

MIND



ALERT



BRAIN HEALTH FROM 1 TO 100
2002 SPECIAL LECTURE BY PAUL NUSSBAUM

A JOINT PROGRAM OF
THE AMERICAN SOCIETY ON AGING
AND THE METLIFE FOUNDATION

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The American Society on Aging is pleased to partner for a second year with the **MetLife Foundation** and the **Archstone Foundation** to showcase its MindAlert program. The aim of MindAlert is to translate new research on keeping the mind alert in later life into practical tools for elders and aging-services providers.

In the 2002 MindAlert booklet, you will find the following:

- A monograph from the **MetLife Foundation MindAlert Lecture Series**, established in 2001 to disseminate the latest research findings on maintaining and enhancing cognitive function in late life. The second MindAlert lecture was presented in Denver in April 2002 at the Second Joint Conference of the National Council on the Aging and the American Society on Aging. Paul Nussbaum, a neuropsychologist specializing in the assessment and treatment of older adults, was invited to speak on his vision of how best to promote cognitive vitality across the lifespan. The monograph centers around a transcript of Dr. Nussbaum's speech, followed by his 10 tips on how to maintain brain health from the ages of one to 100.
- Brief descriptions of the 2002 winners of the **MetLife Foundation MindAlert Awards**. The awards identify and recognize innovative community-based programs that fulfill the mission of the MindAlert program. Contact information for each award winner is provided for those interested in learning more.

If you would like more information about the MindAlert program, including its Web-based clearinghouse of resources on mental fitness, please visit www.asaging.org/mindalert. Or contact Maggie Durham, manager of education and training, at maggied@asaging.org.

BRAIN HEALTH FROM ONE TO ONE HUNDRED

Paul Nussbaum

It is a pleasure to be here with you to discuss two things that I am very passionate about: the human brain and the aging process. I am going to talk about the intersection of those two areas.

At last year's MindAlert Special Lecture, Marian Diamond and Arnold Scheibel presented a wonderful talk on the latest research dealing with what we know about the animal brain. Their research articulates their belief—and their findings—that contrary to what we have long believed, neurogenesis (the development of new neurons) does occur in the animal brain. We will also talk about that today.

The good news is that not only are we living longer, we are healthier.

One of the things that challenges me, as well as many other academics, is taking information that we deem useful and actually making it useful. Peer-reviewed scientific journals are not the only way to make things useful—in fact, they may not be the best way. Most Americans don't go to the library to read articles in peer-reviewed journals. It's important to me to make information useful to your moms and dads, your children and grandchildren, so they can understand and become passionate about these important issues.

You already know we have a demographic revolution—you folks can cite these statistics in your sleep. We are going to have a lot of older Americans. Certainly, 20 percent of our population will be ages 65 and older by the middle of the century, and one-third will be over the age of 55. We are going to go from about 3 million to 16 million Americans ages 85-plus; some estimates indicate that our country is going to see the number of centenarians increase from 60,000 to about 600,000.

So how are we going to respond to these changes? Some people are running around moaning, "My God, what a burden." I tend to look at this and say, "What an opportu-

nity." But only if we get savvy.

What are you doing today to plan to live this long? How do you take control of your aging? The good news is that not only are we living longer, we are healthier. Studies have shown marked declines in disability in the total U.S. population over the past two decades (disability is a clinical term we use to refer to individuals who are no longer independent). Getting older in the United States of America, although not everything it should be, is a good story.

Now, I come from a field that is fairly morbid. I was trained in disease and pathology, trained to tell you what is wrong. You don't go to your doctor for good things. We aren't trained to understand what's healthy; we're trained to know what is wrong. You go to the see the doctor, and the doctor asks, Why are you here? You say, No real reason. Your communication stops. Once you tell me that you have a pain somewhere, we are OK, and communication picks up.

You have heard a lot of statistics about Alzheimer's disease. One of the things you don't hear from know-it-alls like me, however, is that most Americans over the age of 65 don't have Alzheimer's disease. Most older Americans are not emotionally ill. Most older adults are not financially bankrupt. They are not lonely. We have only 3 million people living in nursing homes, and that's probably a high estimate. Some of those folks aren't even older, they are younger, since we have shifted folks getting rehab in acute-care settings into the long-term care setting. Maybe we would feel a little bit better if the public became more aware of these statistics.

Don't be afraid about getting older. Aging is a continuous variable. Children are aging. Some people say you are aging in the womb. You may be aging after you die—we don't know, we have not been able to measure it yet. Think about aging as a continuous process, not as dichotomous—young people vs. people ages 65 and over. This whole country's view of aging follows a nonsensical premise: that

old age begins at 65. Our social legislative agenda is based on that. Why do we use the age 65 as a cutoff? We adopted 65 as a demarcation point from Germany in the 1800s. Most of the healthcare leaders don't know that, and I'll bet you most politicians don't, either.

Here's What Older People Say They Need

Wouldn't it be nice if we in this room had to create the society we wanted to age successfully in today? What would we want to do? Don't ask me. Don't ask Denver Hospital. Don't ask Blue Cross/Blue Shield. We might want to ask an older American, Hey, what is it that you need? Radical notion. When you ask older adults that question, it's interesting that their responses are not medical in nature. Nobody's up there jumping up and down saying, For God's sake, I want more pills. I want a longer stay in your acute-care center. Make the needle a little bit longer, that would be nice. That's not what people say they need to maintain their quality of life. What they say they need most of all is independence. Research backs that up. They also need family, they need transportation, they need homes. (Did you ever think of your home and your car the way you think about Prozac?) They need something to do, a role and purpose. They need to be loved, and they need somebody or something to love.

I will make an argument today that the education system is the real wellness center for the brain of the 21st century. We don't have to recreate the wheel. It doesn't have to happen in a school building—people like older-adult educators Deanna Eversoll, Barbara Ginsberg and Judy Goggin are leading the nation in lifelong learning programs that don't necessarily have to occur in schools.

The Status Quo Doesn't Work

The last thing we want anyone to access is the healthcare system. The last place that you want to be is in the hospital, right? Yet it is our primary place for care. Isn't that an interesting paradox? Your local hospital

takes care of acute illnesses. Yet, older adults don't suffer from acute illness, they suffer from chronic illness. There may be acute exacerbations of chronic illness, but we send grandma into the acute-care system, with its approach to care, and there are no cures with older adults. You want to manage her illnesses and to prevent decline. So we don't know what we are doing with regard to older adults once they enter the acute-care system, which is why grandma comes back out not looking any better, then goes

The last thing we want anyone to access is the healthcare system.

back in. Now we have a revolving door and politicians sit back and say Medicare has gone broke. Gee whiz, why might that be? Well, let's come up with a chronic-care system. We don't have one. Instead, we have nursing homes, which one-third of the country would rather die than use.

This talk today is about people who have lost their memory. It's about people who come into my office in tears because they want something, a magic bullet to bring their wife back. We are all here together struggling with a thing called Alzheimer's, a classic model of brain disease. At some point in time, we have to say that the status quo doesn't work. People come to see me, they have had this disease four to six years. My hands are tied. I can recommend medications, but they are going to be minimally effective—they probably help more with the doctor's psyche than they do with the patient. We need to do something else: to shift the culture toward proactively promoting life and health across the lifespan.

I don't want you to ever suffer Alzheimer's disease. I still take care of folks with Alzheimer's disease, but I am now out there reaching out to all of you who do not have Alzheimer's disease and trying to inform you so that you never get it. Do we know conclusively how to prevent it? No. Do we have some ideas about how to reduce our risk for the disease? We think so. That is my odyssey—Brain Wellness: the Final Frontier.

What Works for the Heart, Works for the Head

What health-promotion activities have we in this country done right? We are saying that it's important to keep the heart healthy. One of the ways I know that this program has brought about successful results is that statistics show heart disease is no longer the number-one killer in America. It's no longer on the increase. More interesting to me is to look at our behavior regarding heart-health promotion. In this hotel, there are exercise rooms, swimming pools, gyms—see what we have created to promote healthy hearts? Go to dinner tonight and ask the waiter, “Can you give me a list of foods for a healthy heart?” He will give them to you. Same thing at your grocery store. The clerks will tell you where the heart-healthy foods are located.

Listen to your language: “I love you with all my heart.” “You broke my heart.” “I played my heart out last night even though we lost.” The heart has its own holiday—Valentine's Day! The heart is the special child of the family, no doubt about it. But for Pete's sake, can we get a little love to the brain?

I am advocating that we give the brain the same amount of energy at the behavioral-applied level that we devote to maintaining a healthy heart.

Now, traditionally, we have a picture of the brain that doesn't inspire this kind of energy. We have long known that before you are born you lose half of all the neurons that are developing in the womb. You come out of the womb and you continue to lose neurons at a very rapid rate. There is almost a Darwinian thing going on with the neurons that survive—perhaps they are the strongest ones or the ones most needed. At full maturity, the brain weighs between two and four pounds, 60 percent of which is fat. As you get older, you lose brain cells. Do you replace those? The traditional mindset says no, certainly not. You replace skin cells, but you don't replace brain cells. So for me, metaphorically, what does that tell me? Coming out of the womb, it's all downhill. That is what we have been taught.

The Brain From the Top Down

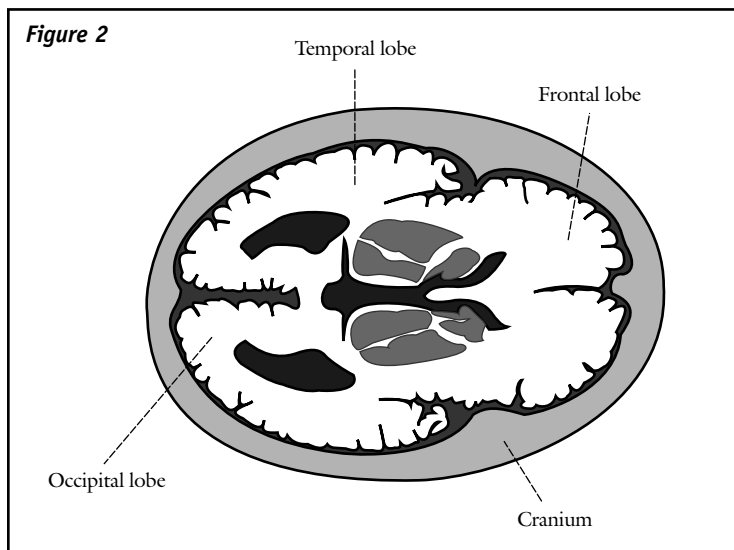
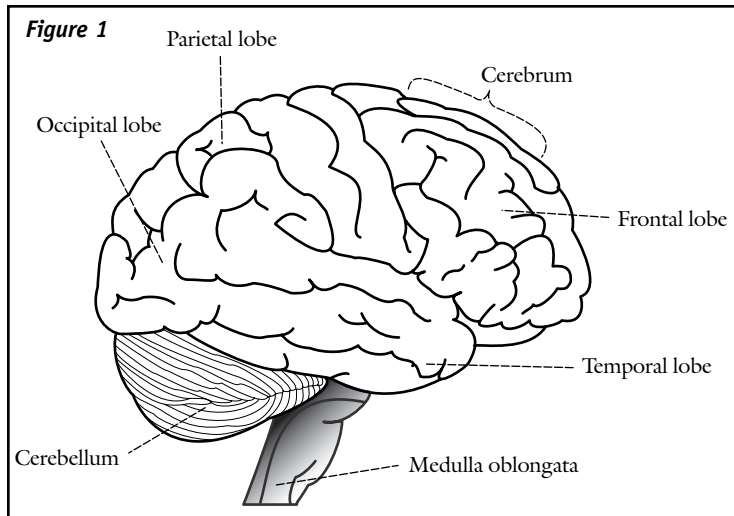
I know of three ways that we organize the human brain conceptually. The first is the top-down model (*see figure 1*). The top part of the brain is this ruffled thing called the **cortex**, which translated means “bark” (as in tree bark). The brain evolves from the back to the front. The spinal cord comes up, then the brain stem. The **cerebellum**, which we don't talk about a whole lot, is important for fine motor coordination, for balance, these kinds of behaviors. The cortex sits up here, convoluted. One of the miracles of the brain is that it continues to evolve over time. It grows from back to front. How can it grow? There's not a lot of wiggle room in your skull, is there? It becomes convoluted like an accordion. That is one of the miracles of the brain.

Now, in my opinion the brain is the single most complicated thing in the universe. We have not nearly tapped into what the brain can do. The only thing that is changing is our ability to measure. Isn't it interesting how all the theories about the universe are falling by the wayside as the Hubble telescope is showing us pictures from farther and farther out? The same thing is happening with the human brain.

The cortex handles high-order thinking, including memory. Just below, on top of the brain stem, is the **subcortex**. These structures sit on top of the brain stem, and they seem to be important for motor skills—they're the area of the brain that gets hit in Parkinson's disease. The subcortex has some cognitive capacity, but it's really important for motor ability.

Left Brain, Right Brain

Then there's the left-right model of the brain. You have two hemispheres in your brain, left and right. Some behaviors relate primarily—but not exclusively—to one hemisphere or another. For example, more than 90 percent of us right-handers have language in the left hemisphere. Which means the right hemisphere helps us get around in space, helps us with shapes and location in space. It also helps us with the pitch and tone of language.



The Brain: Two Views

left (see figure 2). We call them lobes. The back part of the brain is called the **occipital lobe**. Just under each temple is the **temporal lobe**. Just above the temporal lobe and in front of the occipital lobe is the **parietal lobe**. Left and right, the largest part of the brain is the **frontal lobe**. You separate the hemispheres, and you're looking inside the oreo cookie. The middle part of the temporal lobe is what is called the **hippocampus** (see figure 3). It feeds information to the brain, so it's a critically important structure for memory and learning. Researchers have shown that in the animal brain, neurogenesis occurs in the hippocampus. Interestingly, we have learned that in animals, stress of a chronic nature damages the hippocampus. If you know anyone with chronic anxiety, anybody who suffers from posttraumatic stress disorder, they have memory problems.

Now, left-handers are an interesting group. We think about one-third of them also have language in the left hemisphere primarily, like right-handers. Left-handers tend to distribute their functions more bilaterally. Some 20 to 30 percent of left-handers have language in the right hemisphere. We think these are folks who have left-handed parents or there is left-handedness in the family.

The Four Neighborhoods In the Brain

There is then a third model for the brain: You have four neighborhoods in your brain, two on the right side and two on the

Behavior Is Not Random

Some people start in the brain and try to explain behavior. It is also OK to look at behavior and try to relate it back to the brain. Behavior is not random—certain areas of the brain are actually responsible for different behaviors.

For example, in the back part of the brain is the **vision cortex**. (Have you ever thought for a moment how complex it really is? How miraculous it is to distinguish faces?) We think that the auditory brain is in the temporal lobe. On the left side we process words, sentences, the lyrics of music, numbers, letters. On the right side the temporal lobe processes the beat of a song, or

the difference between a fire siren and a baby's cry. Memory and new learning are very important. For some reason, the temporal lobe is vulnerable to seizure disorder: temporal-lobe epilepsy. There is a brand-new field called neurotheology. We think the temporal lobe is where the seat of our ability to appreciate a higher being lies. The reason for this is that people with temporal-lobe epilepsy often become hyperreligious.

In the parietal lobe, there is a strip of cells going from just under the ear up to the top of the brain down to the middle part of the

as we talk about what we do day in and day out. Planning is a frontal-lobe function, perhaps the most complicated thing we do. Right now you are sitting there and you're planning where you're going next, you're planning what you're going to have for lunch. The frontal lobe handles your ability to organize the world. You may not think of it this way, but you put frontal lobes all around you in your life. On the refrigerator you've got magnets set up with all kinds of things. You've got a date book or schedule book, you've got a list, you've got icons on

your computer screen. They're all based on the frontal lobe. There is too much information out there, so you need these external "lobes" to organize it.

The frontal lobe also handles inhibition. Your ability to not stand up on the chair and disrobe and yell vulgarities at me tells me something about the integrity of your frontal lobe. When the frontal lobe breaks down, all heck breaks loose. Jails are filled with people who have frontal-lobe problems. As any of you who work directly with older adults with dementia know, it becomes very, very difficult to manage those kinds of behaviors.

Your ability to conceptualize and abstract comes from the frontal lobe, and all of the neuropsychiatric illnesses that we describe in terms of mania, bipolar disorder, depression, obsessive-compulsive disorder, schizophrenia, attention deficits and the like seem to have some relationship to the frontal lobe doing something wrong either neurochemically or neurostructurally.

It's important to understand that behaviors are related to the brain if you're designing brain health-promotion messages. Another thing to keep in mind is that some of the ways we look into the brain are improving as technology advances. We now have methods to measure glucose metabolism, which is what the brain churns out when it does certain things, such as speaking. Looking at glucose metabolism, we see that women tend to use both sides of the

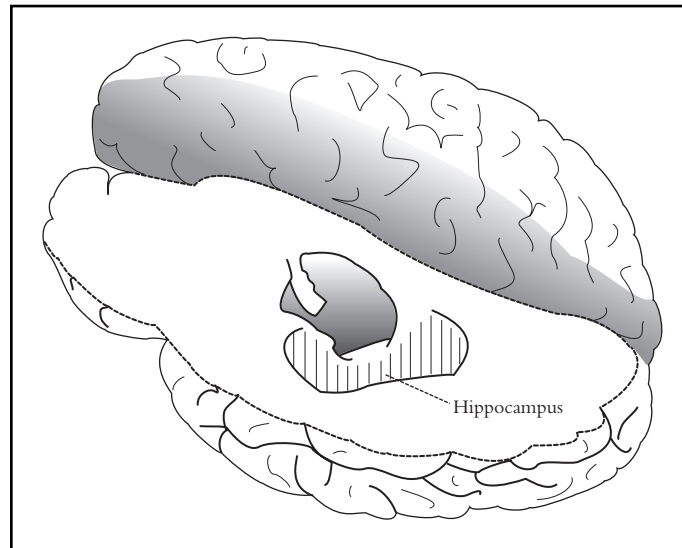


Figure 3

brain on both sides. It is called the **sensory strip**. The cells are laid out to help you experience sensation in your body. The left parietal lobe is pretty important for math calculation. The right parietal lobe helps us with math too, but it's a little bit different: You typically work math problems out by hand on paper, but a person with right-parietal-lobe disorder can't, because she gets her columns mixed up.

Now the frontal lobe is a fun place to be. It's where our personality sits. You can't blame it on what you eat—blame it on your frontal lobe. On the frontal lobe there is a strip of cells, like the sensory strip, called the **motor strip**. It is dedicated to helping you think about the areas of your body that need to move.

Think about some of these complicated behaviors, because they become important

brain. Men tend to be much more unilateral—we only use one area of the brain to produce a behavior.

So, for example, how do we apply this rather academic point? One of the top three complaints at any workplace—in any relationship, in fact—is communication. It’s almost normal, statistically, for men and women to struggle with communicating. Well, maybe there is a reason for that. Perhaps the unilateral brain can be taught by the bilateral brain to hear the complete message being articulated. That way we can all better understand that the words that come out of the mouth aren’t the only important way we communicate. That’s trainable, teachable.

The brain has a lot of brain cells, which are called **neurons**. Those are the cells we are interested in when we talk about neurogenesis. **Glial cells** are the supportive cells. If neurons are running the marathon, glial cells are standing on the side handing out the water. Glial cells help the neurons be all that they can be. We think glial cells continue to develop in the human brain into the fifth decade of life. That’s relatively new. We didn’t think that was the case four or five years ago.

A Happy Heart Means A Happy Brain

Another point I want to make is that your heart and your brain are very happily married. Every time your heart beats, 25 percent of its output goes straight to the brain. Poke a little bit around your Adam’s apple, and you’ll be able to feel your pulse in your carotid arteries. The carotids distribute blood to the anterior two-thirds of the brain. At the back part of your neck you have what we call the vertebral artery system, a network of arteries that distributes blood to the back (occipital) part of your brain. Keep the heart happy, keep the carotids clean, and you keep a good flow of blood, oxygen and nutrients to the brain. Without oxygen, we stroke, and the hippocampus is very, very vulnerable. That is one of the primary reasons that exercise programs are so beneficial to cognitive functions.

In your brain you have four ventricles, which are fluid-filled sacs. They give shape to the brain. In brain disease, typically what happens is that the brain shrinks and loses significant numbers of cells. As a result, space opens up. The ventricles get bigger to fill up that space. Swelling ventricles mean that something is going wrong with the brain. When radiologists do MRI scans to take pictures of the brain, they often talk about the size of the ventricles.

Cognitive Functions Change With Age—But It’s Not All Bad

Until recently, we thought that everything goes downhill as we get older. That is just not true. What really seems to be the case today is that different cognitive functions change differently across the lifespan. We don’t see this term used often anymore, but crystallized intelligence, the facts and figures you learned in school, is going to stay with you. I don’t care if you are 110—you’re going to hang on to that knowledge. Fluid intelligence refers to information that is new in nature—new skillsets, new learning. It’s a little more difficult for older adults to learn, but don’t ever let anyone tell you that older adults cannot pick up new information or new skills. That is a flat-out myth.

The gerontologist and psychiatrist Gene Cohen is studying creativity, and he talks about a major correlate of creativity being advanced age. Isn’t that interesting? Creativity involves envisioning new things, so that is really challenging our whole mindset in regard to what the brain can and cannot do in late life. How many of you know a 75-to-80-year-old who suddenly started doing art? Either that older brain is beginning to nurture dormant brain cells that haven’t been used, or it is laying down new neuro-circuitry in the brain—something that we fundamentally don’t think can occur in the human brain. Somehow you still have to explain the new behavior.

Though our capacity for creativity increases, our capacity for remembering things decreases. It is normal for healthy older adults to complain of memory problems. Frankly, I’m worried about the 85-year-old lady who is bragging about her memory.



As we age, there's no reason to believe that the integrity of the hippocampus, the information feeder to the brain, becomes diseased or damaged to the point that no new information can get in. We may lose some cells as we get older, but that hippocampus is still firing. The problem that a healthy 85-year-old has is retrieval—getting

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the information back out—which may be related to the frontal lobe. The frontal lobe appears to be very vulnerable to some cell loss as we age. Older adults don't retrieve information or organize it quite as well. What happens when you give your mom or dad or grandma some reminders? They quickly reply, "Oh yeah, thank you, now I got it." That tells you that older adults have good recognition memory. Remember in school how much easier multiple-choice questions were than fill-in-the-blank questions? You would say, Thank goodness, there it is—I just have to recognize the answer. Functionally, older adults encode well and benefit from prompts.

Language stays relatively preserved way into the ninth decade. Now, there is a thing called **dysnomia**, which describes word-finding problems we have when we become stressed or have too much on our plates. As your brain gets a little bit older, you will find yourself not being able to come up with words as easily, but it is not disease-based. Dysnomia may be related to the release of cortisol and steroid hormones, which occurs when you become excessively anxious, as your heart beats, you sweat and your thoughts race. We call that the acute anxiety response.

Stress Can Be Good for Your Brain

Stress can be a good thing. Some anxiety helps you with learning. When we get to the point of life-threatening events such as September 11, where people are not responding anymore on a day-to-day basis

because of psychological trauma, that is posttraumatic stress disorder.

Early research has shown that people diagnosed with posttraumatic stress disorder have smaller hippocampi than age-matched controls. The problem with this research is that the size of the hippocampus structure prior to the exposure to a life-threatening stressor is not known. If we are going to build a bridge between what we know happens in animals and what we suspect happens in humans, we better find this, at least preliminarily. Overall, the hippocampus appears to be sensitive to the good and bad stimuli in the environment.

Stress is beginning to emerge as a very important issue in terms of human brain development, and not only as we age. The stress that a developing brain experiences early in life, for example, when parents aren't loving or touching a child, is being looked at in terms of brain development. Deprived children tend to have smaller bodies, and cognitively they are delayed. The area of the brain that is hit by stress is the hippocampus—which is also the area of the brain that gets hit with Alzheimer's disease. More important for me is the fact that the hippocampus is the area of the brain that shows neurogenesis in animals when exposed to enriched environments.

The Tangle of Dementia

Let's turn to a model of brain disease: dementia. There's a lot of confusion, even in the healthcare system, in regard to what dementia is. Dementia is a global impairment of intelligence. Information processing becomes impaired. Personality is affected; memory will always be affected at some point in dementia. Estimates on how much of the older adult population experiences dementia vary, but they're somewhere between 10 and 18 percent. Ninety-five percent of all dementias are irreversible. Five percent we think are reversible—I'm not saying treatable, I'm saying reversible.

It's important to establish dementia by these following criteria, in addition to those I've already mentioned, before trying to understand what is causing it. You can have one of the three *A*'s: *aphasia*, the inability to

process language; *apraxia*, the inability to carry out purposeful movement; and *agnosia*, the inability to recognize or derive meaning from something (think *agnostic*). These deficits affect a person's ability to carry out activities of daily living, to do what she does every day: carry out hygiene behaviors, dress, get in a car, drive, be socially appropriate, write checks—all of those things we take for granted. About 70 percent of us function at the average range of intelligence. Some of us are at the superior range; some are impaired intellectually. Dementia represents a decline from a previous level of function, so you have to establish the person's baseline first. If a person starts in the superior range of intelligence, and declines to the average range, he is impaired.

Diagnosing Alzheimer's disease isn't a one-step process, it's a waltz. The first step is diagnosing whether the patient has dementia; the second step is looking for a cause. The number-one cause of dementia is Alzheimer's disease, which accounts for 50 to 70 percent of all dementias. Four million Americans are affected. Alzheimer's disease is what's known as a **cortical dementia** because the cortex and the hippocampus are affected very early in the disease process. Alzheimer's disease is named after Alois Alzheimer, who in 1906 wrote a very important clinical paper describing specific neuropathologic changes in an individual's brain at the time of death.

In the late 1980s, a study led by Dennis Evans revealed that Alzheimer's is not caused by advanced age; it is related to advanced age. There is a big difference. We think there is about a 10 percent overall risk of Alzheimer's after the age of 65. Between the ages of 65 and 74 there is about a 3 percent risk. Then, between 75 and 84 the risk shoots up to about 18 percent, and though study findings vary, between 85 and 94 there may be as much as a 40 percent risk of the disease. This is a problem, because we have a lot of folks turning 85—3 million now, about 16 million by the middle of the century.

Epidemiologist David Snowdon's research has suggested that new-onset cases of Alzheimer's are very rare if in existence at all after the age of 94 or 95. In fact, there's very low incidence of any diseases after that

age. People who live that long are pretty healthy. So be careful in the language you use: People between the ages of 84 and 94 are clearly vulnerable; why, we don't know. People who reach the age of 95, though, are doing better than 70-year-olds.

If you believe the demographics, which you should, the population of people with Alzheimer's in this country is going to rise from 4 million to 14 million by the middle of this century. But it is my belief that we

| *Change does not necessarily mean disease.*

are never going to see those figures. The world is going to look radically different five years from now—if not then, by 2030. I get in trouble for this speculation, but I think there will be a cure for Alzheimer's by 2030. The reason I say that is because I am aware of how fast things are changing, how we are approaching this disease. I have good feelings about it. We still need to do more today, because we are not in 2030 yet.

So, with normal aging, you see cell loss in the frontal lobe, motor strip and hippocampus regions. Change does not necessarily mean disease. With Alzheimer's disease, you lose more cells in the same areas, but also have new cell loss in areas not affected in healthy aging. We lose acetylcholine, an important neurochemical in the brain, when we get Alzheimer's disease. The hippocampus is hit very early, and plaques and tangles emerge in the brain. If you have a disease that affects the hippocampus, you will repeat yourself. You are not encoding or laying down new information. As the disease advances, not only is new information lost, some of the older memories begin to erode, and ultimately we lose our personal life story.

Plaques and tangles in the brain are caused by abnormal protein development. A cascade of pathological events occurs with proteins that we all have, which results in plaque development surrounding the brain cells, inflaming them and killing them. Tangles emerge in the neurofibril substance of the brain. We think the tangles correlate more with behavioral and

cognitive problems than the plaques. I was trained that the only way you could diagnose Alzheimer's with 100 percent accuracy was at the time of death: A neuropathologist literally counts up the plaques and tangles, and if she crosses over a certain threshold in certain critical brain regions she makes a diagnosis of Alzheimer's. Interestingly enough, that may not be true. There are people out there with plaques and tangles of a sufficient number to be diagnosed with Alzheimer's who have never manifested the disease in life. Snowdon's research has concluded that the presence of plaques and tangles may not be sufficient to diagnose Alzheimer's; cerebral vascular disease may also be necessary—getting us back to the heart and the brain.

Snowdon's speculation is only a theory, but it is of interest. Why do certain people with sufficient plaques and tangles never manifest the disease? At the base of the brain is where we manufacture choline. People with Alzheimer's lose choline in the brain. As a result, they become confused and disoriented, and memory becomes problematic. (You also become happy as you lose choline.) There are now four FDA-approved drugs that replace choline in the brain. If you get these medications early in the disease process, they will slow the course of the disease. They won't cure it.

Protecting the Healthy Brain: We Know Enough to Get Started

What are some of the factors that can protect us against Alzheimer's disease? This represents, for me, a new and exciting arena for health, which is a lifestyle that promotes a healthy brain. Protecting the brain has to begin very early. You are not too old to take this to heart—no pun intended. Plenty of studies have taught us that increased levels of education, defined as number of years in school, correlate with—but don't cause—a lowered risk of Alzheimer's disease. Indeed, people who have more education and who do get Alzheimer's disease manifest the disease later in life and die soon thereafter. The same relationship is found between more cognitively challenging occupations and lowered risk of Alzheimer's. We think this

applies to other dementias as well.

What is going on here? The proposed explanation for this correlation between higher education and more sophisticated occupations and lower risk for Alzheimer's disease is that these environments contribute to our brain reserve or intellectual reserve. According to epidemiologist James Mortimer, we have to think of intellectual reserve in terms of neurophysiology. How you stimulate your brain has a neurophysiological effect, whether it be good, neutral or bad. The brain will react to stimulation. It has to. Higher levels of education, defined as more years in school, and more sophisticated occupations that demand more problem solving correlate with increased intellectual reserve and a more robust brain. When we expose our brains to complex and novel environments, we lay down more synaptic density, so that if one day Alzheimer's disease comes knocking on our door, we have built up our brains sufficiently to delay its onset.

That is why those with higher levels of education who do get Alzheimer's manifest it later in life. It is as if their reserve fights off the disease. The disease may ultimately win, but when it presents the disease is already advanced. Now, the more rote your work is, the more unhealthy it is for your brain. Get yourself in new situations at work, situations that are harder and more complex to deal with. Rote is bad.

People who smoke tend not to get Alzheimer's disease at the same rate as non-smokers, though of course they die of other things sooner. Controlling for that, we are beginning to understand that the nicotinic receptors in the brain are important for memory. Reminyl, the latest FDA-approved drug for Alzheimer's, hits the nicotinic receptor, trying to help us enhance memory. Several groups of researchers are now studying the benefits of building up nicotine levels in the blood when higher risk for carcinoma is not involved as well.

In addition, we have known for some time that wine consumption on a daily basis at the rate of a glass of wine a day appears to be beneficial—unless you have a history of cancer, at which point the doctors usually will tell you that you can't

drink alcohol anymore. A daily glass of red wine appears to be beneficial for the heart because the antioxidants in red wine keep the arteries pretty clean. Studies in Europe are now showing that a glass of red wine a day may also help with cognition, as well.

Anecdotally, it appears that people who take anti-inflammatory drugs for rheumatoid arthritis tend not to get Alzheimer's disease at the same rate as the general population. The long-term use of anti-inflammatories may help fight off the pathological protein development in the brain. There also seems to be some cognitive benefit for estrogen supplementation for postmenopausal women with Alzheimer's. You have to work this out with your doctor, because the downside of estrogen supplementation is the increased risk of cancer.

A study published in 2000 showed a link between poverty in childhood and increased risk for Alzheimer's later in life. This study ties in well with what Marian Diamond is trying to teach us, which is that rats placed in enriched environments (with other rats, toys and obstacles) are found to have more cells in their hippocampi. Human babies who play in impoverished environments—another way of saying environments that are not enriched—will show both immediate and long-term effects in their brains. When we talk about policy, we tend not to think about poverty in the context of Alzheimer's. We need to start: Alzheimer's is a childhood disorder! Might we be a little more proactive about mitigating the effects of poverty if we treat it that way?

21st-Century Wellness For the Human Brain

The final point of my talk today is 21st-century wellness for the human brain. I am just finishing a book in which I take all this really interesting stuff that much smarter people are doing in the lab and try to figure out how we can use it to improve the human condition. It's a great time to be alive.

We know that the brain can do so much in childhood, such as learn three to five languages. Skill development is just a matter of

exposing children to experiences and knowledge; their brains will just eat them up. Children's brains evolve so rapidly because their brains do not have any experience in them yet.

But learning doesn't only occur in childhood. We should base our definition of old not on chronological age but on functionality. We have to think about our brains as highly dynamic and constantly reorganizing systems. *Neuroplasticity* is the theoretical term we use. It heralds a health-promotion opportunity of unprecedented stature.

We have to think about our brains as highly dynamic and constantly reorganizing systems: a health-promotion opportunity of unprecedented stature.

Marian Diamond and her team of scientists have shown that adult rats have the ability to generate new neurons. I know that we don't have the research findings to prove the same thing for human adults, but using my street smarts and not my book smarts, I have to ask, Why would a rat's brain be able to do something my brain can't do?

Dr. Diamond and her team of scientists compared the size of the brains of rats living in enriched environments to those living all alone in sterile cages and found that the former had larger brains. When scientists talk about enriched environments, they're referring to a number of factors:

- *Socialization.* The animal is surrounded by others of its kind.
- *Physical exercise.* The animal has access to a wheel to run on.
- *Mental stimulation.* There are toys and other things to interact with in the environment.

So exercise, socialization and mental stimulation all appear to be critical factors in assuring an enriched environment and brain health. What else do we know from these animal studies? Researchers have even identified the stem cells, the precursor cells that develop specialized cells in the animal brain. Studies coming out of Harvard indicate that scientists now may understand



how to molecularly trigger those stem cells to develop new brain cells. This suggests the animal itself may have the ability to trigger new brain cell development. This is a different model of brain stimulation from the current discussion in this country, which focuses on helping our brain through influences that are external to our bodies, such as cell transplantation. We do not believe the human brain can fix itself.

What if the brain had a good-maintenance guarantee? What if the brain had the capacity to fix itself? Scientifically, we don't believe that today, but what if it did? Philosophically, why would a system so complex not come with that kind of capacity? Might it be that we just don't know how the brain repairs itself? Interestingly, when researchers transplanted an animal's brain cells into its blood system, they observed that those brain cells began to make blood. Here we thought that stem cells and regular cells only have one function. And if you can go from brain to blood, can you go from blood to brain?

Inside the scientific community, specifically the group of scientists conducting research with animal models, there is a huge, heated debate that has even made it into the national news. The subject of this fierce argument: We know that neurogenesis has been observed in the hippocampus and in the olfactory system. But what about the cortex? Some scientists are asserting that yes, neurogenesis occurs in the cortex, and some other scientists are saying no.

We have long been taught that the critical period in human brain development is from birth to the age of five. But now we have a sort of Hubble telescope showing us a little bit deeper into the brain. This whole notion of a critical period of brain development is nonsense. It is, finally, under tremendous scrutiny. New research is showing that new brain cell development is occurring in the human cortex into the second decade in life. And now we're finding that glial cells are developing into the fifth decade of life. What is changing isn't the brain—it's the sophistication of our scientific capabilities.

In 1998 Peter Eriksson and colleagues published the first study demonstrating neurogenesis in the human brain in the

hippocampus—precisely the area where neurogenesis has been shown to occur in the animal brain. Their findings need to be replicated: Studies such as Erickson's were not out there five years ago. Research is beginning to find evidence of what we all have speculated for some time.

Now we need to demonstrate what might cause neurogenesis. Based on the animal experiments I discussed earlier, I'd propose exercise, mental stimulation and socialization. Education and occupation are two important factors in creating enriched environments to stimulate brain-cell development and build up the robustness of the brain. You should begin to think consciously, What am I exposing my brain to today? Ask yourself, How complex is my environment right now? How novel is my environment right now?

In the next decade, I predict that we will start seeing activities being associated with a value, giving us some idea of how well they stimulate the brain.

To illustrate, another recent study led by Robert Friedland compared the lifestyles of elders with Alzheimer's and elders who didn't have the disease. The researchers examined the activities the study participants had engaged in while in their 40s and 50s, and rated those activities on the basis of passivity. Those who engaged in more passive activities in midlife were at a higher risk for Alzheimer's late in life.

Similarly, in 1995 the neurologist Robert Katzman reviewed a number of studies that found that certain activities reduce the risk of Alzheimer's: knitting, gardening and travel. What makes travel, say, so beneficial? Complexity is one answer. The point I am trying to get across to you is that soon, every activity will be analyzed in this way.

Another health-promoting factor may be language sophistication early in life. Snowdon's study of nuns found that the subjects who demonstrated more sophisticated use of language in their twenties showed lower incidence of Alzheimer's 60 years later. Linda Acredolo, a researcher at the University of California, Davis, has been examining the effects of teaching toddlers sign language. The neurological systems of young babies have not yet evolved enough for oral

language to be produced. However, toddlers can easily learn symbolic gestures. Acredolo taught hearing toddlers about 19 signs or symbolic gestures. She has since shown that toddlers exposed to this sign language have significantly higher IQs several years later than age-matched controls. Similarly, people who have higher IQs in their teens and their twenties have been shown to have lower risk for developing Alzheimer's later in life. Symbolic gestures should be part of every baby wellness and Head Start program in the United States.

Just as advanced education develops a more sophisticated language system, resulting in higher IQs, language is perhaps an instrument that can help promote a healthy brain. Tell your child, For God's sake, get an A on that English test. You don't want Alzheimer's, do you? We don't think about language in that way. We need to start. Language is fundamentally important to human beings. And, you know what, humans are the only animals that develop Alzheimer's.

I now think of schools as wellness centers. Just as we talk about how teachers, postal workers and checkout clerks—not doctors—are the gatekeepers monitoring the functioning of older adults in the community, we must start to think about teachers as health promoters. Let's move from the brain scan to the lesson plan, and get neuroscientists and speech and language specialists involved in developing curriculum. And let's expand our concept of wellness programs far beyond the healthcare system to involve environments we all have access to—the school system, the family, daycare centers, religious centers, occupations. Further, we should consider placing the most sophisticated neuroimaging technology in our schools to measure growth and development with the new brain curriculum.

The research findings we are seeing in 2002 may not yet have revealed the precise formula for keeping our brains healthy. But I am comfortable saying that we know enough to get started.

TEN TIPS FOR MAINTAINING A HEALTHY BRAIN FROM 1 TO 100

Tip 1: Don't smoke.

Smoking represents a major risk factor for cancer, heart disease and stroke. These leading causes of death represent an ongoing concern for all Americans. Nonsmokers might consider taking an empathetic approach to smokers who are trying to quit, and parents might use a “tough love” approach with their children to make sure they don't even start.

Tip 2: Follow your physician's advice.

Your relationship with your physician is critical to your health. Remember, though, that as a consumer of health services your doctor is your employee, so establish a good working relationship based on the understanding that you are the boss of your body. We must develop a proactive attitude toward maintaining our health and take responsibility to change those aspects of our lifestyles that are minimizing our longevity potential. Our physicians can help guide this process.

Tip 3: Exercise regularly.

Exercise and physical activity continue to emerge as primary components of a healthy lifestyle at any age. Aerobic exercise, weight training and recreation are critical not just to our cardiovascular health but to our brain health, as well. Every time our heart beats, 25 percent of its output goes to our brains—quite a large market share! Clearly, maintaining efficient blood flow to our brains through regular exercise promotes health. If you don't exercise regularly, start by walking around the block tonight and build from there.

Tip 4: Reduce the overall calories you consume daily.

We Americans tend not to underconsume anything—including food. Yet the leading factor for longevity in animals is caloric restriction. This finding has yet to be demonstrated in humans. However, provided you get your daily nutritional needs from the USDA's food pyramid, you should pay close attention to how much you eat. Follow the advice two physicians gave me: Never go to bed stuffed, and eat only 80 percent of what you intend to consume at every meal.

Tip 5: Socialize and have fun.

We Americans specialize in stress, with little understanding of how to have fun. We need more time to socialize, celebrate and laugh! Some of us have walls around us that keep other people away. As humans, though, we need to be engaged and to be social. Kofi Annan, the secretary general of the United Nations, once stated that every time “we lose an elder from our village, we lose a library.” If we begin to think of everyone as a library, it becomes clear that we can learn from others.

Tip 6: Develop your spirituality.

Evidence continues to emerge that prayer is a health-promoting behavior and that attendance at formalized places of worship may have more significance to our health than we understand. Meditation, yoga, relaxation procedures and prayer have neurophysiological bases. They help to alter our existing homeostasis for the better. Praying or meditating daily can help us combat the stresses of life and focus on the challenges ahead.

Tip 7: Engage in mentally stimulating activities.

“Mental stimulation” refers to the ways our brains respond to stimuli in the environment. Novel and complex stimuli are health-promoting for the brain. New learning translates to neurophysiological growth and to mental stimulation in the same way that aerobics translates to cardiovascular health. We can benefit from being challenged, from learning information and skills that we do not yet understand, and from engaging in pursuits that are initially hard for us!

Tip 8: Maintain your role and sense of purpose.

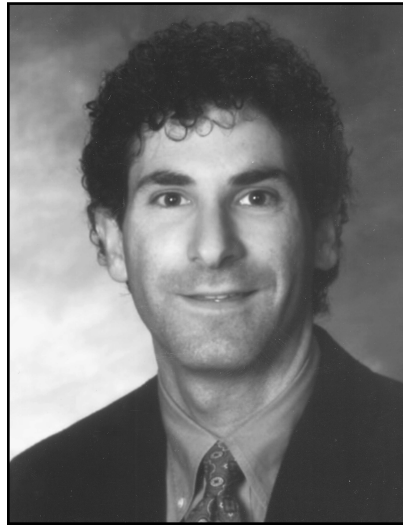
Retirement as it is presently envisioned in this country is not good for the human brain, which benefits from environments rich in novel and complex stimuli. Retirement by definition reinforces disengagement and passivity. Our nation might consider prioritizing social engagement across the lifespan—from a brain-health perspective. Although it is important to allow elders to choose more passive lifestyles, many may benefit from an understanding of the importance of actively participating in society and finding personally relevant roles and senses of purpose.

Tip 9: Seek financial stability.

Research clearly demonstrates that having some money late in life correlates with better health. Therefore, a practical tip for maintaining lifelong health is to hire a financial planner and begin a savings plan that will provide some money late in life. Financial planners do not consider themselves to be health promoters, but they are. We are never too young or too old to begin saving, and the less money we make the faster we need to get started!

Tip 10: Engage family and friends.

Developing and maintaining a social network of relationships is important from a health perspective. Our friends and family help us stay active and involved in the fabric of society. They can provide us with emotional support and can nurture trust. Our roles in life, from child to parent to grandparent, exist within the family; they provide much health and human enrichment across the lifespan. And intimacy, broadly defined, is itself a health-promoting behavior at any age.



Paul D. Nussbaum is a clinical neuropsychologist who specializes in the assessment and treatment of older adults and in forensic neuropsychology. He also travels across North America providing workshops, seminars and consultation on a variety of topics dealing with brain-behavior relations, aging and human development. Dr. Nussbaum communicates daily with the general public, health delivery organizations and others on the importance of maintaining health across the lifespan and on the practical application of our knowledge about successful aging. He lives in Pittsburgh, Pa., with his wife and three sons. For more information about Dr. Nussbaum's work, visit his website at www.paulnussbaum.com.

2002 MINDALERT AWARDS

The ASA-MetLife Foundation MindAlert Awards were established to recognize innovations in mental fitness programming for older adults. The awards recognize programs, products or tools that promote cognitive fitness in later life. The programs are judged for their innovation, their basis in research, demonstration of their effectiveness, potential for replicability, and the extent to which the programs are accessible to diverse populations of elders. This year four programs were selected as winners of the awards.

Early-Stage Alzheimer's Disease Support Groups

Robyn Yale, LCSW
San Francisco, Calif.

In 1986, Robyn Yale, a clinical social worker and consultant to the Alzheimer's Association and other organizations, developed an innovative support-group model for individuals in the early stages of Alzheimer's disease and their families. In 1991, she conducted pilot research at the University of California, San Francisco, that documented the feasibility and benefits of this intervention. The research was funded by the national Alzheimer's Association. Since then, she has published extensively and trained many professionals who have replicated her model across the United States and other countries. She is credited with being among the first to identify the overlooked and underserved mental health needs of people with early-stage Alzheimer's, develop a model targeting these needs, raise public and professional awareness, and advocate for expansion of services to this population.

Ms. Yale's early-stage support group was one of the first of its kind. Until recently, virtually all Alzheimer's literature and support services were designed for caregivers and geared toward the middle-to-later stages of the illness. These materials and services presumed that people with Alzheimer's disease couldn't understand or react to their condition—many were not

even told they had Alzheimer's. Amid initial skepticism and resistance within the field, Ms. Yale disseminated her research and clinical findings, which demonstrated that many with early-stage Alzheimer's are willing and able to share their feelings, concerns and experiences when given the opportunity, and that support groups can help them accept and cope with the illness instead of remaining isolated and dehumanized. Early-stage groups provide the education and support necessary to encourage people with the disease to go on living full and meaningful lives for as long as possible.

Over the years, other professionals have had similar experiences implementing and expanding upon Ms. Yale's model. In many regions, early-stage support groups now constitute a new starting point on the continuum of dementia care. With the current capacity for earlier diagnosis of Alzheimer's, and the fact that many people remain in the early stages longer due to new medications, these groups are more vital than ever.

Ms. Yale conceptualized the distinctiveness of the early stages of Alzheimer's disease for individuals with the disease and their families, created an innovative program model, refined it through research, and used her publications and training events to inspire and influence many professionals to create early-stage support groups—which never existed before—around the world. Her materials made the program easy to replicate, and it has proliferated in such settings as Alzheimer's Association chapters, diagnostic clinics, senior centers and assisted living facilities. Many say that her work facilitated a movement that has changed the face of the Alzheimer's field and given voice to the person with the disease.

**MindWorks:
The Mental Fitness Connection**
Berkeley, Calif.

Mental fitness is brain conditioning brought about by mental exercise, just as



physical fitness is body conditioning through physical exercise. Various thinking skills characterize mental fitness, including awareness, communication abilities, curiosity or inquisitiveness, and the willingness to accept mental challenges.

Mental fitness must become the imperative for a population that includes a growing percentage of elders. The trend toward early retirement, together with increasing longevity, raises the possibility of an extended period during which the need for rigorous thinking is diminished; the solving of everyday problems involving jobs and families is no longer required. However, mental exercise must be ongoing or the abilities necessary to perform such exercises may be lost. An individual who has lost the abilities required for competent decisions may, as a result, also lose control of his or her own life. For this reason, mental fitness is essential for older adults who wish to retain their independence.

MindWorks promotes mental fitness by providing regular sessions of stimulating mental exercise. Participants experience many mental challenges and become more mentally adept, much as those who strive for physical fitness attain higher goals. Members of the MindWorks program indicate that they have more self-confidence and self-esteem as they master the challenges of mental exercise. They have also discovered that their memories have improved and that they are more aware of their surroundings.

The MindWorks approach emphasizes mental activities that are not only interesting, diverse and relevant, but also fun. Participant interaction and the exchange of ideas enliven every MindWorks session. Although members of the MindWorks program may not be particularly proficient physically, they are always ready for the most vigorous mind “workout.”

MindWorks was started in 1986 by scientist-turned-educator Connie Lynch. Since that time, MindWorks classes consisting of 10–20 older adults of all cultural and racial backgrounds have been meeting at various senior centers around the San Francisco Bay Area to engage in weekly mental aerobics. In 2000, Dr. Lynch wrote the book

Don't Lose Your Mind for elders who are unable to attend classes, yet still wish to stay mentally active. The MindWorks program has reached and helped hundreds of older adults and, using Dr. Lynch's curriculum, could easily be adapted for senior centers everywhere. Dr. Lynch and her MindWorks program have been featured on countless television and radio shows and have been the subject of many newspaper articles around the country.

Generations on Line

**Institute of Aging,
University of Pennsylvania, Pa.**

Generations on Line (GoL) has simplified the Internet for elders. Established in July 1999, GoL has created, tested and developed a nonprofit educational software program that provides on-screen, step-by-step instructions to help people over 65 use the Internet. This unique, self-teaching software program helps older adults overcome the barriers of access, skill and intimidation that prevent them from learning to use and enjoy the Internet.

In order to reach the greatest number of elders at the least expense, GoL makes this program and its adjunct materials free to them through places where they live and congregate, such as nursing homes, HUD-subsidized housing, retirement communities, senior centers and public libraries. These sites receive a subscription to the Web-based software, a kit of startup materials, and ongoing telephone technical support with an initial cost-covering fee of \$250.

Tested for 12 months in multiple settings, this program was launched nationally in September 2000, and currently has been adopted by more than 275 nursing homes, senior centers, retirement communities, libraries and subsidized housing communities in 29 states.

The GoL service helps elders learn to use the Internet. It provides individuals with a fully functional, no-cost Internet experience that is in plain English, free of advertising, and supported with on-screen directions and tools. Internet access provides a solution to the isolation, boredom and

helplessness that many of our elders face on a daily basis. It opens up a world of mobility, stimulation and independence.

From an Alzheimer's center in Dallas to a senior center on Staten Island, a retirement apartment in Wilmington and all 27 public libraries in Boston, GoL has progressed from a dream to a nationwide program in 27 months. More than 2,000 men and women in their 70s and 80s who had no idea what a mouse was or of the value of the Internet now regularly use the Internet to search in 25 languages, e-mail family, or share their memories with schoolchildren.

Generations on Line founder and CEO Tobey (Ann) Gordon Dichter is the former vice president of communications and public affairs at SmithKline Beecham Healthcare Services, a worldwide healthcare company. Ms. Dichter began a personal study of gerontology in 1996, and by 1999 recognized that the Internet was both a potential opportunity for multigenerational communication and a threat, because computer illiteracy could further marginalize elders from an Internet-based society. She contributed funding, and the organization was incorporated as a nonprofit. Since then, GoL has enhanced the mental acuity and the self-esteem of our oldest and wisest generations. A demonstration of the program is available at www.generationsonline.org/apply.

Lasell Village at Lasell College

Auburndale, Mass.

Lasell Village at Lasell College opened in May 2001 as a first-of-its-kind "living and learning" continuous care retirement community located on the Lasell College campus in Auburndale, Mass. Lasell Village residents are required to plan and satisfy a continued learning program as a condition of residency. Residents complete a minimum of 450 hours of learning activity each calendar year, or approximately 1.25 hours per day, to the extent that they are physically and intellectually able. The living-and-

learning program is also designed to foster strong intergenerational ties to the college faculty and students, as well as educational ties to the local and national community.

Along with its 162 independent-living apartments and 44-bed skilled nursing facility, a special feature of each of the 14 Village buildings is the inclusion of a classroom, fitness facility or studio devoted to the integration of intellectual growth, creative development and physical wellness. In addition, the Village hosts the Elderhostel-affiliated Lasell College Institute for Learning in Retirement, established in 1998, and the new Lasell College Center for Research on Aging and Intergenerational Studies.

Lasell Village is among a growing number of college-affiliated retirement communities in the country, but it is the first to feature a formal, individualized, required continuing education program for its residents. It is also the first to appoint a full-time academic dean to oversee the unique living-and-learning program.

Awards Review Committee

ASA wishes to acknowledge the members of the MindAlert Advisory Council for their work in reviewing the award submissions: **Sandra A. Cusack**, Gerontology Research Centre, Simon Fraser University, Vancouver, British Columbia; **Marian Diamond**, Integrative Biology Department, University of California, Berkeley; **Nancy Emerson Lombardo**, Center for Research on Women, Wellesley College, Wellesley, Mass.; **Marge Engelman**, University of Wisconsin, Madison; **Barbara Ginsberg**, My Turn Program, Kingsborough Community College, Brooklyn, N.Y.; **Judy Goggin**, Civic Ventures, Jamaica Plain, Mass.; **Paul David Nussbaum**, Neurobehavioral Services, Aging Research and Education Center, Mars, Pa.; **Arnold Scheibel**, Neurobiology Department, UCLA Medical Center, Los Angeles, Calif.; and **Beatrice Seagull**, Professor Emeritus, Rutgers University, N.J.

ABOUT THE MINDALERT PROGRAM

The American Society on Aging's MindAlert Program seeks to disseminate research and innovative practices that address the steps that older adults can take to maintain and enhance their cognitive and mental functions in their later years.

To support this ambitious goal, ASA established MindAlert with funding from MetLife Foundation and Archstone Foundation. The program, now in its third year, has the following components:

- A MetLife Foundation MindAlert Lecture and booklet, which disseminate the latest research findings on maintaining and enhancing cognitive function in late life.
- The MetLife Foundation MindAlert Awards, which identify and recognize innovative community-based programs that translate research into practical cognitive-health promotion activities.
- A clearinghouse of resources related to late-life maintenance and enhancement of cognitive and mental functioning.
- A cognitive-health promotion curriculum that aging-services and healthcare providers can implement in a wide variety of settings with older adults.
- Training, technical assistance and additional resources to organizations using the MindAlert cognitive-health promotion model.

If you would like more information about the MindAlert program, including its Web-based clearinghouse of resources on mental fitness, please visit www.asaging.org/mindalert. Or contact Susan Markey, director of membership and alliances development at ASA, at smarkey@asaging.org.

About the American Society On Aging

With 6,000 members, the American Society on Aging (ASA) is the United States' largest association of professionals in the field of aging. Founded in 1954, ASA's mission is to promote the well-being of aging people and their families by enhancing the

abilities and commitment of those who work with them. To that end, ASA offers a wide variety of conferences and networking opportunities and Web-based training every year. The society also publishes a bi-monthly newspaper, a quarterly journal and nine quarterly newsletters for its members. To obtain more information on ASA and to join, call (800) 537-9728 or visit www.asaging.org.

About the MindAlert Lecture Sponsor: MetLife Foundation

MetLife Foundation, established in 1976 by the Metropolitan Life Insurance Company, has been involved in a variety of aging-related initiatives. Since 1986, the foundation has supported research on Alzheimer's disease through the MetLife Foundation Awards for Medical Research program and has contributed more than \$8.5 million to efforts to find a cure. In addition, the foundation has provided support for a traveling exhibit on memory, a public education video for use by caregivers and families of people with Alzheimer's disease, and support for "healthy aging" projects addressing issues of caregiving, intergenerational activities, health and wellness programs, and volunteer opportunities. MetLife Foundation supports health, education, civic and cultural programs throughout the United States. For more information about the foundation, visit www.metlife.org.

MetLife Foundation



LXXXII. The Brain

The brain is wider than the sky,
For, put them side by side,
The one the other will include
With ease, and you beside.
The brain is deeper than the sea,
For, hold them, blue to blue,
The one the other will absorb,
As sponges, buckets do.
The brain is just the weight of God,
For, lift them, pound for pound,
And they will differ, if they do,
As syllable from sound.

—*Emily Dickinson*

Excerpted from *The Collected Poems of Emily Dickinson*
(Avenel, N.J.: Gramercy Books, 1982)

MetLife Foundation

