

# AGING OPTIMALLY

***100 IS THE NEW 60***

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ORANJ 10/16

## ***OH THAT SENIOR MOMENT***

- HELPFUL ARE:
  - THE REALIZATION THAT YOU HAVE ONGOING POWER TO INFLUENCE BRAIN AGING
  - THAT EMPHASIS ON AGING RESEARCH IS ACCELERATING
- THE FIRST OF THESE ELEMENTS IS THE SUBJECT OF THIS PRESENTATION

## ***HOW PREVALENT & IMPORTANT ARE THE DEMENTIAS?***

### TYPES OF DEMENTIAS

(CAN BE MIXED)

ALZHEIMER'S

LEWY BODY +/- PARKINSON'S

VASCULAR

FRONTOTEMPORAL

HUNTINGTON'S

CREUZFELD-JACOB

NORMAL PRESSURE HYDROCEPHALUS

## ***IMPORTANCE BECAUSE OF PREVALENCE***

- **ALZHEIMER'S**

60-80 % IN U.S., OVER 5 MILLION  
MORE IN LONGER-LIVED WOMEN  
(2/3)

WOMEN WITH IT DECLINE FASTER

11% AT AGE 65, OVER 85 ABOUT  
33%

INCIDENCE IS GOING DOWN  
SLIGHTLY

EARLY ONSET (30-50) GENETIC,  
(CHROMOSOMES # 21, 14, 1)

LATER ONSET (60 & OVER) MORE  
WITH ApoE4 GENE

## ***VASCULAR & LEWY BODY NEXT***

- **VASCULAR ACCOUNTS FOR 15-20%**  
Transient ischemic attacks (TIA's)  
or silent little strokes, unnoticed

- **LEWY BODY INCLUDES 1.5 MILLION**  
Abnormal brain protein deposits, like  
Alz., alone or association with P'sons.  
Important since responds badly to  
Alz. meds, if misdiagnosed.

## ***ALL OTHERS***

- **IMPORTANT FOR DIFFERENTIAL  
DIAGNOSIS, TREATMENT AND  
PROGNOSIS; TO CAREGIVERS;  
TO FAMILIES IF GENETIC.**

*EMPHASIS HERE ON LIFESTYLE CHANGES THAT MAY INFLUENCE BRAIN HEALTH & MAINTENANCE – THUS ALZHEIMER’S, VASCULAR, POSSIBLY LEWY BODY TYPES*

- UNCHANGEABLE RISKS FEW I.E.

GENETIC VULNERABILITY & AGE

### *SO WHAT IS DOABLE (OR NOT TO BE DONE)*

#### GOOD HABITS FOR YOUR BRAIN

- DO NOT SMOKE
- EXERCISE IN SOME FASHION
- ALTER YOUR DIET – EMPHASIS MORE VEGETABLES, LESS RED MEAT, MORE WHITE MEAT AND FISH, FEWER SUGARS
- MODERATE ALCOHOL - LESS THAN 7 –(WOMEN), 14 – (MEN)/WEEK
- LESS HIGH TEMPERATURE COOKING, GRILLING IS LIKELY OUT!

### *OTHER LIFESTYLE ISSUES*

- DRINKING COFFEE SAFE & GOOD
- LESS SODIUM - **BP** CONTROL!!
- ATTENTION TO ADEQUATE SLEEP
- DIAGNOSIS OF SLEEP DISORDERS – OSA, RLS, OTHERS
- OPTIMAL SENSORY INPUT (EYE & HEARING CARE)
- BEST DENTAL CARE (INFLAMMATION)
- BALANCE TRAINING (**NO** FALLS)

## *SPECIAL LABORATORY – OUTSIDE THE USUAL BOX*

- ONCE LIFETIME LEAD LEVELS –

WE'VE ALL LIVED WITH LEAD PIPES, LEADED GASOLINE, PLUS BLOOD TEST INCLUDES OTHERS (THINK PESTICIDES/ARSENIC AS WELL AS MERCURY)

- VITAMIN D3 LEVELS – AND GET SOME UNBLOCKED A.M. SUN

- THE B'S – FOLATE & B12 LEVELS BRAIN & SPINAL CORD LOVES THESE AND B1 (THIAMINE)

- FERRITIN (IRON BODY **STORES**) – TOO MUCH OR LITTLE NOT GOOD –  
RELATIONSHIP TO BRAIN NEUROTRANSMITTER DOPAMINE

## *OTHER DOABLES*

- **NEW** LEARNING – MEANING **NEW**,  
I.E. AS YET UNTRIED –
- A NEW LANGUAGE, NEW BOARD GAME (MEMORIZATION/PATTERNING),
- LEARN TO USE OTHER HAND
- NEW DRIVING ROUTE  
(VISUOSPATIAL),
- CHANGE EXERCISE ROUTINE  
(POSITION SENSE)
- WORK ON BALANCE (DIFFERENT PART OF ONE'S NERVOUS SYSTEM)

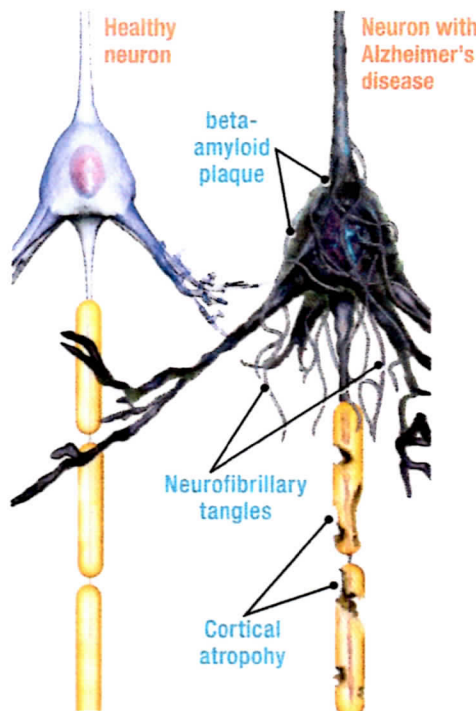
## *AND MORE*

- **STRESS** MAKES EVERYTHING WORSE
- LEARN TO MEDITATE OR EQUIVALENT
- DO AT LEAST ONE GOOD UNEXPECTED DEED A DAY
- LAUGHTER – THE BRAIN LITERALLY DOES NOT KNOW THE DIFFERENCE BETWEEN TRUE MIRTH AND JUST LAUGHING FOR NO REAL REASON!  
(STILL, THE BEST GUFFAW BETWEEN FRIENDS IS QUITE PRICELESS...)



## WHAT IS ALZHEIMER'S DISEASE?

BOX 1-3

HEALTHY NEURON VS.  
NEURON WITH ALZHEIMER'S DISEASE

## Brain changes in Alzheimer's disease

The brain—by far the most complex organ in the body—contains about 100 billion specialized cells called neurons (see Box 1-2, “Neurons”). Neurons are clustered into distinct regions of the brain, each having specialized functions. For example, a region called the hippocampus plays a critical role in memory. The regions of the brain communicate with each other via an extensive two-way network of neurons. This interaction produces all of the functions of the brain, from thoughts, feelings, and memories, to movement and even breathing.

Damage to the brain—from strokes, head injuries, dementia, or other causes—can interfere with normal brain functioning depending on the type of damage and where in the brain it occurs.

Alois Alzheimer, who identified the first Alzheimer's patient in 1906, found two distinctive features when he performed an autopsy on the brain of a patient who had symptoms of dementia before she died. He discovered that nerve cells in certain areas of the brain were gummed up by a sticky material called amyloid plaque. Inside the cells, he found twisted threads called neurofibrillary tangles (see Box 1-3, “Healthy neuron vs. neuron with Alzheimer's disease”).

The presence of these plaques and tangles distinguishes Alzheimer's disease from other forms of dementia (see Box 1-4, “Plaques and tangles”).

Plaques and tangles show up first in the regions of the brain responsible for memory. As the disease progresses, these plaques and tangles rob cells in crucial brain areas of the ability to function. Key brain cells eventually die, which accounts for the permanent problems with memory, thinking, and behavior.

In addition to plaques and tangles, other abnormalities are seen in the brains of people with Alzheimer's disease. These include inflammation and oxidative damage to brain cells (from highly reactive forms of oxygen).

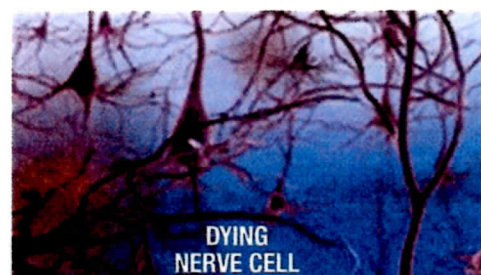
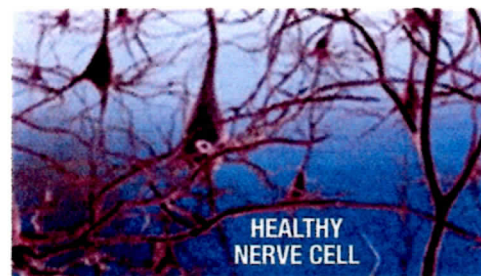
Many questions remain unanswered about the relationship of the plaques and tangles to the disease. For example, do plaques form first, which then cause tangles to form, which leads to the development of Alzheimer's disease? Or, do the tangles occur first? Or, does some other physiologic event happen that triggers the formation of plaques and tangles? These questions have become imperative to answer because researchers now believe that understanding the earliest brain changes is the key to unlocking the mystery of Alzheimer's disease and possibly preventing it.

### Amyloid plaques

Amyloid plaques are a sticky byproduct of a substance called beta-amyloid. Beta-amyloid is a small section of a larger protein called amyloid precursor protein (APP), which exists inside neurons. Under normal circumstances, APP appears to aid in the growth and maintenance of neurons. It stimulates the development of nerve paths. Intact nerve paths are essential for the brain to function properly. Through a process not yet fully understood, the APP can get snipped into smaller pieces, like taking a long strand of ribbon and cutting it into smaller sections. Sometimes it gets clipped into harmless pieces and sometimes it gets clipped in such a way that it forms beta-amyloid. Scientists have identified the enzymes that act like scissors, snipping APP into the beta-amyloid fragments.

The short beta-amyloid strands, intermingled with portions of neurons and other cells, clump together and eventually form sticky deposits called plaques. Plaques are found in the spaces between the brain's neurons. In people with Alzheimer's disease, these plaques form first in areas of the brain responsible for memory and thinking. The plaques displace healthy neurons and may kill them. Research is underway to better understand the biological mechanisms of APP, in the hope of discovering a way to stop it from breaking down into the detrimental beta-amyloid.

### PLAQUES AND TANGLES



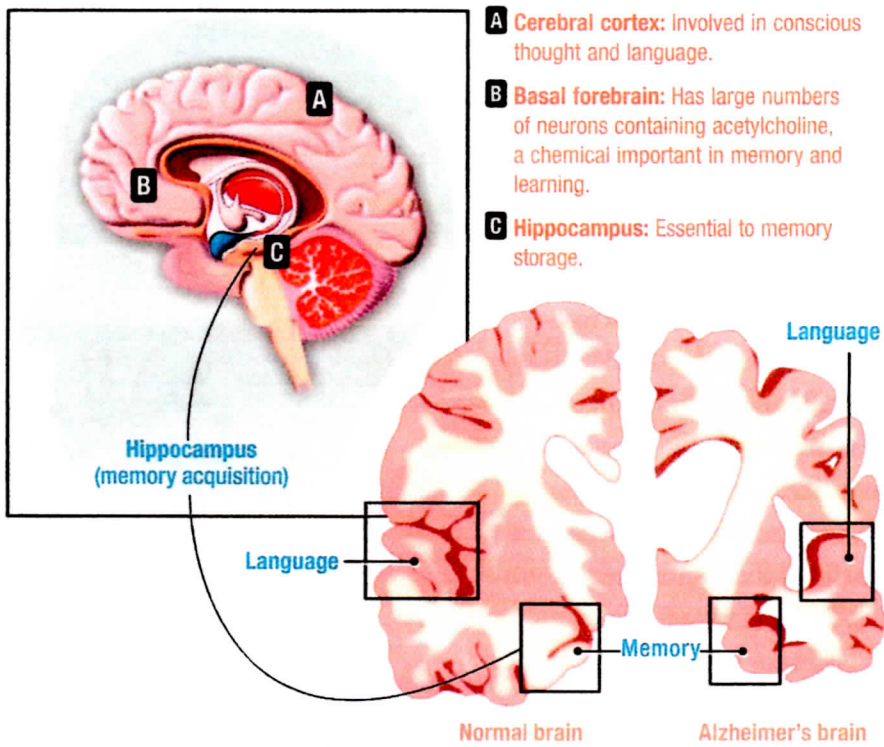
Alzheimer's tissue has far fewer nerve cells and synapses than a healthy brain. Plaques build up between nerve cells. Dead and dying nerve cells contain tangles, which are made up of twisted strands of the protein tau.

Image credit: Jannis Productions. Rebekah Fredenburg, computer animation



## THE BRAIN AND ALZHEIMER'S DISEASE

Alzheimer's disease attacks nerve cells (neurons) in several areas of the brain, including:



BOX 1-6

### Normal brain vs. Alzheimer's brain

In the Alzheimer's brain the cortex shrivels up, damaging areas involved in thinking, planning and remembering. Shrinkage is especially severe in the hippocampus, an area of the cortex that plays a key role in the formation of new memories. Ventricles (fluid-filled spaces within the brain) grow larger.

### Neurofibrillary tangles

Neurofibrillary tangles are dense proteins within neurons that injure the cells. These tangles are twisted threads, the major component of which is a protein called tau. Normally, tau has a beneficial function. But in people with Alzheimer's disease, the tau protein has gone through a chemical change that prevents it from acting normally. The tau threads become twisted up with one another, forming tangles. As a result, the neuron loses the ability to function well, and it ultimately dies.

### Lost connections

As plaques and tangles become more numerous, they damage neurons to the point where they can no longer communicate with one another.

Neurons communicate via chemicals

called neurotransmitters, which carry signals from one cell to another. It is the intricate interconnection of billions of neurons communicating via these signals that regulates all the functions of the brain, from generating thoughts to controlling bodily movements.

Eventually the plaques and tangles cause neurons to die, and vital connections are lost. At first, the loss of neurons primarily affects the parts of the brain responsible for short-term memory (the hippocampus and entorhinal cortex), leading to short-term memory failures (see Box 1-5, "The brain and Alzheimer's disease"). Later, the areas of the brain that control language, attention, and reasoning (in the cerebral cortex) are affected. Damage caused by Alzheimer's disease can spread to other parts of the brain, leading to greater and greater disability. Over time, the brain shrinks dramatically as more and more neurons die (see Box 1-6, "Normal brain vs. Alzheimer's brain").

Scientists don't fully understand the exact sequence of biological events that leads up to Alzheimer's disease, yet there are several hypotheses. It is believed that the plaques, tangles, and other brain changes of Alzheimer's disease begin long before memory loss and other cognitive problems become noticeable.

## Symptoms of mild cognitive impairment

- Difficulty performing more than one task at a time
- Difficulty solving problems or making decisions
- Forgetting recent events or conversations
- Taking longer to perform more difficult mental activities

## Early signs of dementia

Early symptoms of dementia can include:

- Difficulty performing tasks that take some thought, but that used to come easily, such as balancing a checkbook, playing games (such as bridge), and learning new information or routines
- Getting lost on familiar routes
- Language problems, such as trouble finding the name of familiar objects
- Losing interest in things you previously enjoyed; flat mood
- Misplacing items
- Personality changes and loss of social skills, which can lead to inappropriate behaviors

National Library of Medicine

## Alzheimer's changes begin much earlier

The changes in the brain associated with Alzheimer's disease may be detectable years before the onset of the disease, even in people as young as 20. New research suggests that the beta-amyloid compounds that are the building blocks of the plaques characteristic of Alzheimer's are present even in healthy brains and at a young age. These amyloids often first clump together in a key area of the brain, the basal forebrain; scientists found signs of such clumps in brains of older people who were cognitively healthy when they died. In people who develop Alzheimer's, more amyloid compounds seem to collect and the amyloid clumps form plaques. The findings suggest that Alzheimer's disease is truly a lifelong process, scientists said, and that preventive interventions may need to begin much earlier.

*Brain*, online first, March 2, 2015

## 10 warning signs of Alzheimer's

Early warning signs of Alzheimer's disease:

1. Memory loss that disrupts daily life.
2. Challenges in planning or solving problems.
3. Difficulty completing familiar tasks at home, at work, or at leisure.
4. Confusion with time or place.
5. Trouble understanding visual images and spatial relationships.
6. New problems with words in speaking or writing.
7. Misplacing things and losing the ability to retrace steps.
8. Decreased or poor judgment.
9. Withdrawal from work or social activities.
10. Changes in mood and personality.

The Alzheimer's Association [www.alz.org/10signs](http://www.alz.org/10signs)



**M**any people in middle and older age complain that their memory just isn't as sharp as when they were young. It becomes harder to remember names of people you just met. You may spend more time than you'd like looking around for your reading glasses, watch, or car keys. How many times have you walked into a room only to forget why you went there? As we age memory starts to falter in mostly predictable ways. Increasing difficulty with short-term memory (like forgetting where you parked the car), diminished ability to quickly switch mental gears among several tasks, and taking longer to process new information are typical in most people as they get older.

These problems are not uncommon, and they are not telltale symptoms of dementia. In dementia, cognitive abilities are lost to the point where a person cannot function independently. In normal aging, they are simply diminished somewhat.

Some memory problems may be caused by a health condition or medication you're taking. Fatigue, stress, depression, and anxiety can lower your memory potential, as can a vitamin B12 deficiency, thyroid problems, and anemia. Medications such as antihistamines, anti-anxiety drugs, sleep aids, and painkillers also may impair memory. You can correct the problem by treating the underlying condition or by stopping the medication. Any concerns about medications and their potential cognitive effects or interactions should be discussed with your doctor. Concerning drug interactions, your pharmacist may be a valuable resource of information to bring to your doctors.

## Normal memory changes

The changes that take place in memory and cognition vary from person to person; however, some are relatively common. For example, the speed at which the brain processes information is often affected. This means if a list of words is given to a group of 20-year-olds and a group of 75-year-olds, and they are asked to recall the words a short time later, the 20-year-olds will remember more words. However, if the list of words is shown more than once and the participants are allowed to read the words out loud, the 75-year-olds are likely to do just as well as the 20-year-olds. The more exposure

you have to information you need to remember, and the more often you repeat it, the more likely you are to remember it, at any age. Therefore, it's possible to compensate for reduced information-processing speed.

Older adults may also experience a delay in recalling information. This is what is happening when you have to rack your brain to remember a familiar word or the name of someone you recently met. The encouraging news is the information is not gone for good. If someone tells you the word or name, you will recognize it, or you may eventually come up with it on your own.

## Focus on one task at a time

Some older adults have a decreased ability to divide their attention among more than one activity or source of information. This also happens to people with Alzheimer's disease. With Alzheimer's disease it becomes increasingly worse, significantly impairing the ability to function. With normal aging, it simply means that you need to concentrate your attention more fully on one task at a time.

On the positive side, aging does not affect the recall of established skills. Vocabulary and general knowledge continue to increase with age, and reasoning and intelligence are not impaired.

It is important to realize there are large differences in mental function among people at any age. Not everyone experiences difficulties in all aspects of mental function, and the degree of difficulty varies widely among different people. Some people in their 70s and 80s have a remarkable ability to maintain a very high level of memory and other mental functioning.

## The adaptable brain

In the past, age-related changes were blamed on dying neurons in the brain. Experts believed that new neurons were produced only early in life and once a person reached adulthood brain cells started to die off. A much more complex view of the brain has come to be accepted. Neurons don't die quite as rapidly as previously thought and new neurons actually can grow, even in adults.

Perhaps more importantly, new connections among neurons continue to be formed throughout life. Brain processes, including memory, thinking, and other functions, occur as neurons communicate with one another via projections (called axons and dendrites) that create a vast web inside the brain. As memories are formed, new skills learned or other thought processes occur, new pathways get created among the network of neurons. The more the information is reinforced, the



stronger the pathway becomes. Because the brain responds to stimulation, such as exposure to new information, by creating new connections staying mentally active by reading, doing crossword puzzles, joining discussion groups, or engaging in any activity that stretches your mind may help you maintain mental function.

The brain also is capable of adapting. In fact, the brain has a remarkable capacity for modification and repair. If one network becomes faulty, another network can often take over its function. And even if new neurons are not created the existing ones can create new connections.

## Memory training

Because the brain is adaptable and can continue to form new connections throughout life, most people can learn and improve their memory at any age. A memory-improvement industry has grown up around the promise of mental fitness. Numerous books and computer- and Web-based products claim to boost memory and mental function. Whether these brain-training programs have any measurable impact on memory or cognition is not known.

Before spending money on a high-tech solution, however, consider some low-tech strategies for improving your memory. Put simply, memory involves three basic steps: acquiring information, storing it, and retrieving it. Often people have difficulty remembering something because they didn't adequately acquire the information to begin with. Acquiring information requires you to focus your attention on what you want to remember. So when you park your car in a large parking lot, stop and be mindful for a moment, telling yourself exactly where your car is and perhaps write down the location—then it will be easier for you to find your car later.

It's easier to pay attention to, and therefore to remember, information that has meaning to you. You can also give meaning to information you find not quite as interesting, making it easier to remember. You can organize the information in certain ways, or use memory tricks. An example of a memory trick is the method commonly used to remember how many days are in each month ("Thirty days hath September, April, June and November...").

Another way to improve your memory is simply to be more organized. Use tools such as appointment books and calendars to keep track of your schedule. Keep a to-do list to remember tasks and chores. Designate certain "forget-me-not spots" where you always put your keys or glasses. Remember, it isn't always necessary to rely on your memory. Keep a notebook in which you write things you want to remember.

You can learn memory techniques (see Box 2-1, “Memory techniques”). For example, you can create a story or picture for things you want to remember or say the information out loud. You can also connect new information with something that you already know well.

BOX 2-1

### Memory techniques

There are several techniques you can use to give meaning to information so that you can more easily remember it. Different people prefer different ways of remembering. Choose a method that works for you and keep practicing it. Here are seven techniques for one of the most common memory complaints: recalling names.

#### 1 REPETITION

If you want to learn someone's name, simply repeat it until you've learned it. Say the name silently to yourself or aloud during a conversation, or, if you're on the telephone, write it down while speaking.

#### 2 PRACTICE

This is similar to the repetition method, but it uses a specific structure for the repetition. For example, spell the name (to yourself or out loud), make a remark about the name, or say the person's name at the beginning or end of the conversation.

#### 3 CONNECTION

Make a connection between the name and something that is familiar to you. For example, if the person's name is Noah, say or think, “Oh, as in the ark?” This makes the name more meaningful and memorable.

#### 4 SNAPSHOT

You may not be aware of the strength of your visual memory. Use it by picturing the person's name, which can make abstract information more tangible and meaningful. Some names are easy to visualize (e.g., Green, Shepard, Fox).

#### 5 STORYTELLING

Make a name more meaningful by creating a funny or exaggerated association for it. For example, take the name “Frank Hill.” You may say to yourself, “Frankly, he's getting over the hill.”

#### 6 MOVIE

This technique uses both verbal and visual associations and involves motion. If you want to remember Earl Brickman, you could picture an earl, dressed in robes, laying bricks.

#### 7 VISUAL LINK

In this technique, you link something about the person's physical appearance to his or her name. So, if you meet Alfred Turnball and you notice that he has a very round chin, you can imagine his chin as a ball turning.

Source: *Total Memory Workout: 8 Steps to Maximum Memory Fitness*, by Cynthia R. Green, Ph.D., Bantam Books, September 1999



Don't forget  
To  
Call TOM

Chapter

3

STORY

# BRAIN GAIN

## NEWS FOR YOUR NOGGIN

### 1 Dementia rates are dropping.

The news broke in February. Researchers who had followed roughly 5,200 participants in the Framingham Heart Study since 1975 reported that the incidence of dementia had dropped steadily from 3.6 per 100 people aged 60 or older in the late 1970s to 2.0 per 100 in the early 2010s.<sup>1</sup>

"Our study offers hope that some dementia cases might be preventable, or at least delayed," says Sudha Seshadri, professor of neurology at Boston University School of Medicine, who led the study.

What led to the drop?

"There are two principal possibilities, neither of which can be proved," says David Knopman, professor of neurology at the Mayo Clinic.

"The first is that we're better at reducing risk factors for cardiovascular disease like high blood pressure, high cholesterol, and smoking. The second is that the trend in improved educational attainment over time has delayed the symptoms of dementia."

Unfortunately, the number of people with dementia isn't falling because the older population is growing.

"We are expecting an explosion of dementia over the next 50 years, with devastating consequences on the personal and societal level because our population is aging," says Seshadri.

"If we can, however, bend the arc of risk so that people get it later, closer to the natural lifespan, then we will be reducing the burden of dementia."

"What is her name?" "Where are my keys?" "When is that meeting?" If you're over 50, you've been there. (Thank goodness for phone reminders.) But that's a far cry from having Alzheimer's or another dementia. What's the latest on staying sharp? Here are eight recent findings that may surprise you.

### 2 There are two tracks to brain drain.

To most people, memory loss means Alzheimer's disease. But to researchers, Alzheimer's is just half of the picture.

"Ninety percent of the cognitive decline seen in the elderly is due to amyloid or vascular changes to the brain," says Prashanthi Vemuri, a Mayo Clinic researcher who studies cognitive decline.<sup>2</sup>

■ **Alzheimer's.** The hallmark of Alzheimer's is abnormal fragments of protein called amyloid.

"Amyloid plaques collect in the brain," explains Vemuri. But amyloid

alone doesn't cause Alzheimer's.

"Roughly 30 percent of people aged 70 to 90 have amyloid in their brains, and they're cognitively normal," she says.

Amyloid causes trouble when the brain also has abnormal tangles of a protein called tau (see illustration).

"Amyloid is the trigger and tau is the bullet," says Vemuri. "Amyloid accelerates the spread of tau throughout the brain."

■ **Vascular dementia.** "Vascular dementia is due to damage to blood vessels in the brain," says Vemuri.<sup>3</sup>

On brain scans, it can show up as infarcts—brain cells that have died from lack of oxygen after tiny blood vessels ruptured or became blocked.

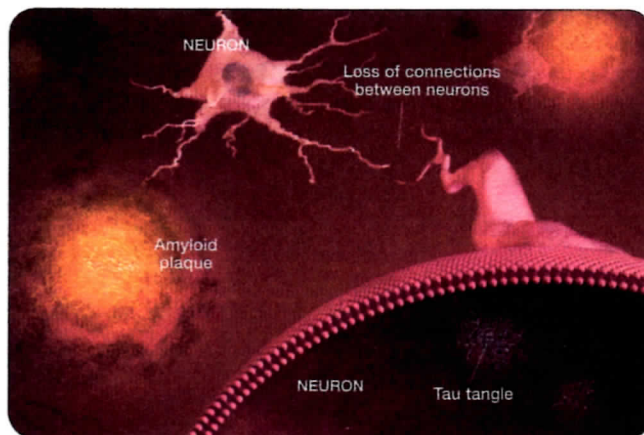
Or it may show up as damage to the brain's white matter, which contains bundles of nerve fibers.

"The white matter starts deteriorating," says Vemuri.

As with amyloid, people don't know that their small blood vessels are damaged. "By age 70, about 15 percent of people have vascular disease in the brain," says Vemuri. "By age 90, about 70 percent have it."

And it's not either/or. Roughly half of people with memory loss have both amyloid and vascular damage.

The endpoint is the same, notes Vemuri.



The hallmarks of Alzheimer's. Excess beta-amyloid may trigger a chain of events that includes tangles of abnormal tau protein and, eventually, damaged nerve cells (neurons).



"Both pathways are linked to slow metabolism in the brain. The brain is like a city of lights, and there is a slowly spreading power failure."

What's more, "the neurons start dying and shrinking," says Vemuri. "Ultimately, it's shrinkage that causes the cognitive decline."

### 3 Blood pressure matters.

Why does damage to small blood vessels in the brain—starting in your 40s and 50s—matter so much for thinking abilities?

"The areas in the frontal lobe of the brain that are most important for executive function, planning, and learning are particularly vulnerable to damage caused by blocked blood vessels," says Patrick Smith, assistant professor of psychiatry and behavioral sciences at Duke University School of Medicine.

That's less of a problem in some other parts of the brain. "Areas like the occipital lobe for vision get multiple feeds of blood from different areas," explains Smith.

But in the frontal lobe, there's less redundancy. "So you see damage in the watershed brain regions, where a blockage in one part of the artery causes a lot of white matter damage downstream."

And many infarcts are silent.

"Small infarcts are pretty common, and most people don't even know they've had them," says Smith. "The same is true with white matter damage. And both are related to blood pressure."

The DASH (Dietary Approaches to Stop Hypertension) diet lowers blood pressure (see "DASH Diet," p. 6). Could it improve thinking ability?

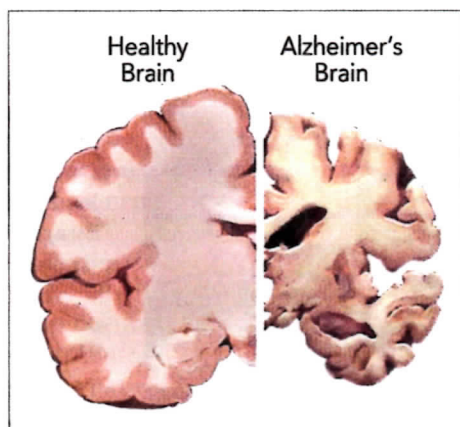
Smith and his colleagues randomly assigned 124 sedentary overweight or obese

adults with pre-hypertension or hypertension to one of three groups: a DASH diet alone, a DASH diet with fewer calories plus exercise, or their usual diet.<sup>4</sup>

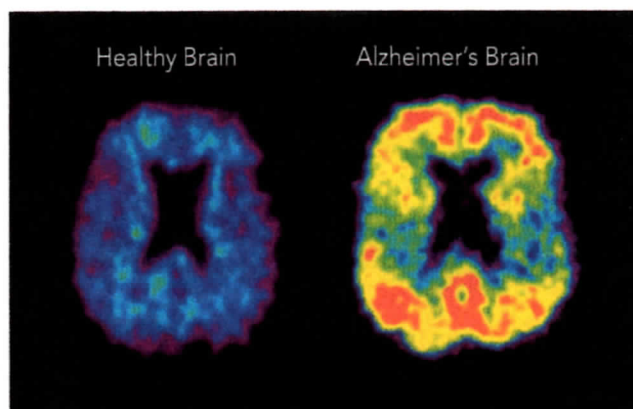
"We were surprised at the results," says Smith. "Even though it was only a four-month intervention, we saw improvements in executive function, processing speed, and some aspects of learning and memory in the group that got the weight-loss DASH diet and aerobic exercise." The DASH diet alone only improved processing speed.

"People who started out with greater thickness in the walls of their carotid arteries seemed to experience a greater improvement in cognitive function," says Smith. "The carotid artery wall is a barometer of cardiovascular risk, so those are people who were at greater risk for stroke or future heart problems."

"One thing that we've learned over the past few decades is that progressive cognitive problems happen over the course of decades," adds Smith. "So controlling your cardiovascular risk factors—getting high blood pressure and high cholesterol into the normal range—could make a big difference over time."



**The shrinking brain.** The brain's white matter shrinks in both advanced Alzheimer's (right) and in advanced vascular dementia.



**Beta-amyloid scan.** Researchers can now detect beta-amyloid (red and yellow) in the brain 20 years before people have any symptoms of memory loss.

### 4 High blood sugar harms the brain.

High blood sugar threatens your brain. Why?

Researchers are looking into two main possibilities.

"Diabetes causes cardiovascular disease in every other organ of the body—the heart, kidney, and

eyes," says the Mayo Clinic's David Knopman. "So why wouldn't it do the same in the brain? It does."

A second possibility: "Insulin metabolism might influence Alzheimer's," says Knopman. "That one is interesting but more speculative."

People with type 2 diabetes may have low levels of insulin in their brains.

"Insulin increases some brain enzymes that degrade amyloid," explains Knopman. "So if diabetes alters brain insulin levels, that could have a deleterious effect on the brain."<sup>5</sup>

Even people with blood sugar levels that are higher than normal—but not high enough to reach the diabetes range—are at risk.<sup>6</sup>

"Nature doesn't obey the boundaries set by humans," notes Knopman. "We may define diabetes as a fasting blood sugar level above 125, but 124 still carries a greater risk than 102."

### 5 Using your brain delays symptoms.

"If you've had a more intellectual lifestyle throughout life—higher education, occupation, and cognitive activities—does it delay your symptoms of cognitive decline?" asks the Mayo Clinic's Prashanthi Vemuri. "The answer is yes."

The delay ranges from three to eight years, depending on how much education, etc., you've had.<sup>7</sup>

"And the protection is the same whether you have vascular or Alzheimer's pathology or both," adds Vemuri. "Your brain is better able to cope with any kind of pathology it gets."

Unfortunately, all that learning and



## WANT TO HELP?

thinking doesn't actually change your brain.

"Some people believe that by using your brain, you're getting rid of the toxic stuff," notes Vemuri. "But that's not the case."

Brain scans don't show any less amyloid or damage to small brain blood vessels in professors than in high-school dropouts.

"The brain is still going through the same changes," says Vemuri, "but better-educated people go longer without symptoms." That is, their brains keep working normally.

In any case, what matters is what your brain can do, not what it looks like on a scan. "It can't hurt to keep your mind active," says Vemuri. "It helps delay the onset of symptoms."

## 6 Brain foods? It's not clear.

"The MIND diet: 10 foods that fight Alzheimer's (and 5 to avoid)," ran the headline on CBSNews.com. "The MIND diet helped slow the rate of cognitive decline and protect against Alzheimer's regardless of other risk factors."

The MIND—Mediterranean-DASH Intervention for Neurodegenerative Delay—diet is a hybrid of those two diets with a few tweaks. For example, instead of *any* fruit, the MIND diet includes only berries, largely because blueberries seem to help rats find their way through mazes.

The 10 "brain healthy" food groups: green leafy vegetables, other vegetables, nuts, berries, beans, whole grains, fish, poultry, olive oil, and wine. The five unhealthy groups: red meats, butter and stick margarine, cheese, pastries and sweets, and fried and fast food.

The problem: researchers have observed less dementia in people who eat a MIND-like diet *on their own*.<sup>8</sup> But no one has told people to eat either a MIND diet or some other diet and then tested to see if one group has better memory after several years.

Back to Stories

Anne is at heightened risk for Alzheimer's and is doing her part to find a cure



Most people wouldn't think twice about forgetting an item at the grocery store or misplacing their car keys; but for people like Anne, these minor lapses in memory can sometimes feel like potential warning signs, reminding her that she is at elevated genetic risk for Alzheimer's disease.

Anne is all too familiar with the effects of Alzheimer's, which has long afflicted her family. She watched as her father's mental faculties

212,493 people have signed up to help end Alzheimer's. THE NEXT STEP IS YOURS.

Email \*

First Name \*

Last Name \*

Zip/Postal Code \*

Year of Birth \*

Want to help scientists solve the Alzheimer's puzzle? They're looking for people with or without symptoms to participate in studies. A few examples:

■ **Brain Health Registry.** Adults aged 18 to 110 can play online brain games every 3 to 6 months to help researchers track their performance with age.

■ **GeneMatch study.** After you mail in a cheek swab, researchers will determine (but won't tell you) if you have the APOE4 gene, which boosts your risk of Alzheimer's. Open to anyone aged 55 to 75 who has neither mild cognitive impairment nor dementia.

■ **A4 study.** The Anti-Amyloid Treatment in Asymptomatic Alzheimer's study is testing a drug that fights amyloid on people aged 65 to 85. You can only enroll if researchers find that you have signs of amyloid (on brain scans) and no memory loss.

The registry is co-sponsored by Banner Health, Cleveland Clinic, Columbia University, Johns Hopkins University, the Mayo Clinic, and other institutions. For more information, go to: [endALZnow.org](http://endALZnow.org) or call (800) 438-4380.

"People who eat a healthier diet may also have higher socioeconomic status, higher educational status, and may be more likely to exercise or engage in other health behaviors," says Knopman.

So far, the only study that pitted one diet against another was the PREDIMED trial.<sup>9</sup>

Spanish researchers randomly assigned roughly 450 people at high risk for heart attack and stroke to one of three groups. All ate a Mediterranean diet. But those who were given a weekly supply of extra-virgin olive oil and those who were given a weekly supply of nuts (walnuts, almonds, and hazelnuts) for four years did better on several cognitive tests than

a control group (which was told to eat less fat, but didn't).

"The results are promising," says Knopman.

"It's great that they tested cognition at the beginning and the end of the study and that they had a control group. But the study was hardly definitive. The improvements were very modest and barely statistically significant."

Nuts and olive oil may help prevent cardiovascular disease, adds Knopman. "But it's an overstatement to say that either a Mediterranean diet or just the nuts or olive oil makes a difference in cognition."

## 7 What's best? Do it all.

Instead of testing the brain gains you can expect from a healthy diet *or* exercise *or* brain training, Finnish researchers did it all.

They recruited 1,260 people aged 60 to 77 who had average or slightly below average scores on memory tests *and* had risk factors for vascular dementia like high blood pressure, high cholesterol, high blood sugar, excess weight, or a sedentary lifestyle.

Half (the control group) got general health advice. The other half (the intervention group) had their blood

pressure, blood sugar, and other risk factors monitored and received training to:

■ **Eat a DASH-like diet**, with fruits and vegetables, whole grains, low-fat dairy and meat, fish at least twice a week, canola oil or margarine (rather than butter), and no more than 12 teaspoons of added sugars and 2,000 milligrams of sodium a day.

■ **Do aerobic exercise** two to five times a week and **strength training** one to three times a week.

■ **Use a computer** for 10 to 15 minutes three times a week to do tasks designed





to improve memory, mental speed, and executive function.

The result: after two years, the intervention group did better on tests of mental speed and executive function, but not memory.<sup>10</sup>

"It has been very difficult to prove anything works for reducing dementia or cognitive impairment in a randomized trial," Miia Kivipelto, professor of clinical geriatric epidemiology at the Karolinska Institute in Stockholm, told the website Medscape in 2015.

"Now we have done it. Our results suggest prevention is key. We can do things before memory problems develop to lower the risk."

Her research team will track the participants for seven years to see if the intervention group has less dementia.

## 8 Hearing loss may lead to memory loss.

"Hearing loss is strongly linked to a higher rate of cognitive decline and a greater risk of developing dementia over time," says Frank Lin, associate professor of otolaryngology at the Johns Hopkins University School of Medicine.<sup>11</sup>

And hearing loss is more common than you may think.

"The percentage of people with hearing loss doubles every decade," says Lin. "By the time you look at adults 70 and older, nearly two-thirds have a clinically significant hearing impairment."

Poor hearing may not affect your blood vessels or your risk of Alzheimer's. "Hearing loss may be an independent hit on the brain," says Lin.

The key theories:

■ **Cognitive load.** "When you have hearing loss as you age, the cells in your inner ear are damaged and can't regenerate," explains Lin.

"So instead of sending a crystal clear signal to the brain, the cells send a much more garbled signal."

Decoding a garbled message takes more effort. "We know from neuroimaging studies that the brain has to work harder to process a degraded signal," says Lin. "So the brain rededicates resources to help with hearing, and it comes at the expense of memory and thinking abilities."

■ **Brain atrophy.** "Hearing impairment may lead to faster rates of brain atrophy," says Lin. "That makes sense, because if you have a very impoverished auditory signal, those parts of the brain that handle sound will atrophy faster. And those parts also serve other areas of brain function."

■ **Social isolation.** "For some people, hearing loss leads to a loss of social engagement, which leads to social isolation," says Lin.

People may feel like a nuisance if

### TO PROTECT YOUR BRAIN

There's a good chance that these steps will protect your brain...and your health.

- Control blood pressure and cholesterol with diet, exercise, and (if necessary) medication
- Keep a lid on blood sugar
- Lose (or don't gain) excess weight
- Exercise 30 to 60 minutes a day
- Eat a healthy diet (see "DASH Diet")
- Stay mentally and socially active
- Get your hearing checked

### IT MIGHT ALSO HELP TO

There's some evidence, but something else about people who do these things may explain their lower risk.

- Get enough sleep
- Eat more seafood and berries
- Get enough vitamin D
- Consume more caffeine

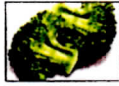




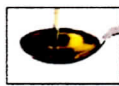
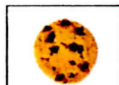

### DON'T EXPECT MUCH FROM

These supplements have failed to help or haven't been well tested.

- B vitamins
- Vitamins C and E and beta-carotene
- Multivitamins
- DHA
- Phosphatidyl serine
- Vinpocetine
- Huperzine-A
- Ginkgo
- Prevagen

## DASH Diet

A DASH diet keeps a lid on blood pressure, which may protect your brain's blood vessels. Here's a 2,100-calorie version.

	Daily Servings	
<b>Vegetables &amp; Fruit</b> (1 serving: ½ cup or 1 cup greens or 1 piece fruit)	11	
<b>Grains</b> (1 serving: ½ cup pasta or rice or cereal or 1 sl. bread)	4	
<b>Low-fat Dairy</b> (1 serving: 1 cup milk or yogurt or 1½ oz. cheese)	2	
<b>Legumes &amp; Nuts</b> (1 serving: ½ cup beans or ¼ cup nuts or 4 oz. tofu)	2	
<b>Poultry, Fish, Lean Meat</b> (1 serving: ¼ lb. cooked)	1	
<b>Oils &amp; Fats</b> (1 serving: 1 Tbs.)	2	
<b>Desserts &amp; Sweets</b> (1 serving: 1 tsp. sugar or 1 small cookie)	2	
<b>Wild Card</b> Poultry, Meat, Fish or Oils & Fats or Grains or Desserts & Sweets	1	

they keep asking others to repeat inaudible words, so those with hearing loss often give up and stay on the sidelines.

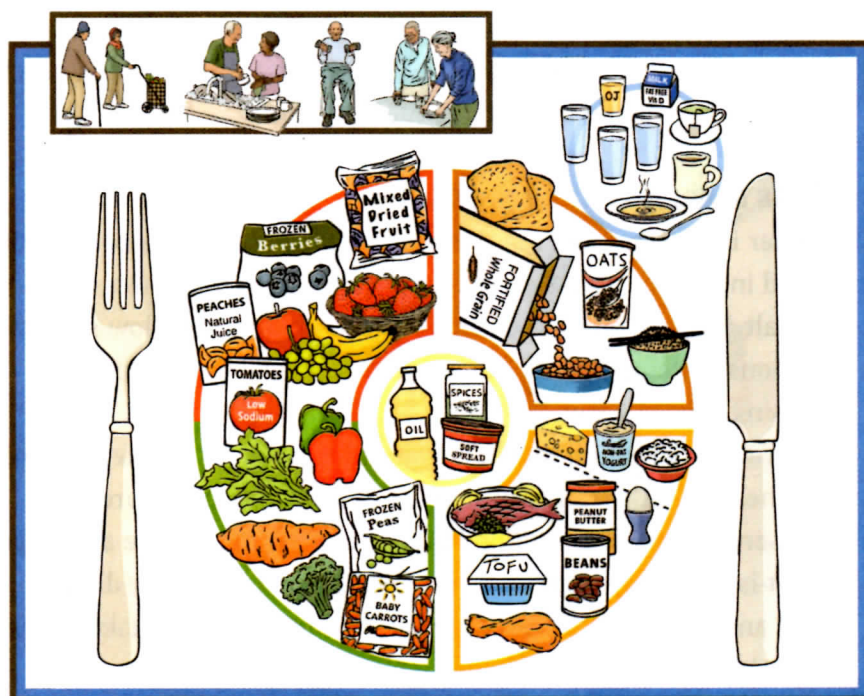
"They're less likely to be engaged, which is clearly a risk factor for maintaining cognitive health," says Lin.

Would a hearing aid delay memory loss? "That's the big question," says Lin. He is currently planning a five-year trial to find out. 🍌

- 1 N. Engl. J. Med. 374: 523, 2016.
- 2 Brain 138: 761, 2015.
- 3 Stroke 42: 2672, 2011.
- 4 Hypertension 55: 1331, 2010.
- 5 Eur. J. Pharmacol. 719: 170, 2013.
- 6 N. Engl. J. Med. 369: 540, 2013.
- 7 JAMA Neurol. 71: 1017, 2014.
- 8 Alzheimers Dement. 11: 1015, 2015.
- 9 JAMA Intern. Med. 175: 1094, 2015.
- 10 Lancet 385: 2255, 2015.
- 11 JAMA Intern. Med. 173: 293, 2013.



## MyPlate for Older Adults



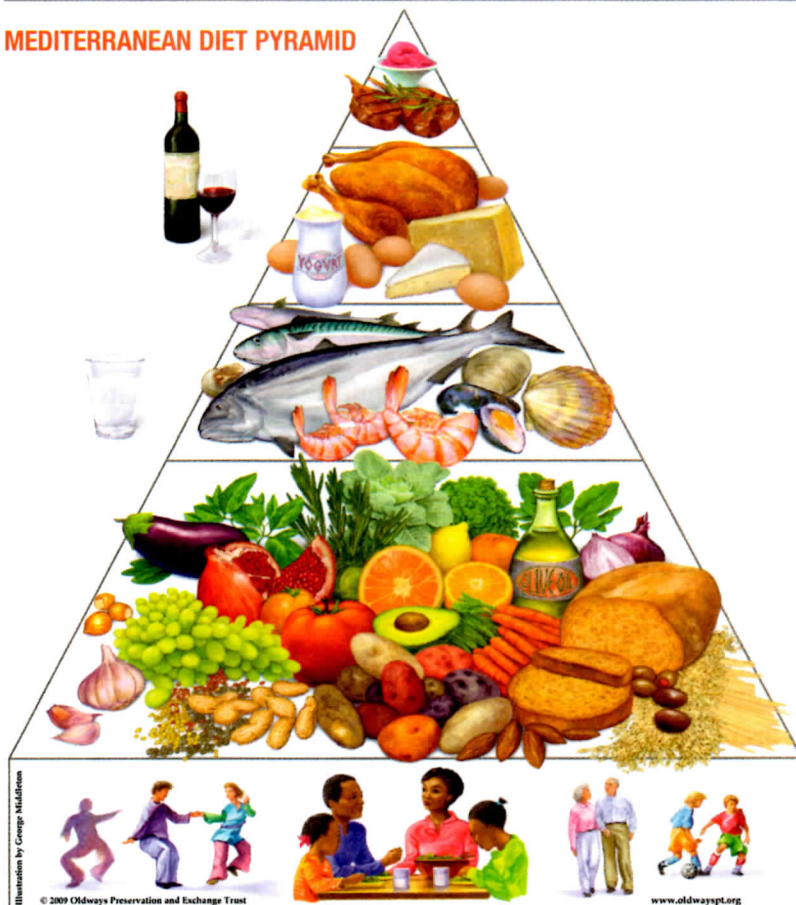
### MyPlate for Older Adults

The MyPlate for Older Adults illustrates:

- Bright-colored vegetables, such as carrots and broccoli
- Deep-colored fruit, such as berries and peaches
- Whole, enriched, and fortified grains and cereals, such as brown rice and 100 percent whole wheat bread
- Low- and non-fat dairy products, such as yogurt and low-lactose milk
- Canned beans and unsalted nuts, fish, poultry, lean meat, and tofu
- Liquid vegetable oils, soft spreads low in saturated and trans fat, and spices to replace salt
- Fluids such as water, soups, teas, and fat-free milk
- Physical activity, such as walking, resistance training, and light cleaning

BOX 2-4

## MEDITERRANEAN DIET PYRAMID



BOX 2-5

### Defining the Mediterranean diet

Despite the popularity of the term, there's no such thing as an official "Mediterranean diet." When researching the possible benefits of a dietary pattern similar to that traditionally found in areas around the Mediterranean compared to the typical American diet, scientists generally look for:

#### MORE

- fruits
- vegetables
- legumes
- cereals
- fish
- monounsaturated fats (such as olive oil)

#### LESS

- red meat
- dairy products
- saturated fats

#### ALSO ...

- Moderate alcohol consumption, especially of red wine with meals

## SLEEP HYGIENE AND SLEEP STRATEGIES

### Suggestions for a good night's sleep from the National Sleep Foundation:

- Go to sleep and get up at the same time each day. Limit daytime naps.
- Exercise at regular times each day.
- Try to get some natural light in the afternoon every day.
- Don't drink caffeinated beverages late in the day.
- Don't use alcohol or cigarettes as a sleep aid. Even small amounts of alcohol can make it harder to stay asleep. Smoking is dangerous for many reasons (including the hazard of falling asleep with a lit cigarette). Also, the nicotine in cigarettes is a stimulant.
- Create a safe and comfortable place to sleep. Make sure you have locks on all doors and smoke alarms on each floor. The room should be dark, well ventilated and as quiet as possible.
- Develop a bedtime routine to signal your body that it's time to wind down.
- Use your bedroom only for sleeping or sex.
- Give yourself about 15-30 minutes to fall asleep. If you are still awake and not drowsy after that time, get out of bed and do a soothing activity (such as listening to soft music or reading). When you get sleepy, go back to bed.
- Try not to worry about your sleep.
- If you are so tired during the day that you cannot function normally and if it lasts for more than two to three weeks, see your doctor or a sleep disorders specialist.

### What's Keeping You Up? 6 Sleep Wreckers

*By Colleen Oakley, Reviewed by Melinda Ratini, DO, MS on July 05, 2015*

When your alarm clock goes off, do you hop out of bed feeling ready to meet the day? Or do you hit the snooze button and roll over trying to figure out how to stay in bed just a little longer because you're so tired?

When it comes to catching your ZZZs, it's not just about quantity. "It's about the quality of your sleep, too," says sleep medicine expert Michael Breus, PhD.

Luckily, you can out maneuver the most common sleep wreckers that block you from getting a good night's sleep. In fact, you can get started doing that tonight.

#### 1. Your Glass of Wine after Dinner

Many people think that a nightcap is just the thing they need to help them relax and fall asleep. But it can backfire.

"Alcohol does make you feel sleepy initially," Breus says. But as your body breaks it down, "it can have a stimulating effect, keeping you out of the deeper stages of sleep, or even causing you to wake often throughout the night."

Do this: You don't have to swear off alcohol altogether. But don't drink right before bedtime.

"It takes about an hour to digest one alcoholic beverage," Breus says. So if you've had two glasses of wine by 10 p.m., it may keep you from a restful sleep until midnight or later.

## **2. Your Smartphone**

Electronic devices, including laptops, cell phones, and TVs, all give off light that can mess with your body's production of melatonin. "Melatonin is the hormone that helps you fall asleep at night," Robert Rosenberg, DO, author of *Sleep Soundly Every Night, Feel Fantastic Every Day*, says.

Do this: Keep your phone in the kitchen or den at night to recharge. Don't keep it on your nightstand where you'll be tempted to check it just before lights out. "And no electronics for at least 60 to 90 minutes before bedtime," Rosenberg says.

## **3. Your Bedtime Snack**

Foods that are high in refined carbohydrates (think chips or pretzels) can cause a quick rise in your blood sugar, Rosenberg says. "Your body then responds with a surge of insulin, causing a drop in blood sugar. That's then countered by the release of stress hormones such as cortisol and adrenaline," he says. "This seesawing back and forth can make it very hard to fall and stay asleep."

Do this: A small snack at night is fine. But ditch the chips for a healthy carbohydrate combined with some protein, Rosenberg says. Some good choices include almond or peanut butter on a whole wheat cracker, shredded wheat and milk, or a banana and yogurt.

## **4. Sleeping In**

Most people think they can "catch up" on sleep lost during the week. But when you get up late on weekends, it can actually be worse for you.

Your body has a natural wake/sleep cycle, also known as its circadian rhythm. When you stay up too late or sleep in too long, you upset that rhythm and make it tougher to get back on track.

Do this: Pick a bedtime and wake up time and stick with it. "The most important thing anyone can do is go to bed and wake up at the same time every day," Breus says. "Consistency is key."

## **5. Your Bedroom's Temperature**

When you are in a room that's too hot or too cold, you may not sleep well, Breus says.

Do this: Of course, perfectly comfortable varies from person to person. Studies show that room temperatures below 65 and above 75 have an effect on sleep cycles. So try to keep it in that range.

You can always adjust the temperature to your liking, and hopefully, your partner will agree with that setting.

## **6. Your Mattress**

A bad mattress and a pillow that doesn't support your body right spell bad news for sleep.

Do this: Buy a new mattress every 8 years, or as needed. "Life changes, such as a car accident or back injury, can change your mattress needs," Breus says. "Also, if you move houses more than two or three times, the springs in a mattress can get damaged."

If you wake up stiff and sore every morning, then it's time to shop for a mattress. Pillows are easy buys, so replace them anytime.