

“Where did I put my car keys?”
Is it Alzheimer’s disease or normal aging?

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Goals for this talk

During this lecture, you will learn about:

1. Normal changes in memory and thinking due to the aging process
2. How dementias, like Alzheimer’s disease, are diagnosed
3. Where to go if you have concerns about your memory

“What’s the difference between dementia and Alzheimer’s disease?”

- Dementia: the general term used to describe loss of previous memory or thinking function
 - “de”: loss of
 - “mentia”: thinking power
- Alzheimer’s disease: a specific type of dementia

Normal age-related memory problems

- Forgetting where you put your car keys, glasses, etc.
- Not remembering names of people you haven't seen for several years
- Forgetting an item or two on a memorized shopping list
- Forgetting why you went into a room

Memory changes which may be abnormal

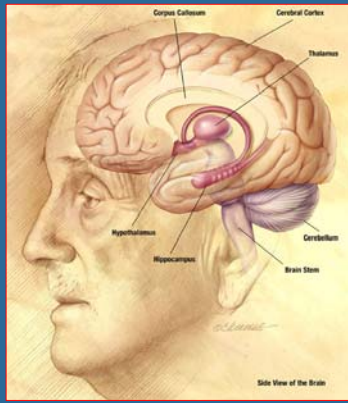
- Forgetting relationships of close family members (for example, grandchildren)
- Putting things in odd places
- Forgetting an upcoming appointment, special event, etc. – and still not remembering it after it is pointed out to you
- Getting lost in a familiar place while driving

Normal changes in cognition with aging

- Intellectual abilities
 - improve until late 30s or early 40s
 - then are stable until mid-50s or early 60s, then
 - change begins to occur in late 60s
 - noticeable effects beyond the mid 70s

Neurons in the human brain

- Estimates of total number range from 14 to 100 billion
- Approximately 10% loss by age 90
- No new neurons formed in the mature human brain
 - Or maybe they are, in the hippocampus???
- New synapses formed throughout life



Inside the Human Brain

To understand Alzheimer's disease, it's important to know a bit about the brain...

The Brain's Vital Statistics

- Adult weight: about 3 pounds
- Adult size: a medium cauliflower
- Number of neurons: 100,000,000,000 (100 billion)
- Number of synapses (the gap between neurons): 100,000,000,000,000 (100 trillion)

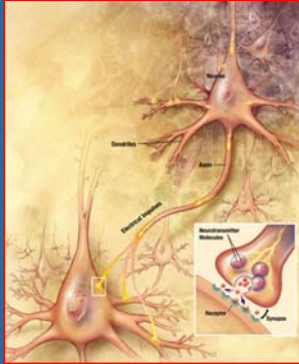
Side View of the Brain

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Inside the Human Brain

Neurons

- The brain has billions of neurons, each with an axon and many dendrites.
- To stay healthy, neurons must communicate with each other, carry out metabolism, and repair themselves.
- AD disrupts all three of these essential jobs.



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Alois Alzheimer

- 1864 to 1915
- Published case of Auguste D. in 1907

Auguste D.: Symptoms

- 1st sx: irrational jealousy toward husband after he took a walk with a female neighbor
- Trouble with cooking, finances
- Disinhibition: doorbells
- Paranoid and anxious
- Spent 4 years in bed crying daily.

Symptoms of Alzheimer's Disease

- Impaired memory (especially for recent events)
- At least one of the following:
 - Difficulty with speech (aphasia)
 - Difficulty with recognition (agnosia)
 - Difficulty with fine motor skills (apraxia)
 - Difficulty with judgment, insight, planning ahead, organizing (executive dysfunction)

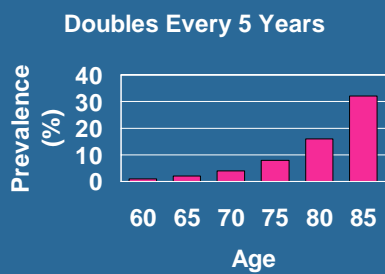
Memory problems seen in Alzheimer's disease

- Short-term memory affected first
 - Leads to difficulty recalling events from hours to several weeks
- Long-term memory: usually preserved early in the course
 - Thus, may have very good recall of events from years ago

Progression of Alzheimer's disease

- Starts very gradually, and inconsistently
- Gradually progresses over months to years
- In addition to memory difficulties, may see
 - Apathy
 - Other changes in personality
 - Hallucinations (false perceptions)
 - Delusions (false beliefs)
 - Poor judgment

Prevalence of Alzheimer Disease



The brains of people with AD have an abundance of beta-amyloid plaques, which are dense deposits of protein and cellular material that accumulate outside and around nerve cells

They also have an abundance of “neurofibrillary tangles,” which are twisted fibers that build up inside the nerve cells

AD and the Brain

Mild to Moderate AD

- AD spreads through the brain. The cerebral cortex begins to shrink as more and more neurons stop working and die.
- *Mild AD signs* can include memory loss, confusion, trouble handling money, poor judgment, mood changes, and increased anxiety.
- *Moderate AD signs* can include increased memory loss and confusion, problems recognizing people, difficulty with language and thoughts, restlessness, agitation, wandering, and repetitive statements.

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AD and the Brain

Severe AD

- In severe AD, extreme shrinkage occurs in the brain. Patients are completely dependent on others for care.
- Symptoms can include weight loss, seizures, skin infections, groaning, moaning, or grunting, increased sleeping, loss of bladder and bowel control.
- Death usually occurs from aspiration pneumonia or other infections. Caregivers can turn to a hospice for help and palliative care.

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AD Research: the Search for Causes

Epidemiologic Studies

Scientists examine characteristics, lifestyles, and disease rates of groups of people to gather clues about possible causes of AD. The NIA is currently funding epidemiologic studies in a variety of different groups. Two of the studies focus on religious communities. Researchers conduct yearly exams of physical and mental status, and studies of donated brains at autopsy. Some early results indicate:

- Mentally stimulating activity protects the brain in some ways.
- In early life, higher skills in grammar and density of ideas are associated with protection against AD in late life.

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AD Research: Clinical Trials

Clinical trials are the primary way that researchers find out if a promising treatment is safe and effective.

- Trials examine approved drugs to see if they can be used for other purposes, or look at experimental drugs.
- Participating in a trial means regular contact with the study team, who can provide state-of-the-art AD care.

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What can you do to prevent Alzheimer's disease?

Education

- Strongest buffer and predictor of later memory impairment.
- Education sets a pattern of reading, chess, crossword puzzles – that become lifelong exercises.

Sense of purpose

- **Meaning** for older adult often found by those who participate in “work” before/after official retirement.

Social Support

- NH study: 3 groups puzzles -- verbal encouragement, direct assistance, neither.
- Verbal encouragement = improved in speed and proficiency.

Prevention of Alzheimer's disease

- Stay active
 - Mentally
 - Physically
 - Socially

Strategies to Improve Memory

- Make notes and lists
- Use humorous visual images
- Rehearse names, facts ahead of time
- Do one thing at a time

Summary

1. Fears of memory problems in later life, although they have some basis in reality, are often exaggerated.
2. In spite of age-related changes in some cognitive functions, the vast majority of older adults retain more than enough reserve capacity for a meaningful, satisfying life of independence.

What if you suspect you have memory problems?

- Talk to your personal physician
- May wish to consult with:
 - Geriatric internist, family physician, or psychiatrist
 - Neurologist
- Blood tests and possibly a CT scan or MRI scan
- Consult local Alzheimer's Association

Resources

- Alzheimer's Association: www.alz.org
 - Or call your local chapter
- Alzheimer's Disease Education and Referral (ADEAR) site: <http://www.nia.nih.gov>
