



Aging with a Brain Injury:

EVIDENCE AND TREATMENT

Objectives

- ▶ Describe the impact of prior brain injuries on an aging population
- ▶ Evaluate changes in cognition and personality that are associated with aging and brain injury
- ▶ Assess some strategies one can use to assist in the maintenance of independence

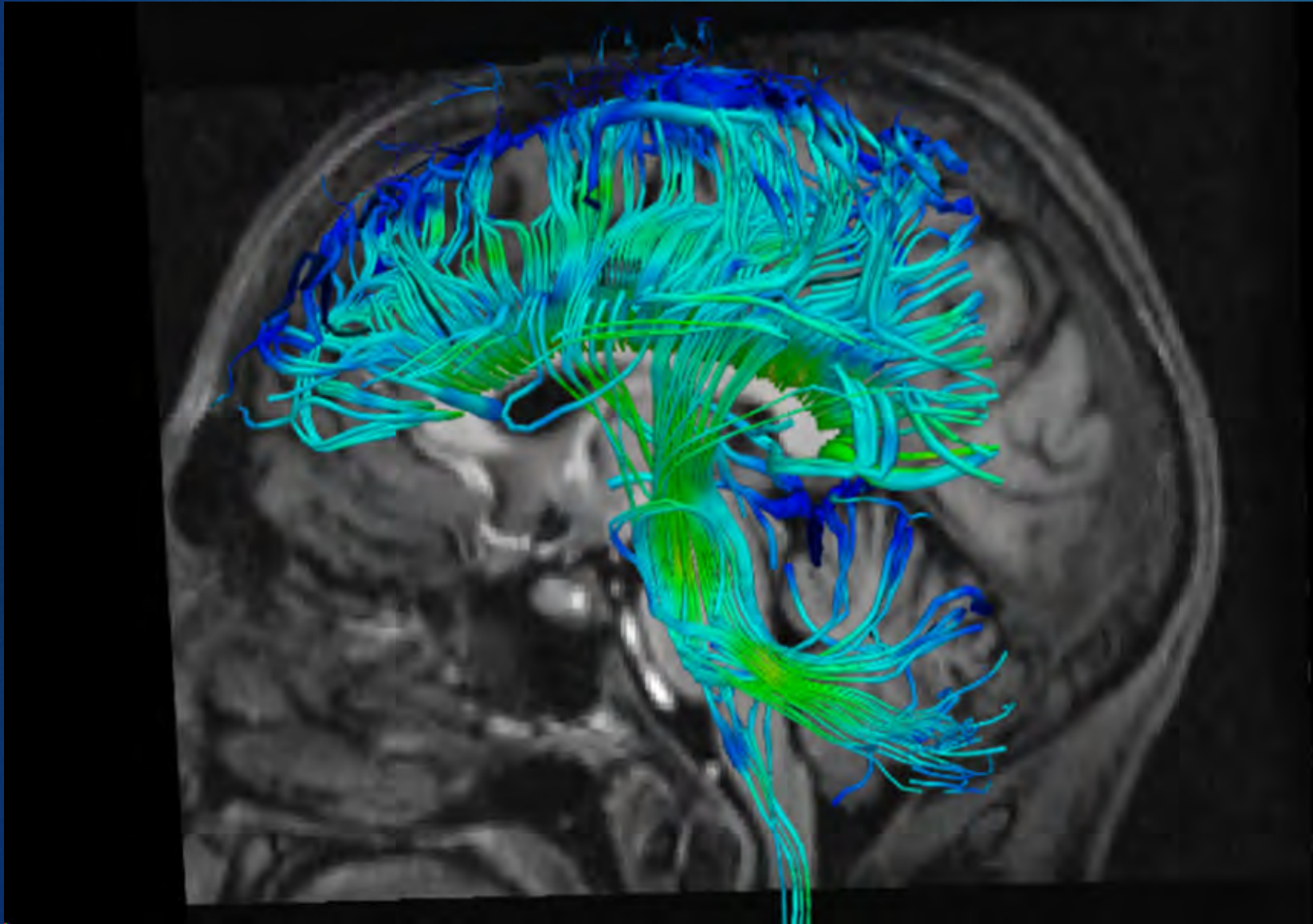
Conflicts of Interest / Disclosures

- ▶ I wish I did, because that would mean someone was paying me money to be a spokesperson, but I do not.
 - ▶ No conflicts of interest to report
 - ▶ But I am available if someone needs a spokesperson. ;)..

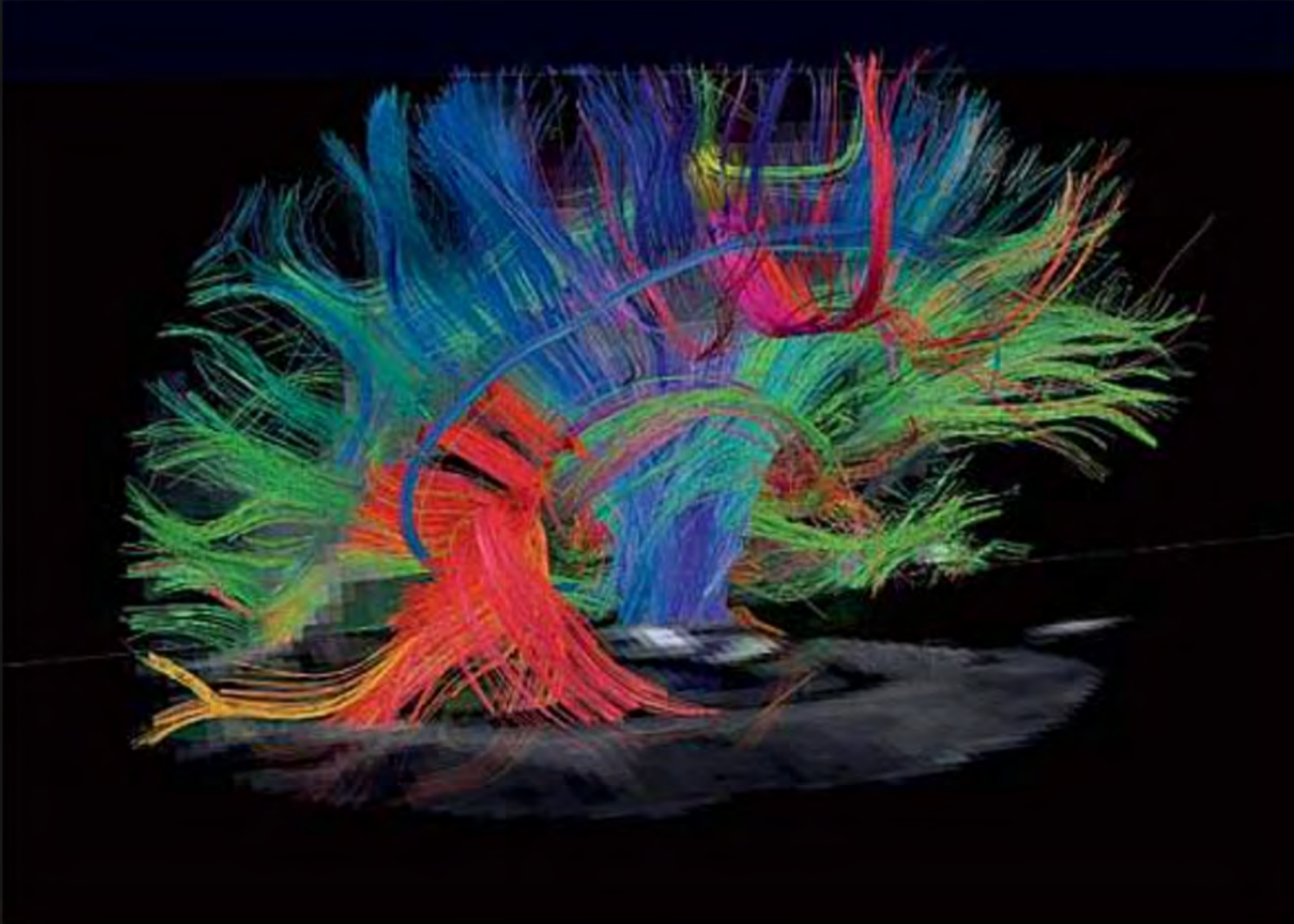
The Human Brain – what is it?



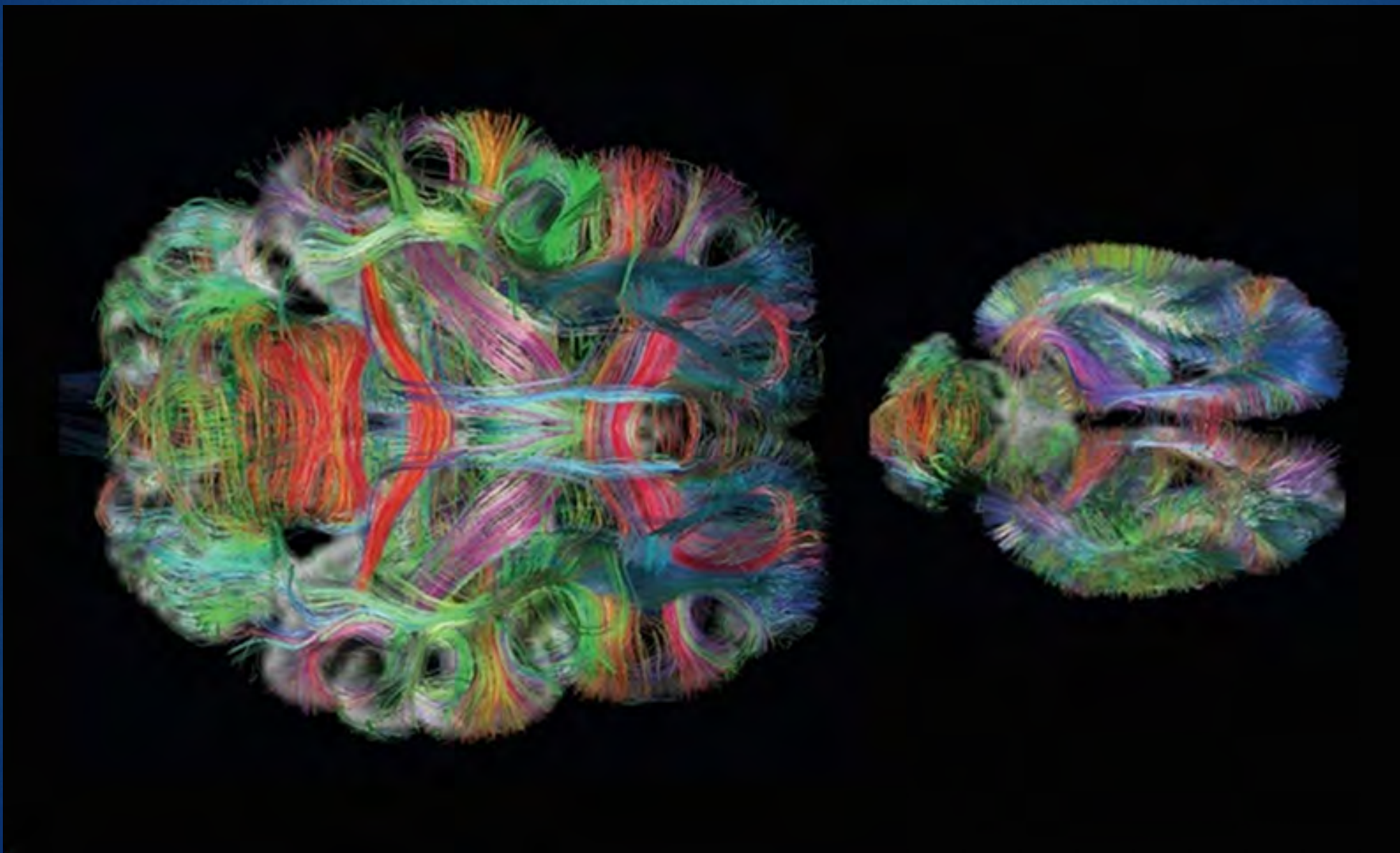
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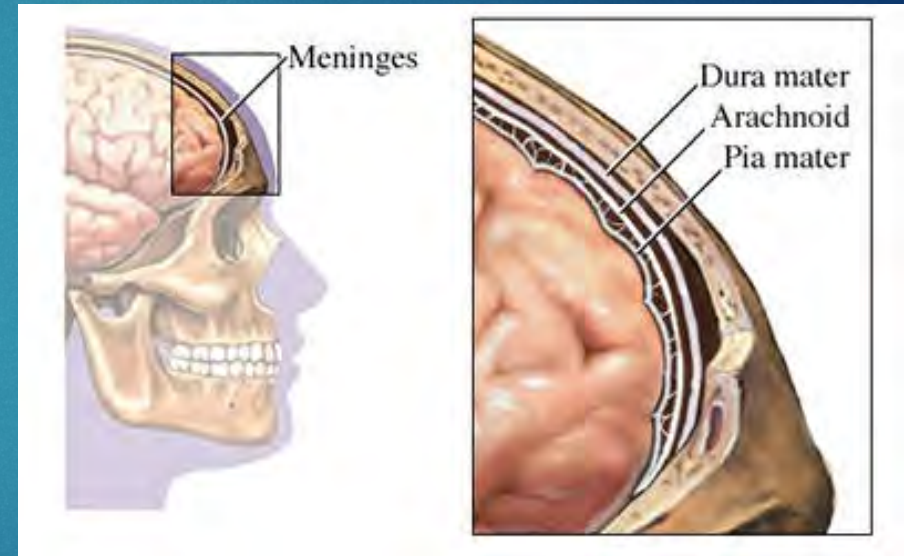


The human brain – what is it?



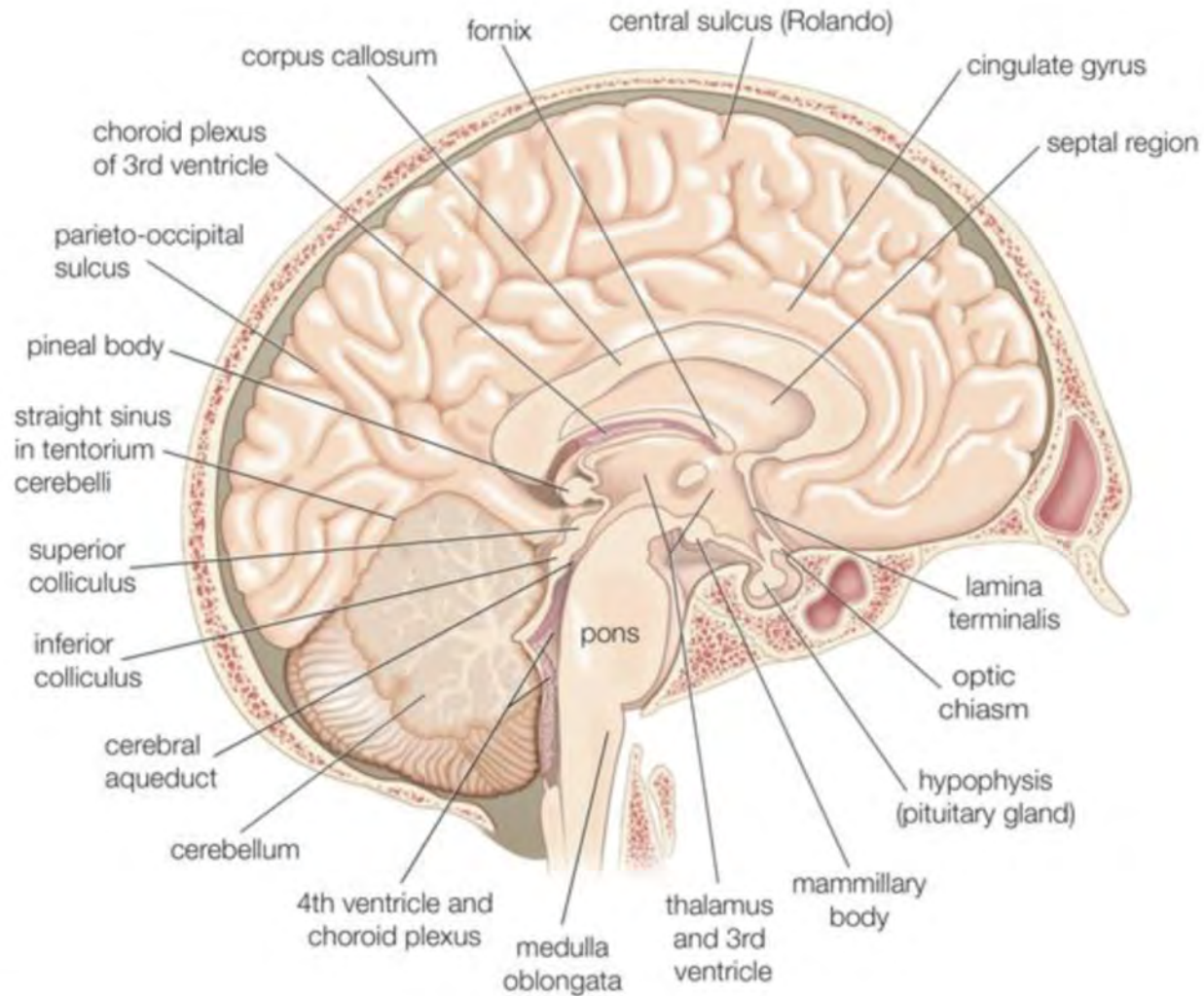
Basic neuroanatomy

- ▶ Soft tissue surrounded by:
 - ▶ 3 layers of protective membrane
 - ▶ Cerebrospinal fluid
 - ▶ The skull

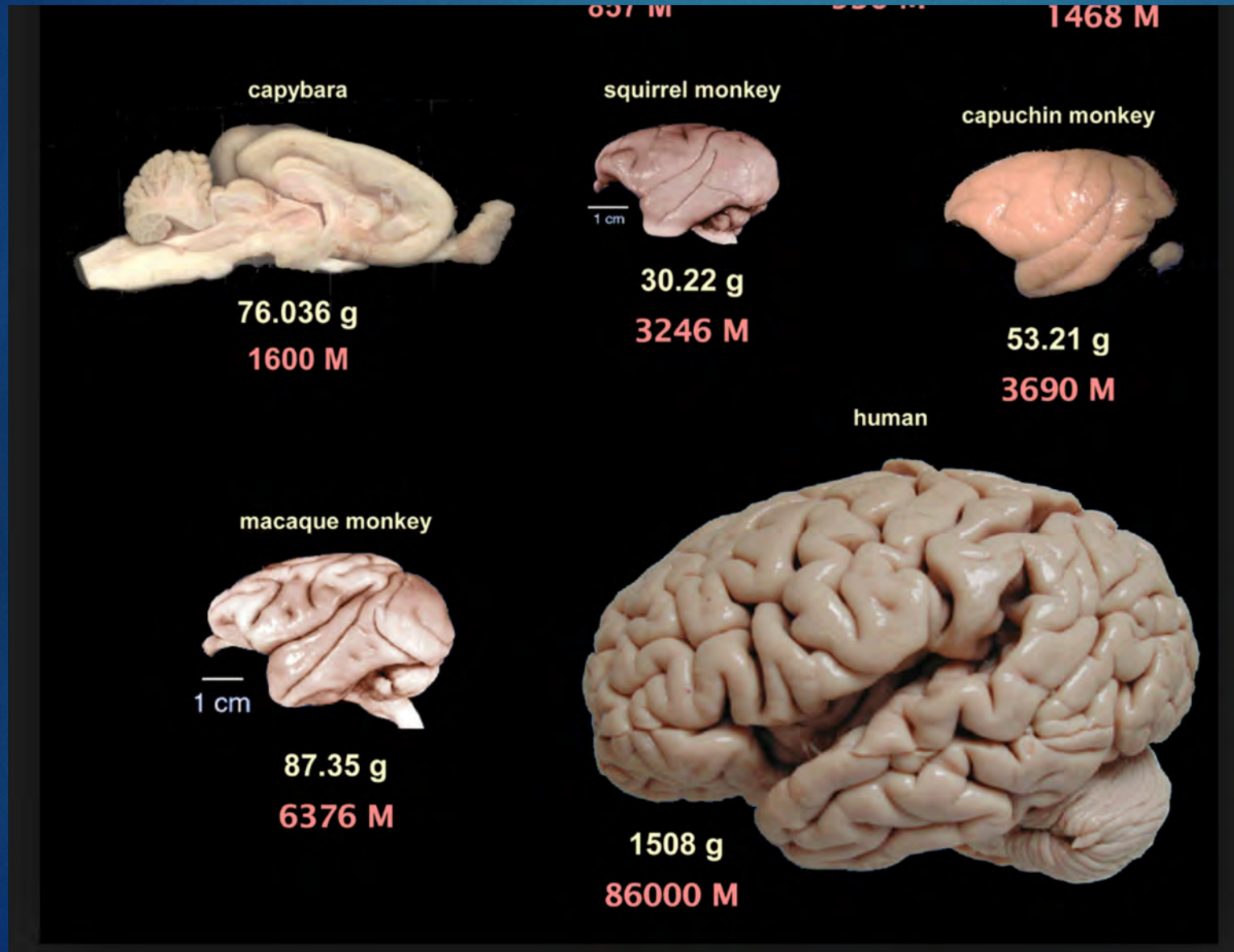


- ▶ Tissue is soft and can be compressed/stretched

The human brain – what is it?

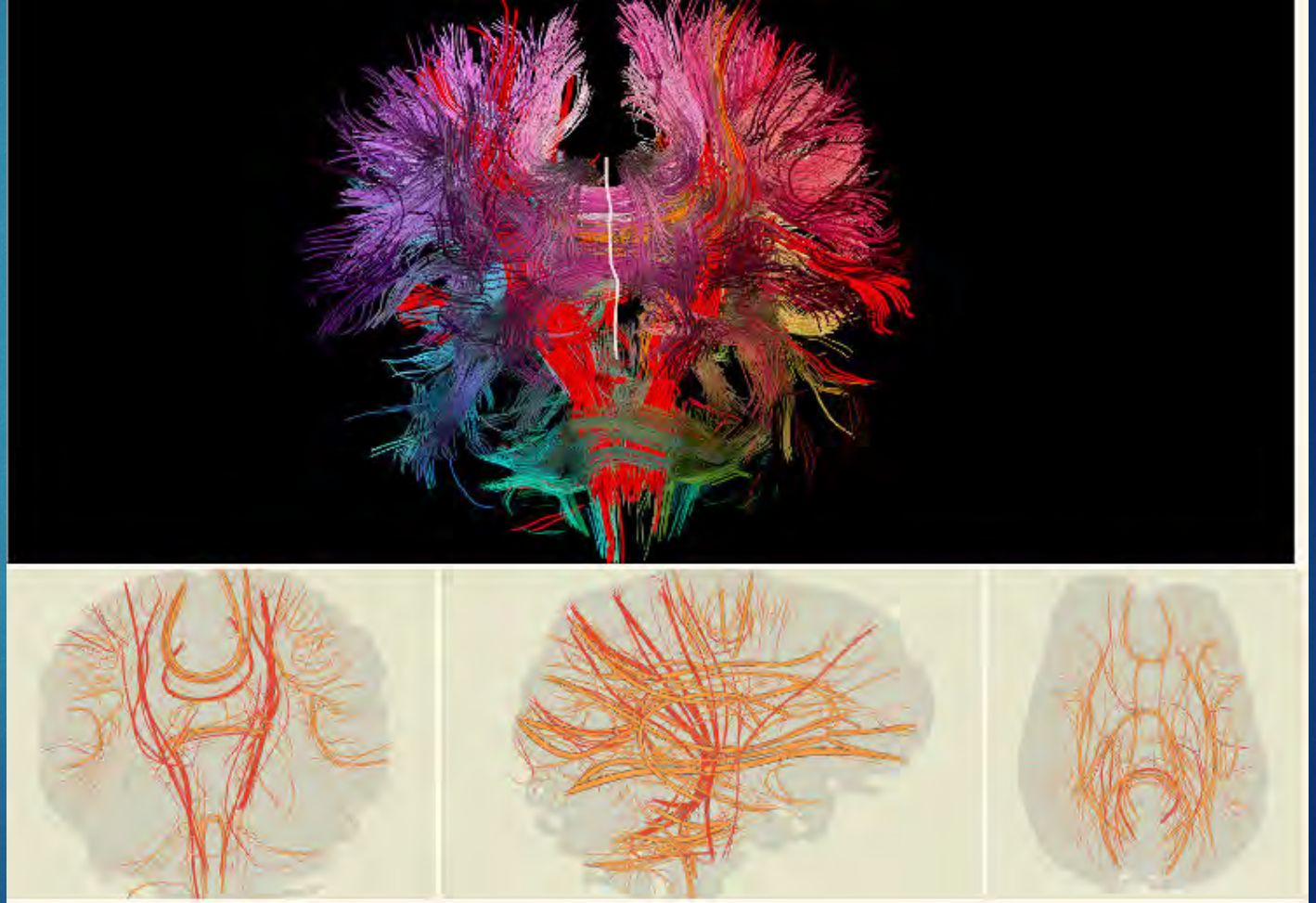


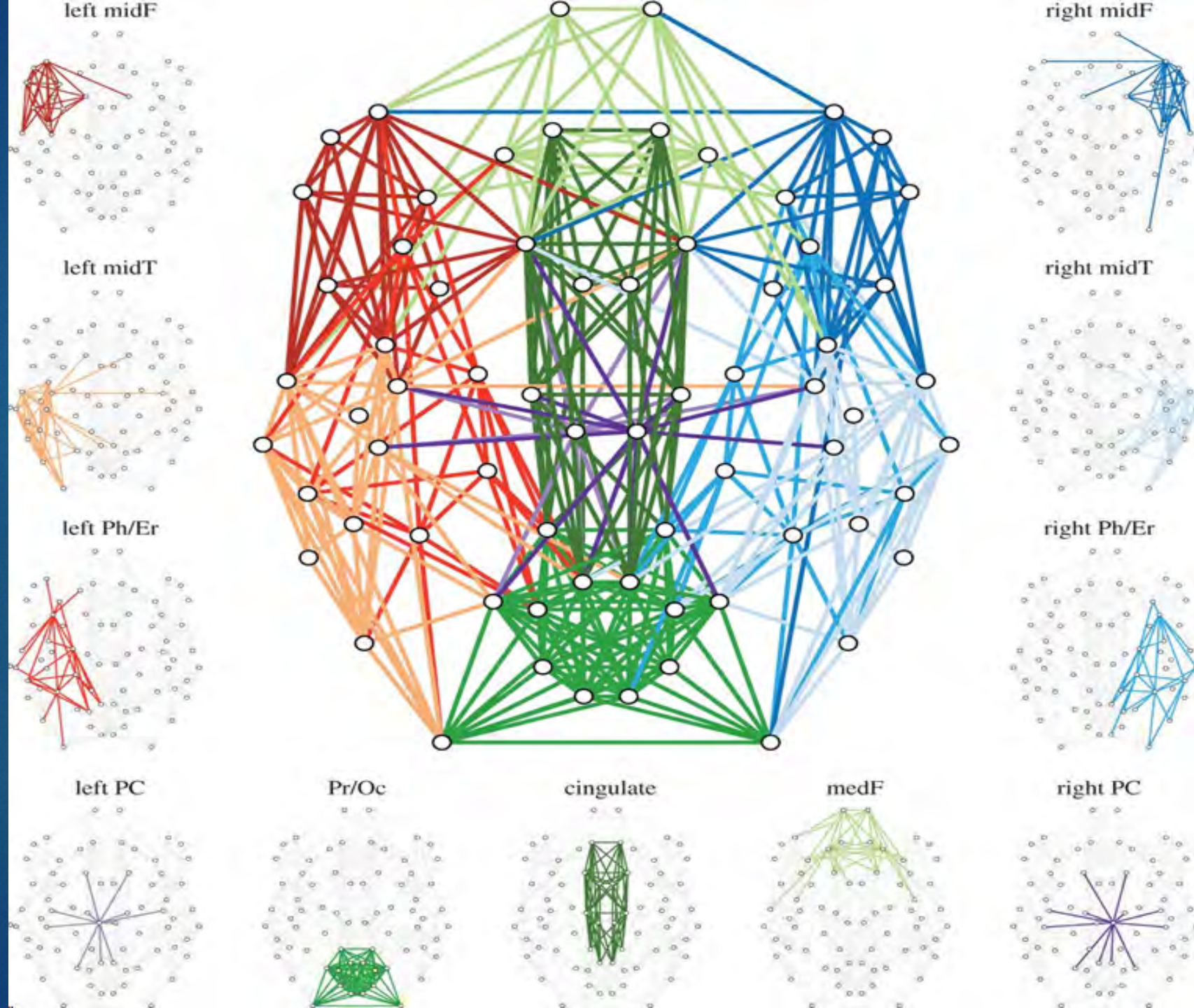
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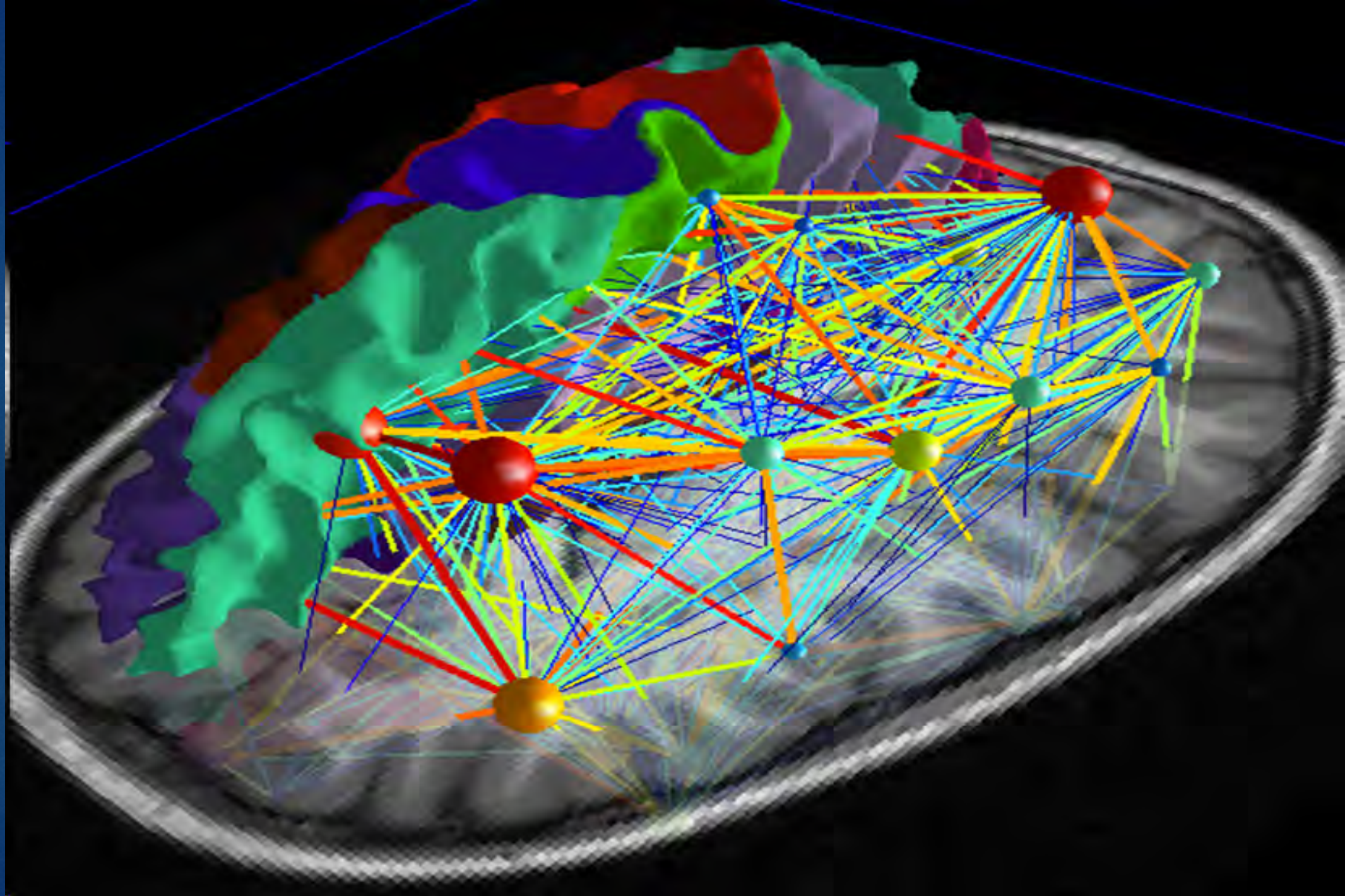


The human brain – what is it?

It is more about
networks than
regions







And what do we do with it?

Brains can be used for various purposes....



And what do we do with it?



And what do we do with it?

- ▶ <https://www.youtube.com/watch?v=HqmF-B2-3NA>
- ▶ We make art, music, opera!

And what do we do with it?



But there is also a baser aspect of our personalities too....



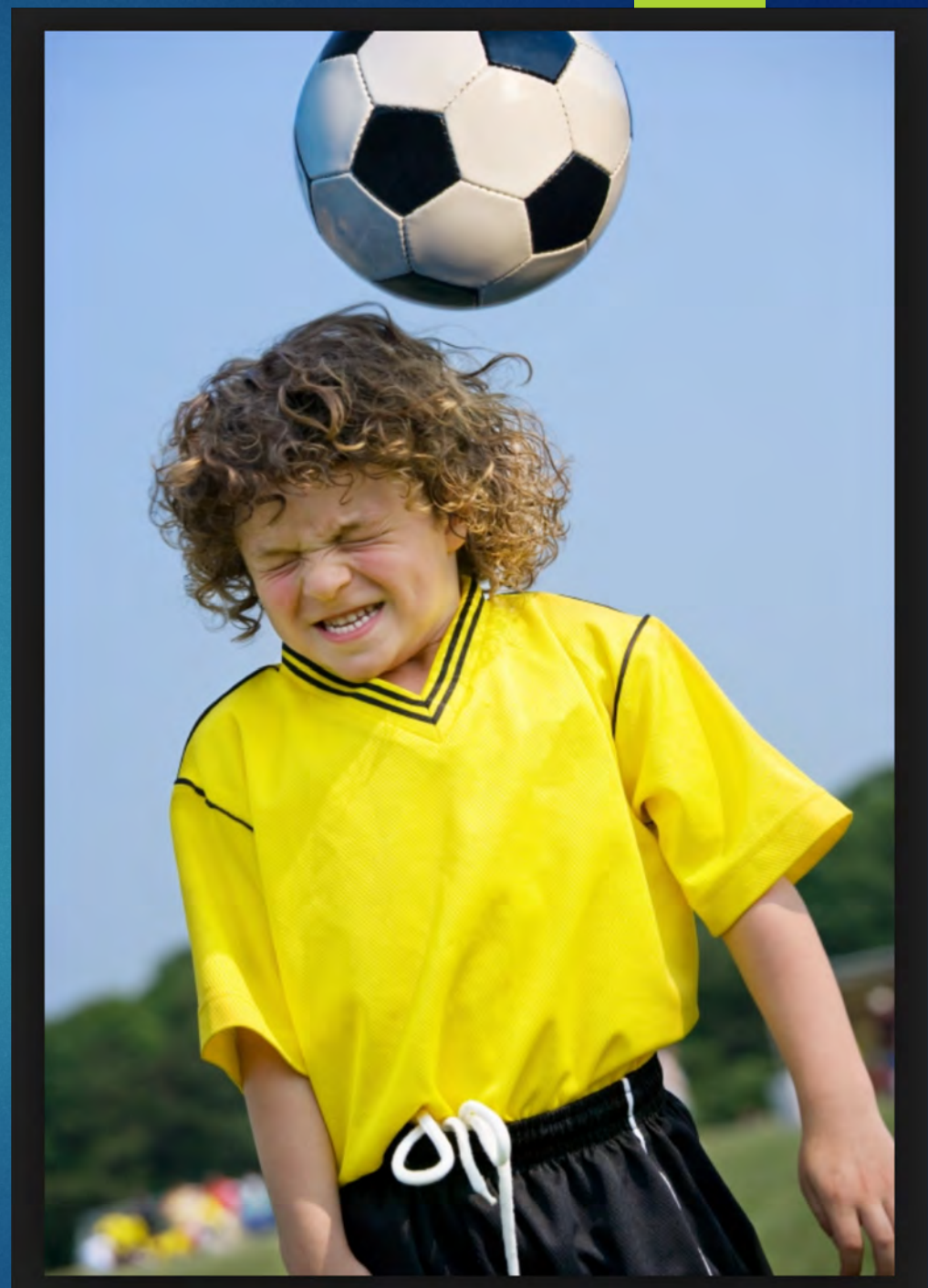


Note on St. Telemachus



Good thing we don't have gladiator games in this day and age..... Oh wait.....





And some honest mistakes: My GPS said to turn left.....



And some people..... Why?

- ▶ https://www.youtube.com/watch?v=-C_jPcUkVrM
- ▶ And then there's engineering mistakes



Then the invention of stairs... Really



So even though we try and protect
our brain....

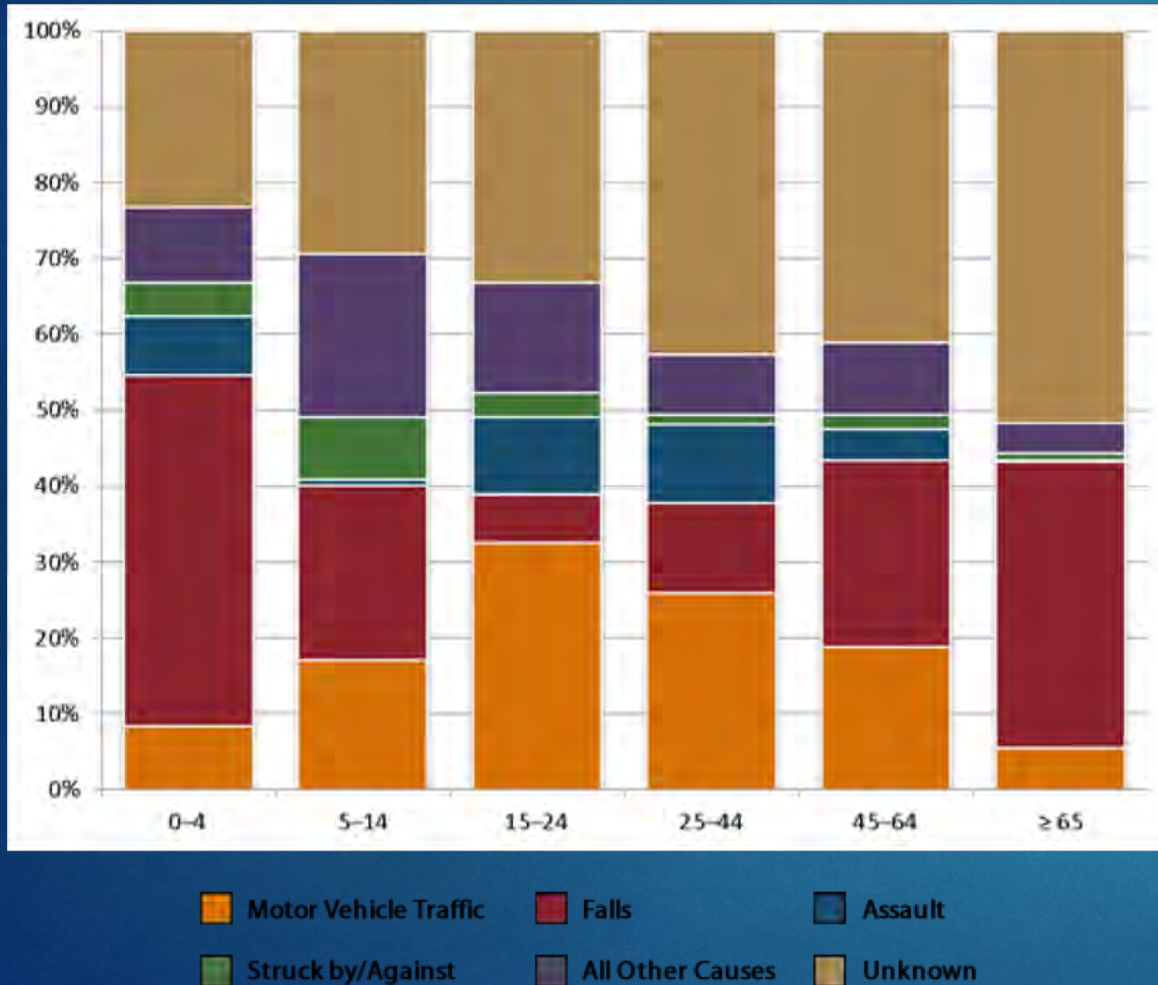


Sometimes... Things don't go our way....



Causes of TBI

Percent Distributions of TBI-related Hospitalizations by Age Group and Injury Mechanism — United States, 2006–2010



- ▶ Traumatic
 - ▶ Hitting head
 - ▶ Being hit in the head
 - ▶ Choking, strangling, or other oxygen deprivation
- ▶ Acquired
 - ▶ Drugs/alcohol/prescription drugs
 - ▶ Tumor/disease
 - ▶ Carbon monoxide/lead
- ▶ Injury exacerbated by
 - ▶ Trauma
 - ▶ Stress
 - ▶ Malnutrition
 - ▶ Sleep deprivation
 - ▶ Cognitive reserve (or lack thereof)

Generalized Core Functions by Lobe

Frontal	Temporal	Parietal	Occipital	Cerebellum
Attention	Language	Spatial Reasoning	Visual Processing	Control Process
Executive Fx	Memory	Sensory Perception		Motor
Behavior				Cognition
Emotion				Emotion
Motor				Error correction



Brain injury can affect one, some, or all these domains

mTBI Symptom Clusters

Physiological

- **Headache**
- **Noise/light sensitivity**
- **Nausea**
- **Fatigue**

Cervical

- **Neck pain**
- **Headache**
- **Numbness/tingling**

Cognitive

- **Slowness**- “brain feels slow”
- **Concentration**
- **Memory**- “can’t remember”
- **Thinking clarity**- “can’t think clearly”

Balance/Vestibular

- **Dizziness**
- **Imbalance**- “off balance”
- **Clumsiness**
- **Motion discomfort**

Emotional

- **Irritability**- “shorter fuse”
- **Sadness**
- **Anxiety**
- **Moodiness**- “more emotional”

Sleep

- **Falling asleep**
- **Staying asleep**
- **Sleeping more than usual**
- **Drowsiness**- “tired”

These often go unrecognized

“I don’t feel right...”
“Something feels off...”

Mod – Sev Symptom Clusters

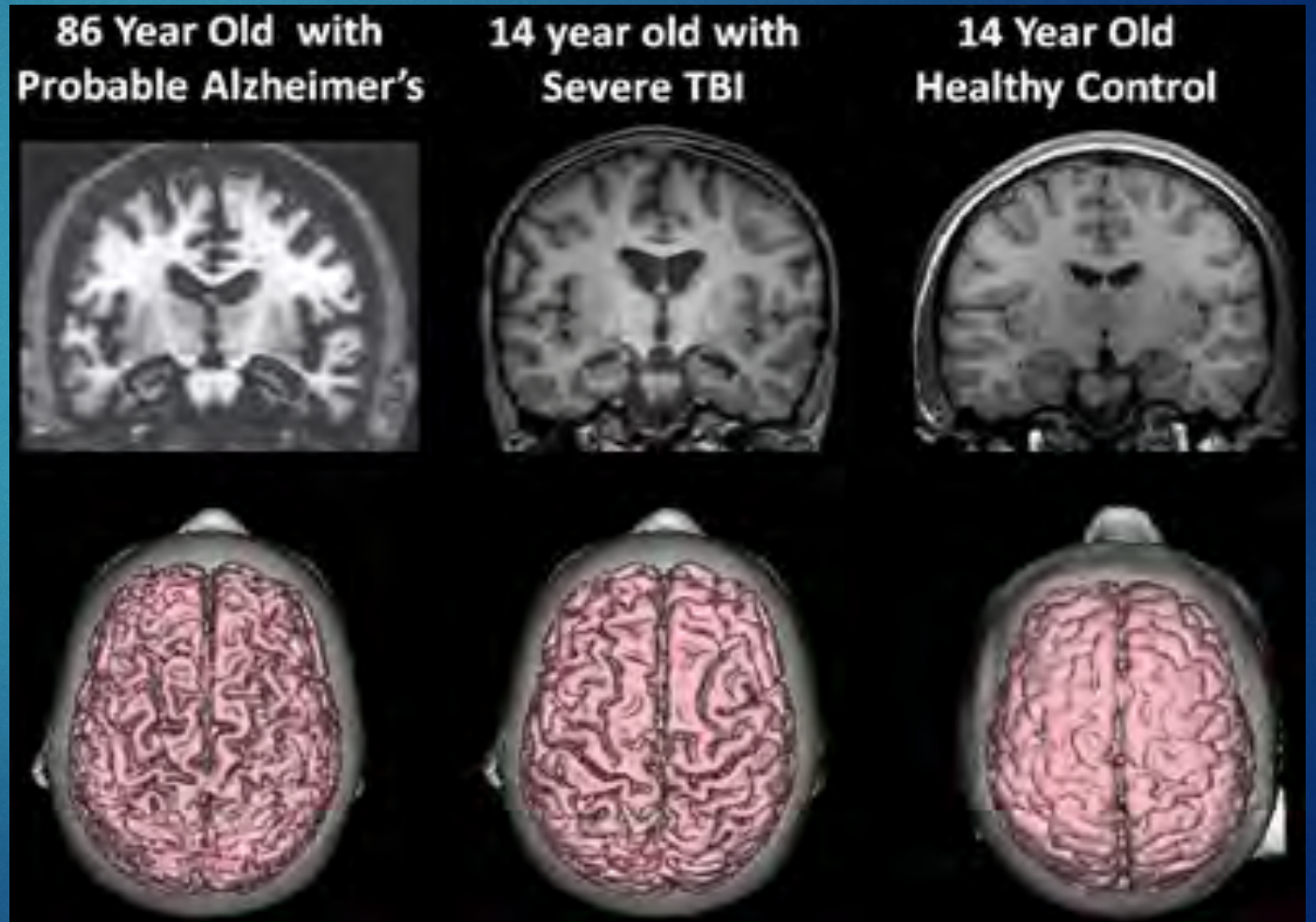


Risk factors for protracted recovery



So what happens.... We all have a start point.... Injury seems to shift that start point.

Demonstrates some loss of neural reserve....



Shifts risk for disease burden...

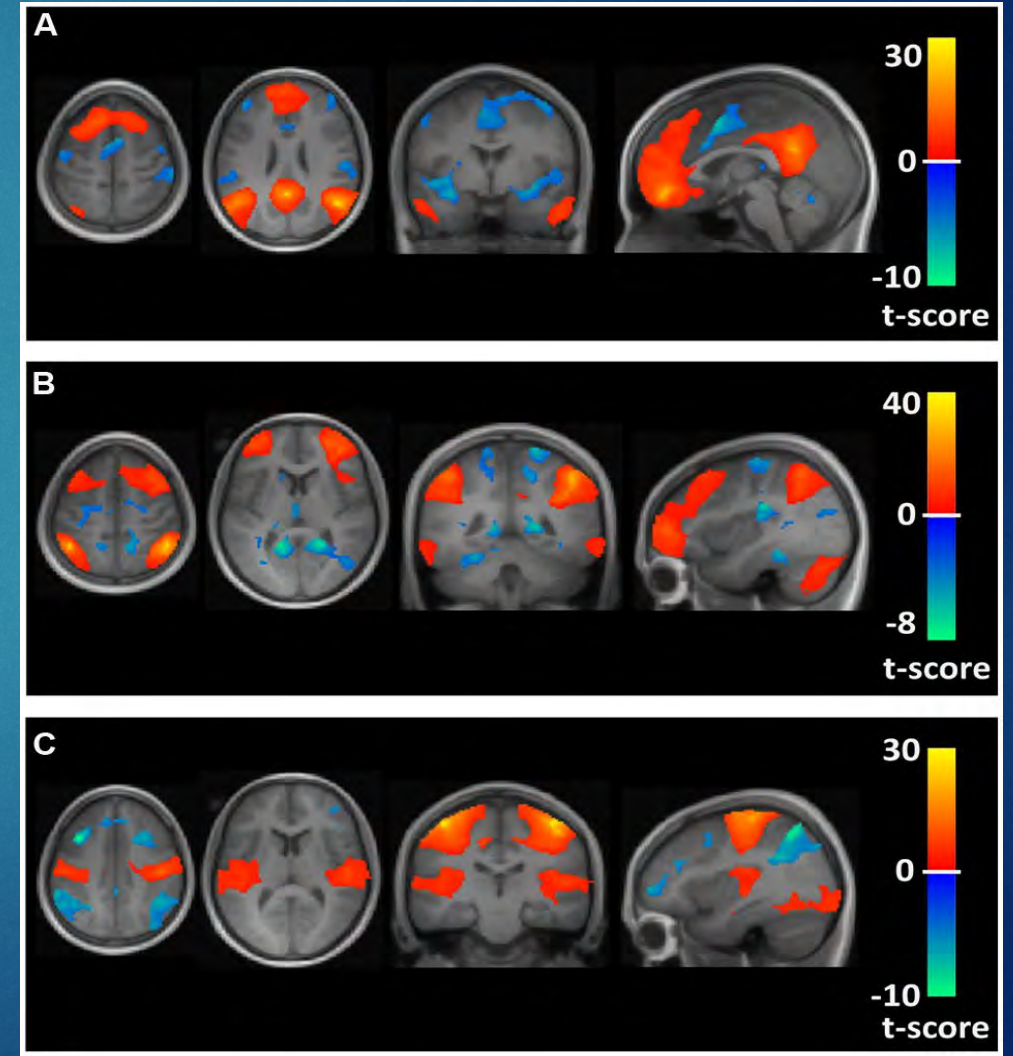
- ▶ There is a shown increase in risk for dementia later in life and moderate to severe brain injury.
 - ▶ WWII vets showed 100% to 200% increase risk for persons with moderate to severe TBI.
- ▶ Dementia risk in mTBI / concussion is unclear and may depend on frequency of injuries, age and other factors.
 - ▶ Do know that these injuries to disrupt brain structure and network function.
 - ▶ Do know that a portion of persons who experience repeated hits to the head develop something akin to CTE.

But the brain compensates....

- ▶ Takes existing structural and functional networks
 - ▶ Resting state MRI studies do show a progressive increase in areas recruited into these networks.
 - ▶ Up to a certain age this recruitment is associated with better test performances and day-to-day function.
 - ▶ There is a tipping point however, at which this network strategy fails and cognitive decline is initiated.
 - ▶ Genetic status also plays a role.

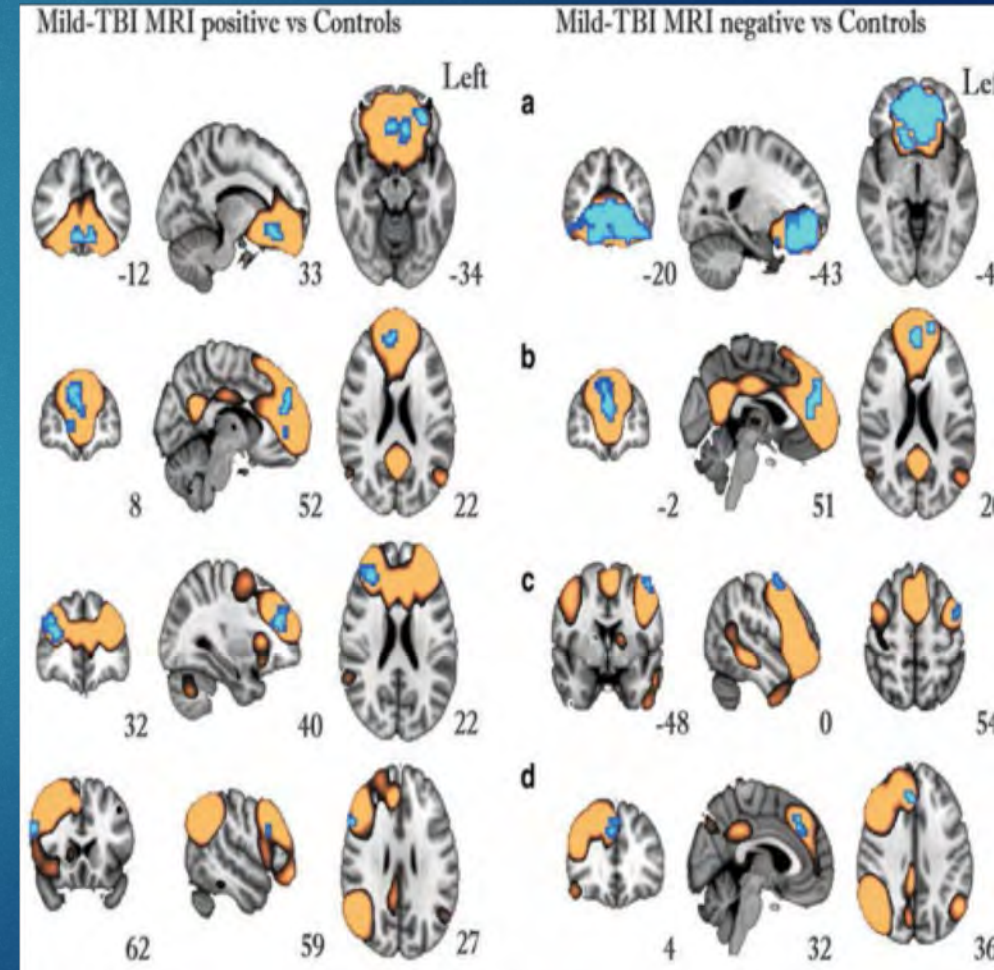
Elderly “recruiting” more brain regions during task activity.

Resting state MRI – Red areas show increased recruitment in DMN.



Brain injury makes this process less effective....

Here brain networks are more diffuse in injured patients – less functional. Difficult for brain to then with aging recruit additional regions to compensate for aging.



Things to watch with aging:

- ▶ Walks with increasing limp/other preference for a side
- ▶ Difficulty focusing vision
- ▶ Difficulty tracking conversation
- ▶ Slow response style
- ▶ Unorganized answers
- ▶ Easily agitated, distracted, labile
- ▶ Slow build-up of mail, unfinished tasks
- ▶ Difficulty cooking, following steps
- ▶ Getting lost while in familiar areas
- ▶ Sensitivities to medications with aging

Some adjustments for Learning and Memory

- ▶ Write things down
 - ▶ Provide way for individuals to record information
- ▶ Provide memory supports in the environment
 - ▶ Written and posted schedule/instructions; label cabinets/drawers/rooms
- ▶ Shorten instructions
 - ▶ Present in with words and pictures
- ▶ Model tasks
- ▶ Checklists for chores/tasks
- ▶ Check in for comprehension

Some adjustments for Processing Speed & Fluency

- ▶ Complete paperwork in quiet, distraction-free room
- ▶ Don't put on the spot
- ▶ Provide cues for time sensitive tasks
- ▶ Create an environment that is conducive to asking for help and acknowledging any cognitive or emotional difficulties

Emotional/interpersonal difficulty

- ▶ Communication should be direct, not subtle
- ▶ Nonjudgement, noncritical, supportive feedback
- ▶ Remain calm to reduce others' agitation
- ▶ Recognition that self-awareness and/or awareness of deficits may be low or nonexistent

Brain injury management – it takes a village. In Nebraska most care happens outside of facilities.

Profession	Expertise
PCP	health history; basic medicine
Neuropsychologist	cognitive function; brain/behavior relationship, behavioral treatment
Physical Therapist	"below the waist"; motor systems; balance
Occupational Therapist	"above the waist" adaptive behavior; functional assessment
Speech- Language Pathologist	speech and language assessment; language rehab including cognition related to language
Audiologist	vestibular system; auditory inputs
Psychologist	Therapy, sleep hygiene, anxiety management
Neurologist	brain structure and function; diagnose disease

Love doesn't judge – thank you.

