State of the Science on Cognitive Health, Impairment, and Alzheimer’s Disease

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What we’ll cover

- The bad stuff first
- Dementia, what is it?
- What causes it?
- Brain health and wellness
- Why we have amazing brains
Definition of Dementia

1) Impairment of recent memory
2) Plus decline in other cortical function, i.e. language, visuo-spatial, or executive function
3) Changes signif. Enough to impair work or social function

Must have all three to meet definition
What it’s not

- You forget your keys
- You forgot what you went to the store for
- You’re not very good with names
- You sometimes forget to take your medications or vitamins
Which one has Alzheimer’s?
Where does it develop?
Where it gets clipped

Beta-Secretase

Gamma-Secretase

A-beta 42

Beta-Amyloid

Enzymes
The plaques

Beta-Amyloid Plaque
Tau Protein – another problem
This is a little scary
Now the good, or what you can do.
What can you do to maintain the brain?

**These things work:**
- Pick good parents
- Education throughout life
- Maintain activities and hobbies
- Remain socially engaged
- Exercise/Physical activity
- Good Diet
- Try to be really rich
We thought these worked!

- Estrogen - WHI
- Statin Cholesterol lowering drugs – Bust?
- Aspirin or non-steroidal anti-inflammatory drugs (NSAIDS) – Probably no help
- Vitamin E – May be bad (>400IU)
- Ginko Biloba – Only one study (DAT)
- Reservatrol – works great in mice
- We ain’t got no pills!
Pick good parents

Centenary Studies – Genes + Longevity
- Diet not much play
- Smoking much less of a risk factor
- Tend to have very nice cholesterol patterns
- Physical function tends to be maintained late
- Brain function maintained
Education

- Higher levels of education offer more protection (more reserve)
- Difficult to separate out from SES
- Verbal skills and language at young age predicts old age cognitive function (nurse study)
- Neuronal cross-link theory
Activities and Hobbies

- People who maintain activities and hobbies have lower rates of Alzheimer’s
- Chicken and egg problem
- Generally good to maintain outside interests
Social engagement

- People who maintain social ties have less memory difficulty
- Social ties and family are powerful protectors against dementing illness.
- Also, when memory problems develop family is a potent compensator
Exercise

- This works for everything
- What does it do?
- How much do you do?
- When do you do it?
Exercise Benefits

- Improved immune function
- Better sleep architecture
- More lean mass, less fat mass
- Improved brain, memory function
- Lower rates of depression
- Lower inflammatory markers, chol
- Benefits persist after exercise bout
How Much Exercise?

- 10 minutes is adequate
- More is better, but don’t go wild
- Intensity does not need to be high
- Walking is sufficient, and probably best
How often?

- **Important!!** As often as possible!
- Frequency is the most important factor
- If choice is 2 hours on day 1 and then nothing versus 30 minutes daily for 4 days choose the latter.
- Combine physical activity into your daily routine
Diet

Possibly as important as exercise

Eat the good stuff!
  – Fresh fruits and vegetables (8 servings)
  – Whole food, plant-based is ideal

Avoid the bad!
  – Saturated fats (fried foods, beef, pork)
  – Trans Fats
  – Too many refined carbohydrates

Actual body weight not a risk factor
The amazing brain

- Old dogma of brain being “hard-wired” is wrong!
- Much research into brain training and rehabilitation (fixed defects)
- Constraint-induced therapy
- Neuro-feedback therapy
Conclusion

- Don’t wait for a pill
- Maintaining brain function is an active process
  - Move your body
  - Follow a reasonable diet
  - Be involved and stimulated
- Support research in this area and other aging related areas