The Biology of Aging

WEEK 2

STRESS
BRAIN HEALTH
DIABETES
NATURE DEFICIT

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Housekeeping

- Slides are now available online
- Microphone issues

- None of the information presented should be interpreted as medical advice.
- Always consult your doctor before making any significant changes to your diet or lifestyle.
Week 2

The impact of stress on the aging process

Brain health, cognition, and memory

Diabetes role in Dementia Risk

Nature Deficit and mood disorders
What is stress?
What is Stress?

- “Stress is the nonspecific response of the body to any demand, whether it is caused by, or results in, pleasant or unpleasant conditions.” ~Hans Selye

- A condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize

- Stress is commonly defined as a state of real or perceived threat to homeostasis
What is stress?

Reaction to the **perception** that demands placed on us exceed our abilities

How many **stressful events** do we have **each day**?

50!
Different Types of Stress

1. **Eustress**
   - Good stress
   - Motivates us to get work done
   - Provides incentive
   - Focuses energy & improves performance
   - Short-term
   - Examples: getting married, retirement, buying a house

2. **Distress**
   - Bad stress
   - Too much to bear or cope with
   - Short or long-term
   - Feels unpleasant, reduces performance
   - Examples: loss of employment, divorce, death of a loved one
3 Stages of Stress

- Dr. Hans Selye
How Does Stress Affect Us?

- “Stress response” is a combination of actions of hormones, immune system and nervous system to maintain homeostasis

- Loss of homeostasis = potential for increased aging

- More stress = more aging?

- Cortisol: main function is to restore homeostasis after stress
Stress & the Nervous System

Central Nervous System
- Brain
- Spinal cord

Peripheral Nervous System
- Cranial nerves
- Spinal nerves
  - Autonomic
  - Somatic
    - Voluntary CNS to skeletal muscles

Sympathetic & Parasympathetic
- "Fight & Flight"
- "Rest & Digest"
Parasympathetic vs Sympathetic

**Sympathetic**
- Gas pedal
- Ideal for responding to short, intense bouts of stress
- Should represent a small fraction of overall nervous system function

**Parasympathetic**
- Brake pedal
- Ideally resting easily & often
- Should be the dominant branch of the autonomic nervous system
The Nervous System: Fight or flight

- Blood pressure
- Heart Rate
- Blood goes to muscles
- Muscles tense up
- Inhibition of vegetative functions
  - Feeding
  - Digestion
  - Reproduction
  - Immunity

.....sound familiar???
The Nervous System: Rest & Digest

- ↓ Blood pressure
- ↓ Heart Rate

- Blood flows to core of body/organs
- Immune system and digestion working optimally
- Body performs “housekeeping” activities
How does stress affect the body?

- Stress causes the adrenal gland to produce hormones
  - Cortisol, epinephrine, norepinephrine

- Cortisol is a “stress hormone”
  - Increases blood sugar (much safer than low blood sugar)
  - Raises blood pressure
  - Depresses Immune function
  - Inflammatory response
How does stress affect us?

- Stress affects hormone production
  - Increases cortisol (stress hormone)
How does stress affect us?

3 Stages of Stress Response

- **Stage 1: Temporary**
  increase in cortisol after brief stress episode
- Increased awareness
- Improved cognition
- Euphoria
- Enhanced analgesia
How does stress affect us?

3 Stages of Stress Response

- **Stage 2: Elevated cortisol levels after chronic stress**
How does stress affect the body?

- Muscle tension, stiff neck, back pain, jaw pain
- Cold, sweaty hands
- Facial tics
- Indigestion, change in bowel habits
- Fatigue, low energy
- Headaches, migraine
- Nervous stomach, nausea
- Teeth grinding, nail biting
How does stress affect the mind?

- Anxiety, nervousness
- Fear
- Irritability
- Hopelessness, helplessness
- Impatience
- Depression
- Overwhelmed
- Loss of concentration
- Apathy
How does stress affect our behaviours?

- Change in appetite, cravings
- Sleep disturbances
- Forgetfulness
- Anger outbursts
- Decreased productivity
- Social withdrawal
- Indecisiveness
- Change in libido/sex drive
- Increased use of drugs/alcohol
- Increased use of caffeine/tobacco
How does stress affect us?

3 Stages of Stress Response

- **Stage 3: Low** cortisol levels following high cortisol output

- **Symptoms:** exhaustion, depression, weak immunity
What are the long term effects of high stress?

• Inappropriate regulation of the stress response has been linked to a wide array of pathologies
  o Autoimmune disease
  o Hypertension
  o Affective disorders
  o Major depression
Stress & Disease

- Chronic elevations in heart rate and blood pressure
  - Increased risk for heart attack and stroke
- Chronic stress can affect inflammation & cholesterol levels
- Stress affects stool motility
  - Diarrhea or constipation
  - Ability to absorb nutrients
- Male reproductive system
  - Altered sperm production, testosterone levels, erectile dysfunction, sexual desire
- Female reproductive system
  - Fertility, severity of menopausal symptoms, sexual desire
Stress & Weight Gain

- Cortisol
  - Lowers thyroid hormone
    - Affects metabolism
  - Causes insulin resistance
  - Increases cravings and overeating
  - Contributes to belly fat

- Overweight/obesity is risk factor for many chronic diseases
Caregiving for a spouse or loved one with dementia

- Delay wound healing
- Interleukin-6 (IL-6) is an important indicator of sub-clinical inflammation thought to contribute to degenerative diseases
- Caregivers average IL-6 levels increased four times more than controls over span of 6 years
- Increased difference in IL-6 persisted for years after caregiving activities ceased.
Stress & Risk of Death

- In one study, senior citizens who felt stressed out from taking care of their disabled spouses were 63 percent more likely to die within 4 years than caregivers without this complaint.
- Spouses and children who provided constant care shortened their lives by as much as four to eight years.
- Moms with severely and chronically ill children have shorter telomeres.
- Caregivers of people with Alzheimer’s have shorter telomeres.
- Individuals with the most job stress had the shortest telomeres.
Stress & Risk of Death

- People under stress:
  - Eat more poorly
  - Exercise less
  - Drink more
  - Often rely on medication
1 in 4 Canadian workers described their day-to-day lives as highly stressful
- 62% identified work as their main source of stress
- Other factors were:
  - Financial concerns
  - Not having enough time
  - Family matters
  - Personal relationships
  - Health
  - Generalized worries
Reported Stress Levels in Canada

Chart 2
Percentage reporting most days quite a bit or extremely stressful, by age group and sex, household population aged 15 or older, Canada, 2013

Source: Canadian Community Health Survey, 2013.
Am I stressed out?

Get your cortisol levels tested

- Blood (AM & PM)
- Saliva (Adrenal Stress Index)
Coping Strategies

- #1: Identify *your* Stressors!
  - Become aware when you experience the signs of stress
  - Figure out what triggers stress in you
- Notice your reactions to stress
- Change what you can, accept what you can’t change
- Exercise: Ask yourself “is this life threatening?”
- Avoid stress-cases!
- Learn from your cool-headed, relaxed friends
Top Strategies for Stress Resilience

1. Make your health a priority
   - A healthy body is much more resilient to the effects of stress
Top Strategies for Stress Resilience

2. Get enough sleep

I love sleep.
My life has the tendency to fall apart when I’m awake, you know?

~ Ernest Hemingway
SLEEP

- Stress and anxiety often hinder good sleep

- Sleep is important for:
  - Concentration
  - Memory formation
  - Repair of damage to your body’s cells
Circadian Rhythm

- Get outside in the morning for sun exposure
What if I can’t sleep?

• Causes of Insomnia:
  - #1 = STRESS
  - Imbalances in cortisol and melatonin
  - Blood sugar imbalances
  - Sleep disorders
  - Chronic pain
  - Poor sleep hygiene aka bedtime routine
Sleep...zzzzz

- Establish regular sleeping hours

- Go to bed by 11 pm
  - Important for adrenal gland function

- Sleep 7 to 9 hours per night
How to get a good night’s sleep

- A few hours before bedtime...
  - Turn the lights down
  - Engage in relaxing activities (reading, tea, bath)
  - Avoid using electronics (TV, laptop, cell phone)

- At bedtime...
  - Make your room as dark as possible
  - Make sure room is tidy, quiet, comfortable temperature
  - Turn alarm clock away from you
  - Use bed for sleep and sex only
If you still can’t sleep...

- Develop a calming bedtime routine
- Make a to-do list or write in a journal
- Take a hot bath or shower before bed
- Avoid exercise within 3 hours of bedtime
- Breathe!.....
Top Strategies for Stress Resilience

3. **Practice** daily relaxation

- **Deep Breathing**: start with 10 deep breaths before every meal

- **Mindfulness & Meditation**: 
  - Guided meditation
  - Progressive Muscle Relaxation
  - Apps: HeadSpace

- **Yoga**
  - Lowers cortisol levels
  - Lowers heart rate and blood pressure
  - Promotes parasympathetic nervous system activity
Mindfulness

- Being present
  - Living in the future -> anxiety
  - Living in the past -> depression

- Nothing exists but here and now

- Be grateful for exactly where you are

- Book: The Power of Now by Eckart Tolle
BREATHE

- Tendency to breathe shallow or hold breath during times of stress and anxiety
- Shallow breathing reduces circulation of oxygen more stress
- Benefits include calming physical effects, increased energy and focus, combats illness, relieves aches and pains, heightens problem-solving abilities, and boosts motivation and productivity
- Bonus: it’s FREE and you can do it anywhere!
- Let’s breathe....
What happens in the mind of man is always reflected in the disease of his body ...

~René Dubos
Brain Anatomy

Frontal Lobe: Thinking, planning, problem solving, emotions, behavioural control, decision making

Temporal Lobe: Memory, understanding language, facial recognition, hearing, vision, speech, emotion

Parietal Lobe: Perception, object classification, spelling, knowledge of numbers, visuospatial processing

Occipital Lobe: Vision, visual processing, colour identification

Cerebellum: Gross and fine motor skills, hand-eye coordination, balance

Brain Stem: Regulates body temperature, heart rate, swallowing, breathing
Brain Anatomy

• Brain consists of 2 main types of cells
  - **Neurons**: perform all of the communication and processing within the brain
    - Contains 100 billion nerve cells
  - **Neuroglia**: helper cells of the brain, support and protect the neurons
    - Outnumber neurons 50:1
Brain Anatomy

- Can we generate new brain cells? YES!
- Neurogenesis does not occur everywhere in the brain
  - Evident in the hippocampus and olfactory bulb
  - Perhaps in the cerebral cortex
  - New neurons develop from neural stem cells that remain in our brains throughout life
Brain Anatomy

- 2 Types of brain tissue: gray matter and white matter
  - **Gray matter**: mostly unmyelinated neurons, most of which are interneurons.
    - Areas of nerve connections and processing
  - **White matter**: mostly myelinated neurons that connect the regions of gray matter to each other and to the rest of the body

- Myelinated neurons transmit nerve signals much faster than unmyelinated axons do.
- White matter = information highway of the brain
Brain Anatomy- Meninges

- Three layers of tissue: surround and protect the brain and spinal cord
  - **Dura mater** (tough mother): leathery, outermost layer of the meninges
    - Holds the cerebrospinal fluid
    - Prevent mechanical damage
  - **Arachnoid mater** (spider-like mother): lining inside of the dura mater
    - Much thinner and more delicate
    - Connects the dura mater and pia
  - **Pia mater** (innermost layer): rests directly on the surface of the brain and spinal cord
    - Blood vessels provide nutrients and oxygen to the nervous tissue of the brain
    - Helps to regulate the flow of materials from the bloodstream and cerebrospinal fluid into nervous tissue
Cerebrospinal fluid (CSF): a clear fluid that surrounds the brain and spinal cord
- Filtered blood plasma
- Contains glucose, oxygen and ions

Rather than being firmly anchored to their surrounding bones, the brain and spinal cord float within the CSF

CSF acts as a stabilizer and shock absorber for the brain and spinal cord
Brain Physiology

- Brain consumes as much as 20% of the oxygen and glucose taken in by the body.
- Brain has a very high metabolic rate due to the sheer number of decisions and processes taking place within the brain at any given time.
- Large volumes of blood must be constantly delivered to the brain in order to maintain proper brain function.
Brain Physiology

- Brain receives signals from the body through receptors
  - Gives meaning to things that happen around us
- Some signals are automatic: blood pressure, heart rate
- Somatic sensory signals: sight, smell, sound, vision
- Responsible for maintaining homeostasis
  - Hypothalamus
  - Brain stem
- Take signals and responds back to the body through the nervous system
The Aging Brain

- Certain parts of the brain shrink:
  - Prefrontal cortex: learning, planning, complex mental activities
  - Hippocampus: memory
- Changes in neurons and neurotransmitters
  - Affect communication between neurons
  - Reduced communication because white matter is degraded or lost
The Aging Brain

- Changes in the brain’s blood vessels occur
  - Blood flow reduced because arteries narrow
  - Less growth of new capillaries occurs
  - Can affect delivery of oxygen and nutrients to neurons

- Some develop structures called plaques and tangles outside of and inside neurons
  - Involved in development of disease

- Damage by free radicals increases
  - Faulty cell division
  - Reduced anti-oxidant capacity
The Aging Brain

- Modest decline in ability to learn new things
- Decline in ability to retrieve information
- May perform worse on complex tasks of attention, learning, and memory
- However, if given enough time to perform the task, the scores of healthy people in their 70s and 80s are often similar to those of young adults.
- Adults often improve in other cognitive areas, such as vocabulary and other forms of verbal knowledge
The Aging Brain

- Adaptable to change
- Major declines in mental abilities are not inevitable
- Growing evidence of the adaptive capabilities of the older brain
  - Additional areas activated to compensate for difficulties in other areas
  - “Plasticity”
The Aging Brain

- **Cognitive reserve:**
  - Brain’s ability to operate effectively even when some function is disrupted
  - Amount of damage that the brain can sustain before changes in cognition are evident

- **Variability may be because of differences in**
  - Genetics
  - Education
  - Occupation
  - Lifestyle
  - Leisure activities
Main features in Alzheimer’s disease

1. **Amyloid plaques**
   - Insoluble deposit found in the space between nerve cells in the brain
   - Protein pieces of beta-amyloid clump together -> plaques
   - Beta-amyloid comes from a larger protein found in the fatty membrane surrounding nerve cells
   - Most damaging may be groups of a few pieces
     - May block cell-to-cell signaling
     - May activate immune system cells that trigger inflammation
2. Neurofibrillary tangles

- In healthy cells: transport system is organized in orderly parallel strands somewhat like railroad tracks.
- Food molecules, cell parts and other key materials travel along the "tracks".
  - “Tau” protein helps the tracks stay straight.
- In Alzheimer’s disease:
  - Tau collapses into twisted strands called tangles.
  - The tracks can no longer stay straight → fall apart & disintegrate.
  - Nutrients and other essential supplies can no longer move through the cells, which eventually die.
3 Main features in Alzheimer’s disease

3. Loss of connection between brain cells

- Disrupts electrical charges within cells and the activity of neurotransmitters
- Loss of signal -> Loss of brain cell function -> Cell death
- The cortex shrivels up, damaging areas involved in thinking, planning and remembering.
- Shrinkage is especially severe in the hippocampus
- Ventricles (fluid-filled spaces within the brain) grow larger
Stages of Alzheimer's Disease

- **Early Stages:**
  - Beginning to produce plaques and tangles
  - Can start up to 20 years before diagnosis

- **Mild to Moderate Alzheimer’s disease**
  - Continued formation of plaques and tangles in areas that control memory, planning, and thinking
  - Develop problems with memory or thinking serious enough to interfere with work or social life
  - May get confused and have trouble handling money, expressing themselves and organizing their thoughts.
  - Diagnosis often occurs in these stages
Stages of Alzheimer's Disease

- Severe Alzheimer’s Disease:
  - Most of the cortex is seriously damaged
  - Brain shrinks dramatically due to widespread cell death
  - Individuals lose their ability to communicate, to recognize family and loved ones and to care for themselves.
Diagnosis of Alzheimer’s Disease

- Detailed patient history
- Speak with family members or close friends
- Conduct physical and neurological examinations and laboratory tests
  - Help determine neurological functioning and identify other causes of dementia.
- They conduct neuropsychological testing
  - Mini Mental Status Exam
- Imaging studies: computed tomography (CT) scan or a magnetic resonance imaging (MRI) test
- Can only be confirmed post-mortem
Alzheimer’s Disease Stats

- 2011: 747,000 Canadians were living with cognitive impairment, including dementia
  - 14.9% of Canadians 65 and older
- By 2031, will increase to 1.4 million
- Alzheimer’s disease = 64% of all dementias
- Economic Impact:
  - Combined direct (medical) and indirect (lost earnings) costs of dementia total $33 billion per year
- If nothing changes, this number will climb to $293 billion a year by 2040
Current Treatment Options

- Medication
  - Can help to control symptoms
  - Do not stop disease progression
  - Do not cure the disease
What causes Alzheimer’s Disease?
Risk Factors for Dementia

Diseases That Cause Dementia
- Alzheimer’s disease
- Vascular dementia
- Parkinson’s disease with dementia
- Frontotemporal lobar degeneration

Other Causes of Dementia
- Medication side effects
- Depression
- Vitamin B_{12} deficiency
- Chronic alcoholism
- Certain tumors or infections of the brain
- Blood clots pressing on the brain
- Metabolic imbalances, including thyroid, kidney, or liver disorders
Genetics

- Chromosome 19
- Gene for APOE
  - A protein that carries cholesterol in blood and that appears to play some role in brain function.
  - APO E2: rare variant, reduces risk for AD
  - APO E3: most common, neutral risk for AD
  - APO E4: found in 40% of individuals who develop AD
    - More common in individual with AD
      - Other factors are at play!
Risk Factors for Alzheimer’s Disease

- #1 Risk Factor = AGING

- Circulatory disorders
  - Brain relies on constant supply of oxygen and glucose
  - Decreased ability to clear beta-amyloid
  - High blood pressure correlated with dementia/cognitive decline
  - Metabolic syndrome: abdominal obesity + high triglyceride levels + low HDL + high blood pressure + insulin resistance
Risk Factors for Alzheimer’s Disease

- **Physical Inactivity**
  - Exercise increases the number of capillaries that supply blood to the brain and improves learning and memory

- **History of head injuries**

- **Stress**
  - Hippocampus contains many cortisol receptors
  - Excess cortisol overwhelms the hippocampus and causes atrophy
  - Elevated cortisol levels display significant memory loss resulting from hippocampus damage
  - Good news! The damage incurred is usually reversible
Risk Factors for Alzheimer’s Disease

- Exposure to nitrosamines linked to
  - Alzheimer’s disease
- Nitrites are added to meats and processed foods for flavor and coloring.
- High levels of nitrates added to fertilizers can be incorporated into produce and then converted to nitrites and finally nitrosamines in the body
Insulin: A Quick Lesson

- Insulin = a hormone
- Takes sugar from the blood stream -> cells to provide energy
- Sugar is stored as glycogen or fat
- Diabetes
  - Type 1: failure of pancreas to produce insulin
  - Type 2: insulin resistance -> excess insulin production
    - High blood sugar
    - High insulin levels/insulin resistance
    - Eventually lack of insulin
Alzheimer’s Disease: Type 3 Diabetes?

- Type 3 diabetes: chronic insulin resistance + insulin deficiency in the brain
- Brain’s ability to metabolize sugar is reduced
- Consequently, the brain cells practically starve to death
- Tau genes: affected by insulin
- Improved cognitive performance AD or MCI after treatment with insulin sensitizer agents or intranasal insulin
Diabetes & Dementia Risk

- Hisayama Study:
  - People with diabetes (vs normal blood sugar levels): 74% increased risk of being diagnosed with some type of dementia over the course of the study
  - People with impaired glucose tolerance (but not diabetic) were 35% more likely to develop dementia
  - Diabetes = more than double the odds of developing Alzheimer’s
  - Impaired glucose tolerance were 60% more likely to get Alzheimer’s
Alzheimer’s Disease: Type 3 Diabetes?

Increased risk could be linked to:

- Chronic hyperglycemia
- Oxidative stress
- Accumulation of advanced glycation end products (AGEs)
- Increased production of inflammatory molecules
- Cerebral microvascular disease
Diabetes in Canada

Diabetes
- Affects 2.4 million Canadians (6.8%)
- Higher among males (7.2%) than females (6.4%)
- 1998 -2008: the prevalence increased by 70%
- Fasting blood sugar levels > 7.0 or random blood sugar > 11.0
- HbA1C: < 0.065 (6.5%)

Pre-diabetes: 5.7 million
- Fasting blood sugar: 6.1-6.9
Diabetes

How much sugar do we consume?

26 tsp (110 grams)

Teenage boys = 41 tsp

Recommended daily intake is 5-6 tsp (25 grams)
Where is all this sugar coming from?

1/3 of added sugar comes from beverages
POP QUIZ!

- How many **grams** of **sugar** in?
  - Starbucks Vanilla Latte (grande)?
    - 35
  - Low-fat chocolate milk (1 cup)?
    - 25
  - Orange juice (1 cup)?
    - 24
  - Tim’s Horton Iced Capp (small)?
    - 33
  - Gatorade (12oz)?
    - 36
  - Coca Cola (1 can)?
    - 40
How does sugar affect us?

Diet rich in sugar & carbs

High blood sugar levels all day

High insulin levels all day

Fat storage mode

WEIGHT GAIN & DISEASE
Nutrition and Lifestyle Strategies to Prevent Alzheimer’s Disease
Cutting back on Sugar

- Aim for less than 25 grams per daily
  - Equivalent of ~6 tsp
  - Start reading labels
  - Sugar is everywhere!

- Avoid all sources of refined sugar
  - White sugar
  - Brown sugar
  - Molasses
  - Agave syrup
  - Brown rice syrup
Sugar

- Healthier sweeteners
  - Maple syrup
  - Honey
  - Stevia
  - Coconut sugar

  These are still SUGARS although they’re “NATURAL” so use in moderation!

- Avoid all artificial sweeteners
  - Splenda, Sweet N low, aspartame, Equal, acesulfame potassium
Choosing Low Glycemic Index Carbs

- A scale that rates foods based on how much they raise your blood sugar levels
- Tells you about the quality of the carbohydrate

- Low GI = 0-55
- Moderate = 56-69
- High = 70 +
Low Glycemic Index Foods

- 100% stone-ground whole wheat or pumpernickel bread
- Oatmeal (rolled or steel-cut)
- Oat bran
- Muesli
- Converted rice, barley, bulgar
- Sweet potato, corn, yam, lima/butter beans, peas, legumes and lentils
- Most fruits, non-starchy vegetables and carrots
Medium Glycemic Index Foods

- Whole wheat
- Rye and pita bread
- Quick oats
- Brown, wild or basmati rice, couscous
High Glycemic Index Foods

- White bread or bagel
- Corn flakes, puffed rice, bran flakes
- Instant oatmeal
- Shortgrain white rice, rice pasta
- Macaroni and cheese from mix
- Russet potato
- Pumpkin Pretzels
- Rice cakes, popcorn, saltine crackers
Load Up on Healthy Fats

• Don’t eat a low-fat diet!
  ○ Needed for satiety
  ○ Important for weight loss
  ○ Contribute to health

• 3 Types of fat
  ○ Unsaturated (mono- and poly-unsaturated)
  ○ Saturated
  ○ Trans fat
Fats

- **Unsaturated fats**
  - **Monounsaturated**: avocado, olive oil, nuts/seeds
    - Associated with lower AD risk
  - **Polyunsaturated**:
    - **Omega 3**: salmon, sardines, herring, mackerel, flax, walnuts
      - DHA abundant in brain tissues
      - DHA (omega-3): reduces beta-amyloid and plaques
      - Essential fatty acids: body can’t produce them
      - Less than 1 serving fish per week: 12% increase in cognitive decline compared to 1+ serving per week
      - 1 serving fish per week = 60% decrease risk of AD
    - **Omega 6**: vegetable oils (corn, canola, soybean)
      - Associated with increased risk of dementia
Fats

- Saturated fat: not all bad!
  - Good: coconut oil
    - Helps with production of ketones
  - Not so good: animal fats (unless organic, grass fed)

- Trans Fat: as close to zero as possible
  - Worst!
  - Margarine, processed foods (e.g. Muffins, crackers, chips)
    - Increased intake associated with increase AD risk
Preventative Strategies

- Diet rich in anti-oxidants
  - Turmeric (curcumin): may help prevent beta-amyloid plaques
  - Vitamin E: protects for oxidative and inflammatory damage
    - Sunflower seeds, almonds, spinach, Swiss chard, turnip greens, papaya, mustard greens, collard greens, asparagus, bell peppers
  - High vegetable intake
    - Green leafy and cruciferous vegetables
    - Slower rate of cognitive decline
The anti-AGEing diet

What foods are HIGH in AGEs?
- Meat: beef, poultry
- Eggs
- Cheese (full-fat, aged such as American and Parmesan)
- High fat spread (butter, margarine, mayonnaise, cream cheese)

What foods are LOW in AGEs?
- Fruits & vegetables
- Whole grains
- Beans/legumes
- Milk, yogurt
- Lamb
The anti-AGEing diet

How can I lower the AGEs content in my diet?

• Avoid cooking with dry heat (e.g. barbeque, grilling, searing, frying, roasting, and broiling)
• Cook with moist heat (e.g. boiling, poaching, steaming, and stewing)
• Cook at lower temperatures
• Add acidic ingredients to your food such as vinegar and lemon juice
• Increase your intake of fruits, vegetables, whole grains, fish and low-fat milk products
• Reduce your intake of meat, full-fat dairy products, solid fats, and processed foods
Preventative Strategies

- **Stay Social**
  - Full social network + social activities
    - Less cognitive decline
    - Decreased risk of dementia
  - Protect the brain in some way, perhaps by establishing a cognitive reserve.

- Intellectually stimulating activities could be the result of very early effects of the disease rather than its cause.

- People who engage in stimulating activities may have other lifestyle qualities that may protect them against developing AD.
Preventative Strategies

- **Use it or lose it**
  - **Cognitive activities:**
    - Listening to the radio
    - Reading newspapers
    - Playing puzzle games
    - Going to museums
  - Risk of developing AD was 47 percent lower in the people who did them the most frequently

- **Are brain games effective?**
  - May help with auditory information processing speed
  - No major effect on cognition and memory
  - May be more effective in individuals with cognitive impairment

- **Better off meeting friends for a game or cards or walking**
Exercise

- Reduces risk of Alzheimer’s disease
  - Increases circulation to the brain
  - Improves blood pressure
  - Promotes healthy cholesterol levels
  - Better blood sugar balance

- Raises your heart rate for at least 30 minutes several times a week can lower your risk of Alzheimer's
  - Walking, cycling, swimming
Nature Deficit Disorder

- Canadians are spending less and less time outdoors
- Benefits of time in nature:
  - Reduced stress
  - Reduced anxiety
  - Reduced depression
- Combination of the elements are very healing
  - Fresh air
  - Sunshine
  - Quiet, sounds of nature
Next Week

Cardiovascular system

Heart health & blood pressure

Hormonal Changes

Sexual Health
References

- The American Institute of Stress: http://www.stress.org/seniors/
- Alzheimer’s Association: http://www.alz.org
References


References