

2024 Better Brain Fridays Seminar

#1 Brain Health as We Grow Older; The Role Medicines Play in our Brain Health as We Age

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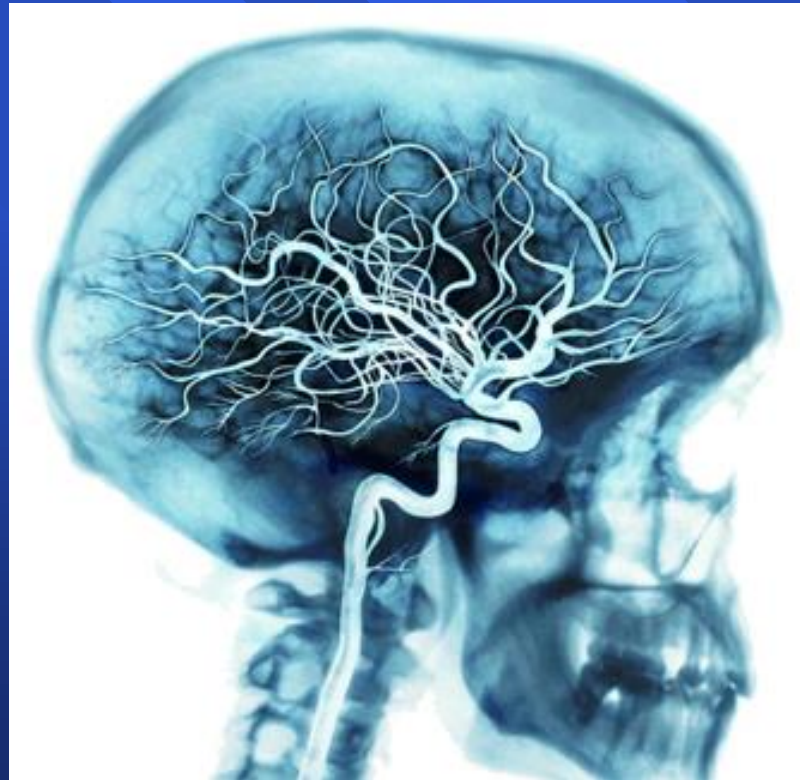
Prevea Health / Eau Claire Family Medicine Residency Program

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Goals

- Review brain changes as we grow older
- How aging processes meds differently
- How medicines may harm or protect brain health
- What happens when you mix meds?
- Can you discontinue medicines?
- Ways to improve brain health

Each heartbeat, 20 -25% of your blood goes to your brain where billions of cells use ~20% O₂
When thinking hard, your brain uses 50% fuel & O₂

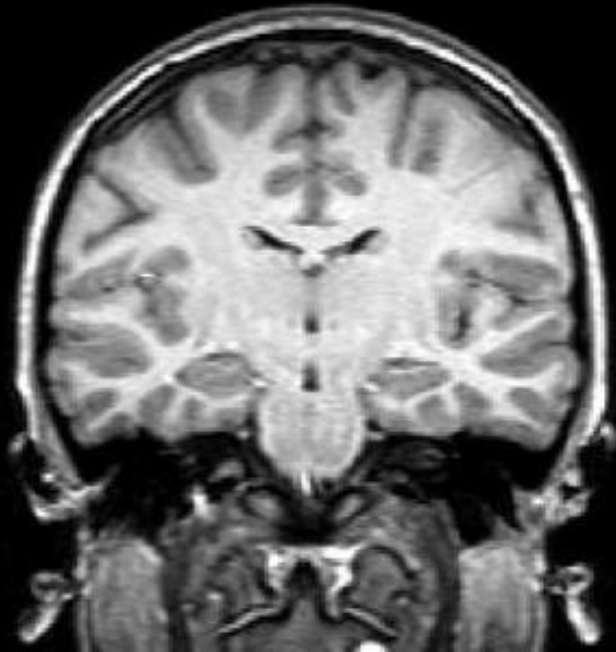


With Aging, Our Bodies may Handle Medications Differently which may Alter How They Affect Us

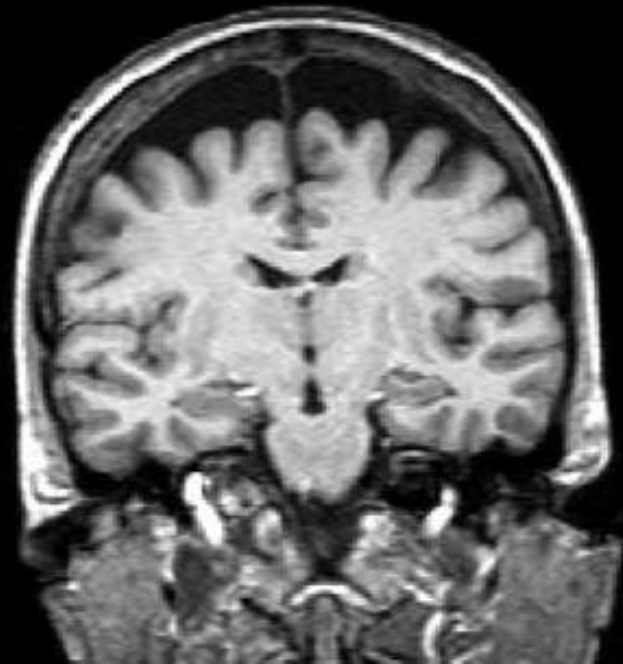
- Brain's physical structure and processing change
- Circulatory, digestive systems, liver, and kidneys slow down
- Weight changes may affect how much medicine you need; how long medicine stays in your body
- Many older adults take more than one medicine which may interact with each other
- You cannot always PREDICT the effect

Brain changes

(a)



(b)



Brain changes in physical structure

- Brain volume shrinks especially frontal cortex/hippocampus

5% per decade starting at 40

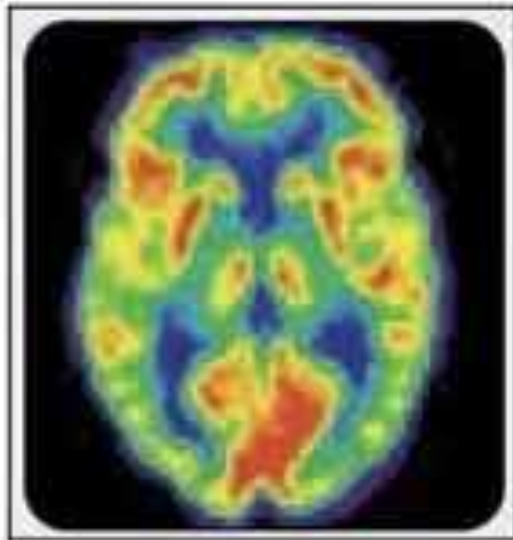
Gray matter: ? neuronal cell death and or dendritic synapses?

White matter: myelin sheath deterioration starting age 40 (slows down transmission of electrical impulses)

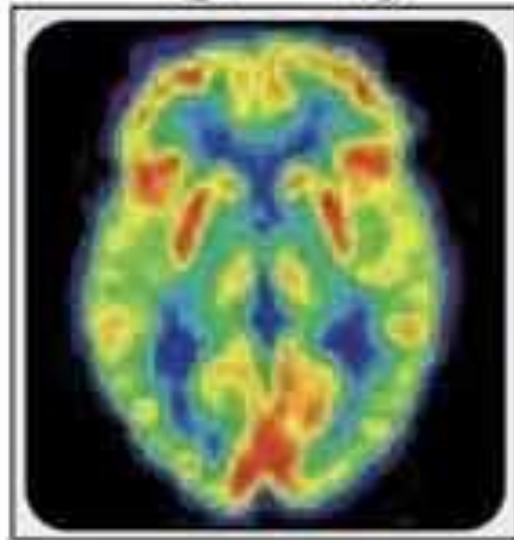
Brain Processing Changes

- Blood flow decreases; more plaque formation
- Neurotransmitters decline
 - Dopamine levels decline 10% per decade in adults
 - Serotonin levels decline ?responsible for plasticity
- Hormone levels
 - Decreasing estrogen levels (noted in women at menopause/higher incidence of AD even if you take into account living longer)
 - Estrogen might increase dopaminergic responsivity

PET and Aging



PET Scan of 20-Year-Old Brain



PET Scan of 80-Year-Old Brain

ADEAR, 2003



Age Associated Function Impairment

- ❑ Slowing of Processing *Speed*
- ❑ Vocabulary, general intelligence and ability to learn not affected
- ❑ *Old dogs can learn new tricks, it just takes longer*





Other body changes

- Your circulatory and digestive systems, liver, and kidneys slow down
 - Decrease blood flow in general
 - Absorption of drugs can be impaired
 - Liver processing can slow down drug metabolism
 - Renal excretion of drugs impaired

Absorption problems

- Stomach acidity decreases in elderly (you secrete less hydrochloric acid with age)
- Stomach pH is reduced which decreases some drug solubility causing reduction of absorption
- Blood flow to GI tract inhibits absorption
- Bowel surgery may reduce transit time and absorption

Absorption problems

- Ability to absorb Vit B12, C & D, Calcium, and Folic Acid lessens with age because of decreased stomach acid which is needed to break down from food sources
- May decrease drug absorption as well

Iron absorption from diet / iron tablets

- An acid environment in stomach necessary for Iron absorption
- The PPI (omeprazole/ Pepcid) for your GERD increased stomach PH. Interfering with iron absorption.

Other body changes

- Weight may affect how much medicine you need and how long it stays in your body
 - Body muscle diminishes 3-8% / decade after age 30; decline even higher after age 60
 - Body fat increases with age after 30 (1/3 more than when younger)



**“Of course I’ve gained weight.
That’s why it’s called *growing older!*”**

Body fat changes drug distribution

- Fat tissue increases the distribution space and thereby lowers the serum concentrations of fat soluble medications, and vitamins(A, D, E, K)
- Alcohol and marijuana also stored in fat cells
- Fat-soluble meds cross into the brain, water-soluble meds don't
- Examples benzodiazepam longer half life in obese patients leading to a delay in maximal drug effect

Decrease sense of thirst as we age

- Can become dehydrated
- Can become hypotensive

- Leads to decrease perfusion of brain and confusion



Some medicines impair mental function

- Meds: anticholinergics (benadryl),
 - pain medicines,
 - sleeping tablets,
 - oxygen (too low or too high)
- Review your medications (RX and OTC), supplements with physician, pharmacist

Anticholinergic medicines

- ❑ Blocks one of the chemicals that brain cells use to communicate with each other
- ❑ May cause older adults to experience confusion, memory loss, and other cognitive problems
- ❑ Benadryl, tylenol PM, advil PM, Unisom, Dimetapp, Dramamine, oxybutin, amitriptyline, ++, many more

Strong Pain medicines: Opioids (demerol, propoxyphene, tramadol)

- Even when taken as directed, these medications may cause confusion, sleepiness, and memory loss
- Stay in system longer if obese(store in fat cells) or liver disease(can't break down as quickly)

Muscle relaxants on BEERS LIST

- Soma
- Flexeril



Benzodiazepines on BEERS List

- Xanax
- Lorazepam
- Valium

Sleeping Pills also on BEER's List

- Ambien
- Lunesta



Alcohol Affect with Age

- ❑ Alcohol is processed differently with age
 - (liver metabolism, absorption)
- ❑ Alcohol mixed with some drugs can affect brain functioning



Polypharmacy



The problem of polypharmacy (older persons take many medicines)

- Definition: > 5 medications including OTC
- Increase risk for ADR: falls, frailty, disability and mortality
- 5-9 medicines 2x likely for ADR
- ≥ 10 meds 3x likely for ADR

Questions for Pharmacist / Doctor?

- ❑ What is medicine name and what does it do?
- ❑ How should I take this medicine?
- ❑ How long will this medicine take to work?
- ❑ When can I stop taking it?
- ❑ Can this medicine effect my body or brain?
- ❑ Can I mix with other drugs (RX or OTC)
- ❑ Is there a safer drug or a nondrug treatment ?
- ❑ Can I stop any of my other meds? If so how?

Oxygen level

- Too low and not enough oxygen goes to brain and can become confused
- Too high (folks on supplemental oxygen) and breathing centers shut down and you don't breath and your CO₂ increases and you get drowsy/ respiratory acidosis and death if not corrected

Sleep deprivation impair concentration and memory

- Reduce performance, memory and increase injury
- Drowsy driving responsible at least 100,000 mva's, 71,000 injuries, 1,550 deaths / year
- 2x accidents on the job / home

Insomnia common 50% \geq 65 yrs old

- Can we improve brain health?
- Can we prevent dementia?



Eat healthy diet

- Healthy balanced diet: whole foods rich in vitamins, nutrients may protect brain just like heart
- Healthy diet can lower cholesterol, BS and protect your arteries to brain
- A healthy BMI lowers risk for DM, HTN, CAD



Exercise can Improve Mental Alertness

- All Ages
- Afternoon “tired-nap” time
 - Exercise helped more than snack more than nothing



Can Other Things Affect Memory?

- Physical disease: deafness, aphasia, and hypothyroidism may appear cognitively impaired.
- Pseudo-dementia (Depression)
- Distractions—Sandwich generation

Do Brain Exercises work ?

- NY Time Cross Word Puzzle
- Sudoku
- Socialization
- Reading
- Playing Music

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The Evidence.....

- People who remain mentally challenged do better
 - Own a pet, take care of plants, socialize, learn new things, puzzles, music, exercise
- WHY? Chicken or the egg?
- *Bottom Line: The more you do the better you will be but....*

CAVEAT from the Institute of Medicine

- Be Careful of Products that Claim to Improve Cognitive Functioning
 - Vit E
 - Ginkgo biloba
 - Estrogen
 - ? Computer based brain training games

Born Loser



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Brain Health

- Genes: Pick your parents well
- Treat medical conditions that affect your blood vessels/ heart as they protect the vessels in your brain

Healthy Brain Choices

- Check meds (otc/rx) with physician/ pharmacist
- Eat a healthy diet
- Drink alcohol moderately
- Don't smoke
- Stay physically active
- Maintain normal body weight
- Sleep 7-8 hours / night
- Learn new things, socialize
- If HTN, DM control bp, wt, bs

Questions ?



ありがとう
Sağ ol
благодаря
Salamat
Tak
спасибо
dankjem
Grazie
Dankie
pakka pér
matur nuwun
Danke
Paldies
Dziękuję
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obrigado
Tack
謝謝
Mauruuru
Gracias
hvala
Dankon
kiitos
Na gode
gràcies
Grazas
Merci
Grazzi
ju faleminderit
eskerrik asko
terima kasih
köszönöm

Thank you!