The Aging Brain

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Section I

AGING IN THE BRAIN
True or False?

Irreversible cognitive and mental decline are unavoidable consequences of aging that cannot be altered.

• The latest research shows that in healthy aging brains, new synapses form and nerve cells regenerate

Healthy Brain Aging

• Medicine tends to focus on diseases of aging; yet aging is not a disease!
• Many perfectly normal brain changes occur as we age:
  – Structural: loss of brain plasticity, thinning cortex
  – Hormonal: decreased production of dopamine and serotonin (both related to learning and memory)
Why the Brain Ages

Normal Brain Activity → Damage to Cells → Disease

Body Kills Damaged and Old Cells → Healthy Aging
How Cells are Damaged

• Free radicals (i.e. from diet, pollution, etc.) cause oxidative damage (why we need antioxidants!)
  – Causes wrinkled skin, stiff joints, hardening arteries, deteriorating vision, many forms of cancer, etc.
Diseased vs. Healthy Brain

70 year old diseased brain on left; 70 year old healthy brain on right.
Preventing Cognitive Decline

• Mounting evidence that cognitive decline can be slowed by controlling the major risk factors

• The “Healthy Brain Initiative” Identifies:
  1. Preventing and treating vascular disease
  2. Curbing physical inactivity
Healthy Heart, Healthy Brain

• When blood flow to the brain is impeded, brain function begins to deteriorate
  – Can occur in an instant: stroke
  – Or can occur gradually over time: hypertension, diabetes, atherosclerosis
Preserving Brain Health

1. Controlling: blood pressure, diabetes, cholesterol, and weight
2. Quitting smoking
3. Reducing stress levels
4. Becoming more physically active

Integrative Approach to Brain Health

- Healthy Brain Nutrition
- Social Interaction
- Improved Fitness

- Staying Mentally Active
- Ideal Weight, Healthy Cardiovascular System, Minimized Stress, Decreased Cellular Damage

- Improved Cognitive Function
Section II

STAYING MENTALLY ACTIVE

- Staying Mentally Active
- Improved Cognitive Function
- Healthy Brain Nutrition
- Social Interaction
- Improved Fitness
- Ideal Weight, Healthy Cardiovascular System, Minimized Stress, Decreased Cellular Damage

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Use it or Lose it!

• Just like a muscle, the brain must be exercised in order to stay strong
  – Challenging your brain and learning new information keeps the brain active
  – Forms new connections in the brain, and may even form new nerve cells, according to new research
Challenge your Brain!

• The bairn is cpalbe of amanizing things, and loevs a cahllegen!
  – Isn’t it amazing the brain can comprehend completely jumbled words?

• Great ways to exercise your brain:
  – Crossword, Sudoku, and Word Jumble puzzles
  – Play Chess, Checkers, and Scrabble
  – Throw away your calculator! Do simple math problems in your head.
  – Avoid monotonous tasks: take different routes to familiar places
Solve Brain Teasers!

As quickly as you can, say aloud the color of each word!
Learn Something New Everyday!

• Higher levels of education are correlated with the lowest levels of dementia
  – Learning something new forms stronger brain cell connections
  – Read often, study a new language, learn or play an instrument
Section III

HEALTHY BRAIN NUTRITION

- Improved Cognitive Function
- Staying Mentally Active
- Ideal Weight, Healthy Cardiovascular System, Minimized Stress, Decreased Cellular Damage
- Social Interaction
- Improved Fitness
Brain Foods

• Increase Healthy Fats
  – Mono- and Poly-unsaturated fats protect brain cells from damage

• Decrease Unhealthy Fats
  – Saturated and trans-fats damage brain cells, increase `bad` cholesterol and increase risk of developing heart disease, stroke, Alzheimer`s and other forms of dementia
Omega-3 Fatty Acids

• Greatly reduce cardiovascular risk and normalize cholesterol levels, both risk factors for cognitive decline

• Found mainly in fish, but also walnuts and sesame/sunflower seeds
  – Aim for 2-4 servings of fish/week
  – Highly recommend 2000 mg of fish oil/day
Brain Foods

• Antioxidants
  – Protect brain cells from oxidative damage
  – High in Vitamins A, C, E, B12 and Minerals
  Zinc and Selenium
  – Reduce risk of heart disease, stroke, diabetes and many other diseases
Foods High in Antioxidants

Fruits & Vegetables
• Brightly coloured fruits and vegetables have the highest levels of naturally occurring antioxidant levels.
• Vegetables
  – Kale, spinach, Brussels sprouts, alfalfa sprouts, broccoli, beets, red bell pepper, onion, sweet potatoes and garlic.
• Fruits
  – Plums, blueberries, blackberries, strawberries, raspberries, plums, oranges, red grapes, pomegranates and cherries.

Fish
• Cold water fish are high in omega-3 fatty acids
• Choose salmon, trout, halibut, white fish, tilapia

Nuts, Seeds & Legumes
• High in Vitamin E and other antioxidants
• Choose: Quinoa, almonds, walnuts, pecans, sesame seeds, sunflower seeds, flax seeds, pumpkin seeds, lentils, brazil nuts
Whole Foods Eating

• Nutritious: contains all daily requirements for vitamins and minerals without causing inflammation
• Highly Antioxidant: protects your cells by neutralizing oxidative damage
• Low Glycemic Load: no spikes in blood sugar → prevents diabetes and stabilizes energy levels
• Protects cardiovascular system
  – Lowers cholesterol
  – Lowers blood pressure
  – Promotes healthy weight
Vitamin B12

- A toxic substance called homocysteine forms in the body as part of normal metabolism, and must be neutralized by Vitamin’s B12, B6, and B9
- High levels of homocysteine causes vascular damage in the brain
- B12 deficiency causes the brain to literally shrink!
- B12 is found in meat products
  - Also consider sublingual and injectable B12

Elderly With Low Vitamin B12 Risk Brain Shrinkage And Cognitive Decline. Neurology September 26, 2011 vol. 77 no. 13 1276-1282
Medicinal Herbs

• What herb do you think of when it comes to memory?
  – Ginkgo!
  – Traditionally used as a memory aid, and has since demonstrated an ability to increase blood flow to the brain
  – However, in clinical trials, it is only shown effective in delaying progression of Alzheimer’s patients, and not improving memory in healthy adults
Medicinal Herbs Continued

• Bacopa: preliminary studies show an improvement in cognition, especially in mentally fatigued individuals
• Green Tea: building evidence that it may improve mental performance
• Rosemary: increases blood flow to the brain, and may improve learning and memory (lacking specific clinical trials)
Section IV

SOCIAL INTERACTION
Social Activity maintains Brain Health

• Study of 800 men and women over 75 found that there was a significant decrease in dementia with social engagement
• Those who added physical and mental activities had an even lower risk of developing dementia
Social Interactions Reduce Cognitive Decline

The following have been shown to reduce dementia and improve cognitive function

• Sports and Clubs
• Cultural Activities
• Emotional Support Systems
• Close Personal Relationships
Adding Social Experiences

• Volunteer for local organizations and committees
• Be an active member in your community
• Join clubs and sports teams
  – Bridge, Dancing, Golf tournaments, Shuffleboard, Gardening, Walking
• Travel
Section V

IMPROVED FITNESS

- Healthy Brain Nutrition
- Social Interaction
- Improved Fitness
- Staying Mentally Active
- Ideal Weight, Healthy Cardiovascular System, Minimized Stress, Decreased Cellular Damage
- Improved Cognitive Function
What is the single most important thing you can do for your brain health?

EXERCISE!
Cardiovascular Fitness = Brain Fitness

Multiple studies show that regular aerobic exercise
• Increases blood flow to brain bringing more oxygen and improving cell health
• Increases brain volume (i.e. increases new brain cell formation)
• Improves brain plasticity (improves learning)
• Improves academic performance
• Decreases risk of stroke, heart attack, type II diabetes and many other diseases associated with cognitive decline
How Much Exercise?

• Complicated and individualized
  – Depends on age, pre-existing health conditions, and fitness level

• In general, more is better, consistently (i.e. every day) to a frequency and intensity that does not cause extreme fatigue or injury
  – Could I be more vague?
Exercise Duration

- Most experts agree that the best ‘return on investment’ is on the first 30 minutes of low-impact exercise/day
  - i.e. walking
  - Additional exercise is still highly valuable, but the rate of health benefit falls off after 30 minutes
  - So simple, yet less than 15% of Canadians do it, according to Statistics Canada!
The Real Question...

“Can you limit your sitting and sleeping to just 23.5 hours per day?”

~ Dr. Mike Evans, Associate Professor, U of T
Exercise & Brain Health

- The most effective exercise programs for the brain will include a mental and a social component
  - Walking Clubs
  - Shuffle Board
  - Golfing
  - Aquafit
  - Gardening
  - Cycle Clubs
  - Yoga
Upcoming Lectures/Appearances:

More to be announced soon!

Today’s lecture is available for download on our website.