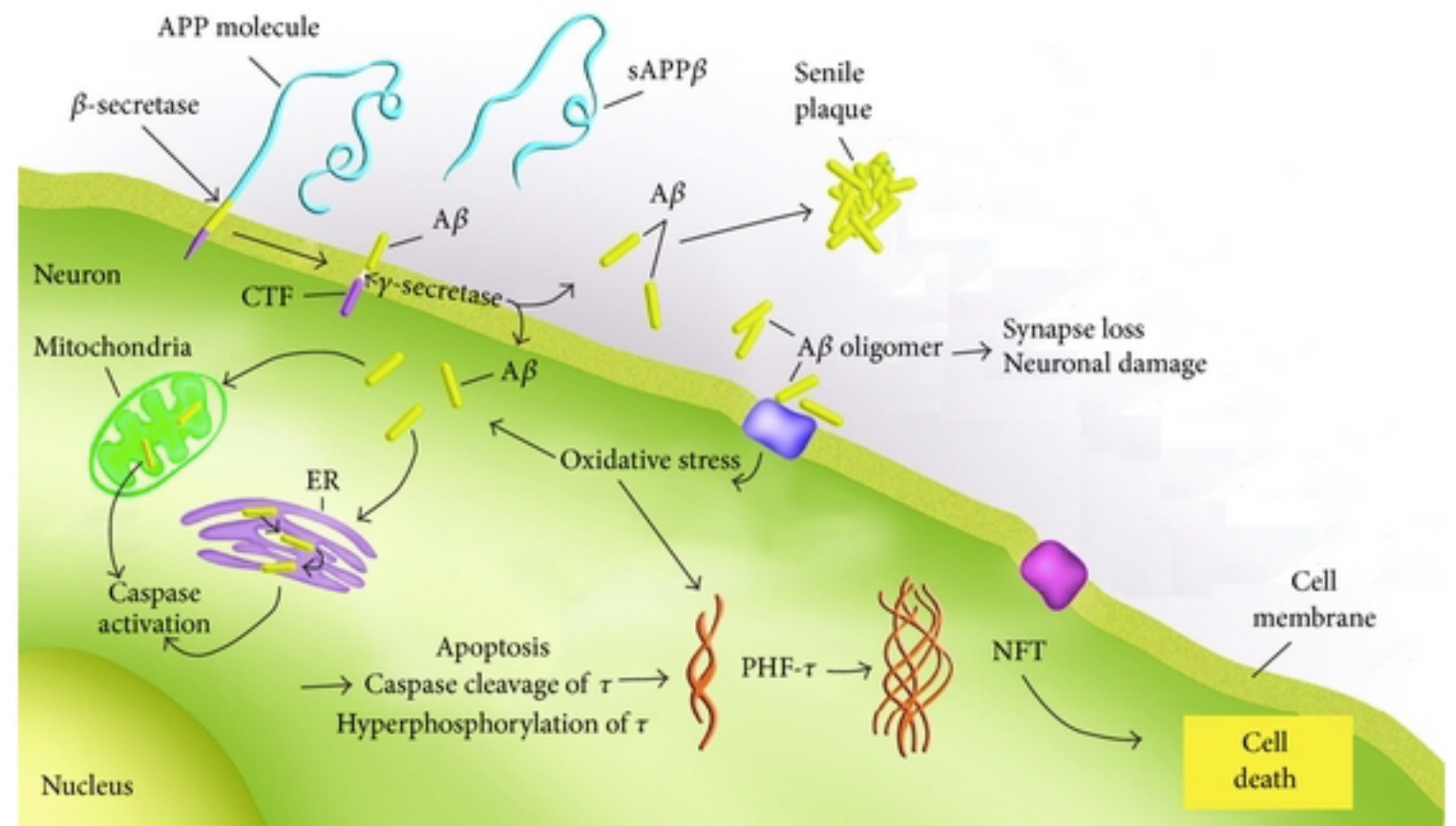
2

Amyloid hypothesis

Abnormal breakdown of neurons.

Buildup of amyloid beta deposits

Damaged amyloid proteins build to toxic levels, causing cell damage and death

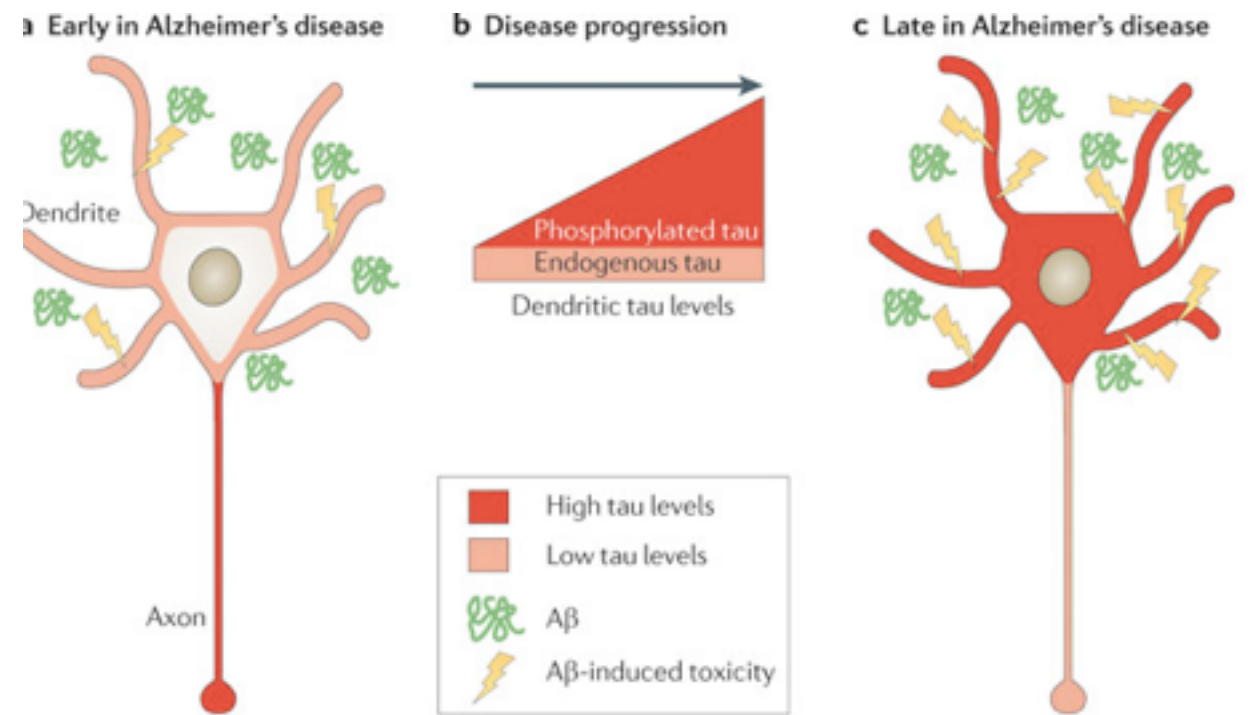


3

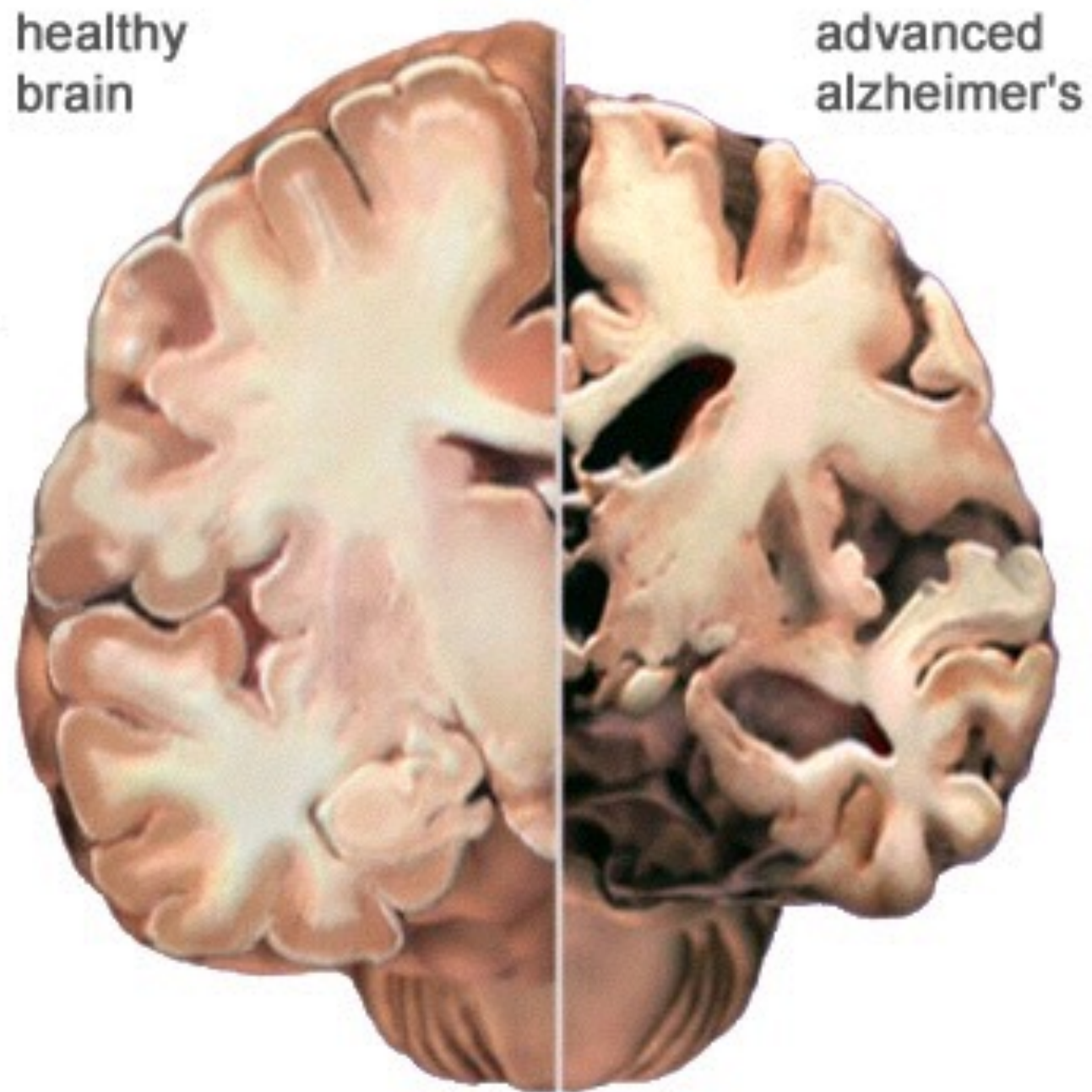
Tau hypothesis

Theory suggests that AD is caused by tau protein abnormalities.

These abnormalities cause the formation of neurofibrillary tangles.



This is your brain on Alzheimer's Disease





The experience of
the individual
with Alzheimer's Disease

Physiological Changes → Impacts on Functioning

- 1 Changes in Memory and Thinking Skills
- 2 Impacts Language Skills
- 3 Changes in Behavior/ Mood

Stages of Alzheimer's Disease

Early Stage

1

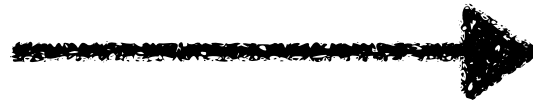
Changes in
Memory and
Thinking Skills



1. Difficulty with short-term memory
2. Loses items
3. Poor attention
4. Difficulty with calculations and organizational skills

2

Changes in
Language Skills



1. Trouble finding words or names
2. Repeats statements or questions

3

Changes in Mood
and Behaviors



1. May become depressed, withdrawn or irritable

Stages of Alzheimer's Disease

Middle Stage

1

Changes in
Memory and
Thinking Skills



1. Difficulty with short-term and long-term memory
2. Forgets parts of one's history
3. Has trouble solving simple problems
4. Becomes disoriented easily

2

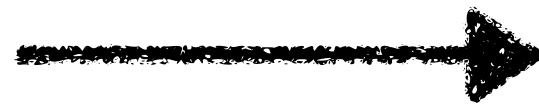
Changes in
Language Skills



1. Has trouble tracking conversations
2. Has difficulty forming complete sentences

3

Changes in Mood
and Behaviors



1. More easily upset or withdrawn

Stages of Alzheimer's Disease

Late Stage

1

Changes in
Memory and
Thinking Skills



1. Mixes up recent and past events
2. Forgets friends and relatives
3. Cannot follow a two-step command

2

Changes in
Language Skills



1. Unable to carry on a meaningful conversation
2. Words and sentences often disconnected

3

Changes in Mood
and Behaviors



1. May express unmet needs by yelling/calling out
2. Difficult to engage

Stages of Alzheimer's Disease

End Stage

1

Changes in
Memory and
Thinking Skills



1.No apparent awareness of past or future

2

Changes in
Language Skills



1.Cannot speak or uses only a few words

3

Changes in Mood
and Behaviors



1. Severe decline in ability show emotion

Changes in ability to care for oneself

1

Early Stage

1. Needs help with household affairs such as cooking and paying bills
2. Trouble managing money and medications
3. May get lost or confused when driving

2

Middle Stage

1. Needs reminders or practical help with personal care
2. Slowed walking and reaction time
3. No longer safe to drive
4. Fatigues easily

3

Late Stage

1. Needs constant reminders or practical help with personal care
2. Loss of control of bowel and bladder
3. Trouble with balance and coordination
4. Sleeps often

4

Final Stage

1. Needs total assistance with personal care
2. Unable to walk and shows little movement
3. Poor appetite and has swallowing problems
4. Sleeps most of time

Aluminum May Be Causing Alzheimer's-like Disease in Bumblebees, Study Suggests

Jun 9, 2015 by Sci-News.com
Posted in: Science

Posted: June 10, 2015

Alzheimer's Disease And Sleep Disorders Have A Common Culprit — Protein That Kickstarts Memory

7 WAYS TO CUT YOUR ALZHEIMER'S DISEASE RISK

Research suggests that certain diet and exercise habits may lower Alzheimer's disease risk by more than half.

Steps to Prevent Alzheimer's

1. Avoid saturated fats and trans fats. Dairy products, meats, and certain oils (coconut and palm oils — listed on labels as "partially hydrogenated oils") contain saturated fat. Many snacks, pastries, and fried foods are filled with trans fats.

6/22/2015 @ 5:00AM | 14,973 views

Many Possible Causes, Many Possible Solutions

Study: Air Pollution May Make Your Brain's Disease Age Faster

+ Comment Now + Follow Comments

Cutting edge science suggests that the brain may function best in clean air.

—By **Samantha Michaels** | Wed Jun. 24, 2015 6:00 AM EDT

Gilbert Ross and Henry I. Miller

Like Share 138 Tweet 215 Email

Alzheimer's can be beaten: New scan predicts cruel disease BEFORE it strikes



A SIMPLE brain scan has been shown to be able to predict who will fall prey to Alzheimer's disease decades later.

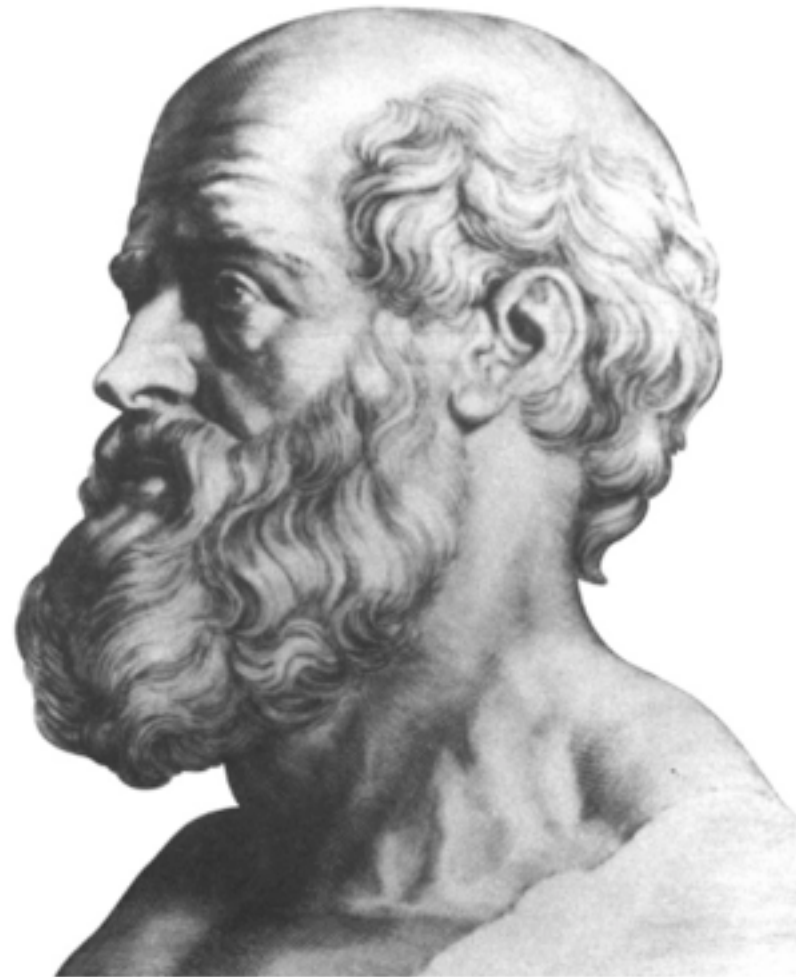
By GILES SHELDRIK

PUBLISHED: 07:04 Wed, Jul 8, 2015 | UPDATED: 09:34 Wed, Jul 8, 2015

Until there is a cure, FOCUS ON CARE.

“Cure sometimes, treat often, comfort always”

-Hippocrates, the father of medicine

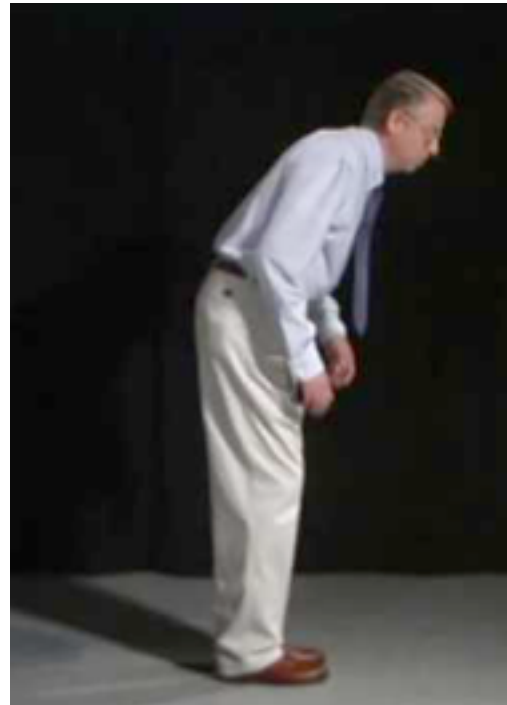


Alzheimer's Disease Simulation

We are simulating:



Loss of central and peripheral vision
(macular degeneration)



Loss of sensory nerves and fine motor skills
(peripheral neuropathy- hampers movement, not
able for brain to alert senses)

Onset of arthritis and neuropathy (Pins and
needles- limits movement)



Loss of hearing and increased
confusion (common AD sounds that
repeat)

Post-test

1. Apple was on the list? **True or False**

True

2. Home was on the list? **True or False**

False

3. Which of the following were not on the list? **Banana, Pen, Car, House, Tie**

Banana



Begin Simulation



Simulation Debriefing