

Aging successfully: Coping with a shrinking brain

By Kim Dawson

Published in The Chilliwack Progress, August 13, 2006

Last week, I left readers to imagine the teenage brain as an orchard full of fruit-bearing trees. There are two gardeners in the orchard. One is fertilizing the trees yet to bear fruit. The other is pruning back trees that have already born fruit or are over-grown. With fertilizing and pruning working at cross-purposes, chaos and confusion is a reasonable experience to expect in teens. Well, as some of you would be quick to remind me, confusion and chaos doesn't end with the teen years.

It's important to remember that chaos is present in every season of life. From the early springtime sprout of infancy to the late spring sapling of childhood, from the early summertime bloom of the teen years to the late summer fruit-bearing of youth, from the bronzes of autumn midlife to the deep midwinter of the elderly.

It is impossible to adequately cover the entire life, so today, I would like to skip most of the adult years and explain a major health risk faced during the winter of life, Alzheimer's disease. This is probably one of the most chaotic and disturbing illnesses because the personality slowly disappears. In Alzheimer's, the mind dies well before the last breath is drawn.

But first, I would like to remind you just how chaotic and confusing the healthy brain is. A microscopic matrix of tubes in the brain can explain this ever-present chaos. Recent research by anesthesiologist and researcher Stuart Hameroff brings attention to the fact that an intricate matrix of tiny chemical tubes called "microtubules" is located inside each cell of the brain. Microtubules are structures responsible for helping the "trees" in the "orchard" of the brain to gather information from the roots and transport it up through their branches to the flowers, leaves, and fruit. Then, these drop off and convey their messages to nearby neural "trees". In a way, microtubules help make order out of chaos.

What is fascinating is that something so small could be so high-powered. Hameroff points out that microtubules become electrically excited at about the same rate as the gigahertz processor inside your home computer. He estimates that there are ten million microtubules inside every neuron. Since there are about 100 billion neurons in the entire brain, the brain has an information processing capacity of ten billion-billion-billion operations each second. In stark contrast with our usual assumption that we can only have "one thought at a time", this number of brain-states is staggering to say the least. Thus, the healthy brain is already overwhelmed with information. Yet it somehow manages to put into order the many billions of signals required to map our very complicated world.

Unfortunately, in Alzheimer's disease, this map starts to break down. New research is showing that the high-powered assembly of microscopic tubes is becoming tangled and disorganized, and these tangles spark cell death in an area of the brain called the hippocampus. If you will remember from a couple weeks back, the hippocampus helps us select, remember, and recognize things.

Other studies looking at memory function have shown that people with Alzheimer's can remember what happened but not WHEN it happened. So, what seems to be happening is a failure to appropriately time the retrieval of memories. You end up with an elderly person who is re-living their early childhood as if it is actually happening. This makes the common misnomer "all-timers" quite fitting.

I don't know about you, but I would rather not know that I reach the age of 85, the chances I could have Alzheimer's have already climbed to a whopping 47 percent (that's nearly one out of every two people over 85)! While there are quite a few people getting past the average lifespan of 80 these days, the chances of getting Alzheimer's are only one percent for those under sixty. Now, if do manage to reach the respectable age of 85 and I do get Alzheimer's, I could live without knowing my ability to

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move (in more ways than one) will decline drastically. As well, I will probably wander around aimlessly (more often than I already do in my 40s!). Even more horrifying, I may not even know where (or when) I am. I can expect to appear totally confused (and confusing) to my friends and family. Worse yet, I would prefer to deny the very real possibility that I won't even recognize my own family. All this may even be so confusing and distressing to my family that they may not be able to look after me any more.

Even if I don't get Alzheimer's disease, it isn't welcome news that my ability to learn and make new memories will gradually slow into my sixties and seventies. I don't want to know that I'm already losing between five and twenty million brain cells per day. (No wonder I forget things so much!) On top of all that, I think that I will be losing a lot of sleep over the changes I experience as I get older. According to a recent poll by the National Sleep Foundation, over eighty percent of North American adults experience insomnia several nights each month. About seventy percent of people with insomnia never have the problem addressed medically and sleeping difficulties are well-known to increase in the elderly. Consequences related to untreated insomnia include depression, anxiety, reduced attention, concentration, and memory.

These are things I would rather not know, but if I must experience them, perhaps knowledge is a gift because it allows me to prepare. In any case, I would much rather know that, since I already have well over one trillion cells in my brain overall, I can actually afford to lose a few. I would like to know that the shrinkage of my brain can be increased by stress because this means I can control my level of stress simply by relaxing more, getting plenty of exercise, and not letting stress bother me so much. I would also be glad to know that I can also reduce the shrinkage of my brain by keeping it active, continuing to learn new things, and by eating a healthy diet. I'm also encouraged to hear these things all reduce the risk of Alzheimer's disease.

For this sort of news, I would be truly thankful. I have also been blessed to learn that there are practical strategies to prevent and treat Alzheimer's disease. In a recent study of 60,000 people, these are the four things that people with low risk for Alzheimer's disease were found to do. They abstain from alcohol, walk briskly for 30 minutes at least three times per week, take supplements of multivitamins and antioxidant, and reduce consumption of refined sugars and red meats. Clearly, it would be a good idea to consult your doctor for more information on these strategies.

Let me sum up the course of lifespan development as explored over the last few weeks in Perspective. Erik Erikson suggested the elder period of life is one of reckoning between integrity and despair. At almost any stage of life, it's easy to feel helpless and despairing when life is so short, suffering so potentially long, and death so final. Brains will shrink and life will often seem overwhelming and chaotic at times.

I can't really speak for anyone else on this one. But when I look at the integrity with which I've tried to live my life, my resilience through trials and tribulations, the finding of joy and beauty despite all the suffering, I think life is very much worth living to the fullest and for as long as possible. When the fruit and flowers in the "brain garden" between my ears are harvested to the fullest, it is enough to know I am doing my best. When I remain compassionate for all the decay and degradation, along with the joy and wonder in the world around me, I am better able to help others struggle through. At least for the time being.

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