The Way Your Brain Is Organised

- Right hand control
  - Writing
  - Language
  - Scientific skills
  - Mathematics
  - Lists
  - Logic

- Left hand control
  - Emotional expression
  - Spatial awareness
  - Music
  - Creativity
  - Imagination
  - Dimension
  - Gestalt (whole picture)

- LEFT HEMISPHERE
  - LINEAR THINKING MODE

- RIGHT HEMISPHERE
  - HOLISTIC THINKING MODE
Executive Function

Organization

Regulation

Manage Resources

Effective allocation and realistic estimates of time, money, attention, and other resources show you have strong organizational skills.

Switch Focus

Transition from one context to another (or between tasks) requires you to understand specifically how your environment has changed.

Plan and Organize

Prioritizing tasks, sorting information, assigning categories, generalizing, analyzing, and gathering information are important components for accomplishing tasks.

Assess your environment and adapt your response.

Gather information and structure it for evaluation.

Integrate Past Experience with Present Action

Repeating your past successes in similar contexts and trying them out in new environments, as well as learning from previous

Select Words and Choose Behavior

Having a range of appropriate behaviors and vocabulary at your fingertips is essential for quickly deciding the best option to respond to your environment.

Recall Details

Remembering step-by-step directions, events from stories, names, faces, dates, and places makes your higher level mental tasks such as analyzing and structuring information far easier.
Ageing vs Senescence

• “Senescence”:
  – deteriorative processes that constitute natural causes of death.

• “Ageing”:
  – processes of accruing maturity with the passage of time, including...

George Martin. *In: The ageing process*, 1984
Hayflick limit

• Many scientists believe in the Hayflick limit—that no one can live past about 120 years old.

• These people might also say that aging—and dying—is a good thing; that the world is already overcrowded, that we already cannot handle our aging populations, that life must be finite to appreciate it, that all good things must come to an end.
Aging is a disease

• But there’s a growing group of people—including gerontologists, biologists, engineers and futurists—who believe that aging is a disease in itself, a disease that can be cured.

• That aging is not an immutable process, an inevitable “dying of the light,” to quote poet Dylan Thomas, but one we can “rage against”—through science, drugs and lifestyle changes.
Life prolongation and healthy living

• Since 1900 the average life expectancy has risen from 47.3 years to 78 years in the United States—that’s about 60 percent.

• It is likely that scientists will be able to prolong life even more—that is, healthy living.

• Gerontologists and others in the field are not concerned with prolonging end-of-life stages, when we are at our weakest, unhealthiest point of life.

• Today’s search for a longer and healthier life is about turning back our biological clocks to be younger for longer.
Telomeres

• Telomeres are the protective caps on the ends of the strands of DNA called chromosomes, which house our genomes. In young humans, telomeres are about 8,000-10,000 nucleotides long.

• They shorten with each cell division, however, and when they reach a critical length the cell stops dividing or dies.
Brain Slowdown

- Brain senescence varies markedly from individual to individual.

- The suggested reasons include gender, education, experience, and elders’ assessment of whether their everyday activities are restricted by their health.
Factors that may impact brain aging

- **Education**  
  Constantly learn and keep your brain active.

- **Exercise**  
  Walk rapidly for 45 minutes three times a week.

- **Rest**  
  Sleeping eight hours a night may help prevent memory loss.

- **General health**  
  Eat a balanced diet, don’t smoke and maintain healthy blood pressure and cholesterol levels.

- **Hypertension**  
  Speeds up normal brain shrinkage and loss of mental abilities.

- **Stress**  
  Leads to the release of a hormone that in large amounts wears away the neurons in the hippocampus.
NEUROLOGY OF GASTROINTESTINAL ACTIVITY

Frontal Cortex
- Excites the vagal nuclei to activate gut motility and enzyme secretion

Insular Cortex
- Contains the somatotopic map of the viscera - lets the brain know where the gut is

Vagal Nuclei
- Activate the intestinal motor cells for gut motility
- Modulate intestinal blood flow
- Activate release of intestinal enzymes

Enteric Nervous System
- Generates intestinal motility
- Generates enzyme release
- Provides afferent input to the vagus
THE BRAIN AND AUTONOMIC FUNCTION

Neocortex

Mesencephalic Reticular Formation

Pontomedullary Reticular Formation
VAGUS NUCLEI

Inhibition

INTERMEDIOLATERAL CELL COLUMN

Excitation

Cerebellum

Sympathetic Response
Autonomic Nervous System

- Parasympathetic:
  - Stimulates flow of saliva
  - Slows heartbeat
  - Constricts bronchi
  - Stimulates peristalsis and secretion
  - Stimulates release of bile
  - Contracts bladder

- Sympathetic:
  - Dilates pupil
  - Inhibits flow of saliva
  - Accelerates heartbeat
  - Dilates bronchi
  - Inhibits peristalsis and secretion
  - Conversion of glycogen to glucose
  - Secretion of adrenaline and noradrenaline
  - Inhibits bladder contraction

- Medulla oblongata
- Spinal cord
- Yagus nerve
- Chain of sympathetic ganglia
QUALITY OF LIFE & BRAIN AGE

Maximum

Healthy Brain

Quality of Life

Healthy Brain

Mild Aging

Moderate Aging

Aging Brain

Severe Aging

Neurodegenerative Disease

Minimum
The Aging Brain

- Structural Changes
- Neurochemical Changes
- Changes in Cognitive and Motor Abilities
Normal Aging

STRUCTURAL BRAIN CHANGES
- Thinning of the Cortical Gray Matter
- Age-Related changes in Neuronal Morphology
- Oxidative Stress
- DNA Damage
- Less efficient Neural Circuits and Brain Plasticity

CHEMICAL BRAIN CHANGES
- Dopamine
- Serotonin
- Glutamate

GENETIC CHANGES
- Decline in Gene expression functions
Vieillissement cérébral usuel: chemin de la dégénérescence neurofibrillaire

Pathway of NFD in aging

- Few
- Frequent
- Always

Tangles at the immunohistochemical level (Braak, Bouras, ...)

Dégénérescence neurofibrillaire observée au microscope: rare à 50 ans, fréquente à 60 ans, constante à 70 ans

Years (années)

- S0
- S1
- S2
- S3
- S4
- S5
- S6
- S7
- S8
- S9
- S10

- S0
- S1
- S2
- S3
- S4
- S5
- S6
- S7
- S8
- S9
- S10

- 50
- 60
- 70
- 80

Tau pathology/pathologie tau

- Transentorhinal
- Entorhinal cortex
- Hippocampus
- Temporal pole
- Inf. Temporal
- Mid. Temporal
- Association cortices
- Unimodal areas
- Primary cortices
- All cortical areas
The Aging Brain

Young Adult  94 Year Old Non-Demented  77 Year Old Demented
Normal Aging - T1 axial

Normal Young Adult Brain

Normal 88-yr old Brain

- normal
- enlarged
- Compare ventricular volumes relative to the whole brain mass
- Periventricular white matter hyperintensity
Earliest Signs of an Aging Brain

- Fatigue promoted by brain activity – driving, reading, brain tasks
- Depression – lack of healthy brain firing leads to depression
- Poor Digestive Function – 90% of the brain’s output goes to the pontomedullary system
Moderate Signs of Aging Brain

• Inability to focus or concentrate
• Difficulty learning new tasks
• Chronic constipation, opportunistic intestinal overgrowth, digestive enzyme insufficiency
• Increased sympathetic tone leading to:
  – Increased blood pressure
  – Increased resting heart rate
  – Stress susceptibility
  – Poor blood flow
Significant Brain Aging

• Inability to work professionally
• Inability to appreciate life
• Inability to perceive neurological loss
• Early signs of neurological disease
  - tremors
  - inability to find directions
  - etc.
Severe Brain Aging

- Neurodegenerative disease
- Uncontrolled bladder tone
- Bowel obstruction and inability to digest food
- Inability to taste, smell, or develop social relationships
- Dependency on family and medical staff for daily functions
Neurotransmitters and The Aging Brain
Age-associated reductions in receptor binding and signaling

- Serotonin associated with sleep, appetite, and mood
- Norepinephrine regulates attention and concentration
- Dopamine associated with pleasure and reward
Brain Aging of the Serotonergic System

Depression, Loss of Joy, Poor Focus, Sense of Self and Purpose
Symptoms of Serotonergic Pathway Degeneration

- Guilty depression
- Inability to feel joy from hobbies, friends, music, food, etc.
- Depressed with overcast weather or chronic lack of sunlight
- Loss of interest in life
Signs of Serotonergic Pathway Degeneration

- Social isolation with unwillingness to go out
- Depression
- Cravings and overeating of carbohydrates and sugars
- Slowed reflexes and coordination
Brain Aging of the Dopaminergic System

Depression, Loss of Motivation, Inability to Finish Tasks, Slow Movements, Slow Mind
Symptoms of Dopaminergic Pathway Degeneration

- Feelings of hopelessness and worthlessness
- Inability to handle stress
- Unable to self-motivate to start or finish tasks
- Need to consume caffeine to stay focused
- Depression
Signs of Dopaminergic Pathway Degeneration

- Depression
- Isolation
- Quick to snap at every little thing
- Poor compliance with healthcare, exercise, etc.
- Anger episodes
- Hypokinesia (slow and diminished movements)
- Constipation with diminished smell or taste perception
Brain Aging of the GABAergic System

Anxiety, Restlessness, Panic Attacks
Symptoms of GABAergic Pathway Degeneration

- Feelings of anxiety or panic for reasons
- Difficulty shutting mind off
- Feelings of being overwhelmed for no reason
- Disorganized attention
- Feelings of restlessness
Signs of GABAergic Pathway Degeneration

- Anxiety episodes
- Cannot initiate projects due to constant distractions
- Startled easily and difficulty calming down afterwards
- Severely sensitive to light and sound
- Increased resting heart rate
Phospholipid Integrity

60% of the Brain is Made Up of Phospholipids
PHOSPHOLIPID CLINICAL MANAGEMENT

Increase

- Spectrum of foods with high essential fatty acids
- DHA, phospholipids, and sesamin with intake of BRAIN-E™ DHA (K53/55/65)

Decrease

- Intake of fried foods
- Partially hydrogenated fats
- Foods high in arachidonic acid such as red meat and shellfish
As Adiposity Increases, Brain Volume Decreases

BMI is inversely correlated with total brain volume in healthy middle-aged adults.

Interleukin-6
C-Reactive Protein
Leptin

Solutions from your kitchen
Curcumin
Derived from turmeric, a member of the ginger family, curcumin has medicinal properties.

- Anti-inflammatory via inhibition of cytokine production
- Anti-cancer effects via induction of apoptosis
- Anti-depressant effects via MAO inhibition
- Inhibits formation of β-amyloid
- For inflammatory disorders, 2-8 grams curcumin/day
Omega-3 Fatty Acids
Essential fatty acids

- Essential fatty acids required for normal metabolism
- EPA, DHA, and ALA
- Sources: Wild fish, seaweed, algae
- Ideal ratio of omega-6:omega-3 is 1:1, but in Western diets ratio is closer to 16:1
- For general brain health: 2-4 grams of pharmaceutical grade fish oil/day
Coffee
A methylxanthine, coffee is rich in anti-oxidant and neuroprotective compounds

- Enhances cognitive function and reduces formation of β-amyloid
- Decaffeinated coffee does NOT provide same level of neuroprotection as caffeinated coffee
- Drinking 3 cups coffee/day associated with 4-fold slower rate of cognitive decline in study of elderly men over a 10-year period
- Black coffee or espresso are best choices
Medium-Chain Triglycerides
Saturated fatty acids containing 6-12 carbon atoms

- Coconut oil is composed of ~65% MCTs
- MCTs are metabolized to ketone bodies, which improve cognition in patients with mild memory impairment
- Axona, a medical food product containing MCTs, improves cognitive function in patients with MCI or AD
- Dose of MCTs: 5-40 grams/day
Cocoa

Derived from the seeds of the tree *theobroma cacao*, “drink of the gods”, cocoa is rich in anti-oxidants

- Improves cardiovascular health by reducing blood pressure, inhibiting platelet aggregation, and reducing insulin resistance
- Contains range of bioactive compounds, including theobromine (similar to caffeine) and phenylethylamine (a psychostimulant)
- Dark, unsweetened 70% cacao
- Optimal dose 10 g/day
Cinnamon

*Cinnamomum Cassia* (Ceylon Cinnamon) stabilizes blood sugar and reduces lipids

- Meta-analyses demonstrate that cinnamon lowers fasting plasma glucose, triglycerides, and LDL cholesterol in patients with type 2 diabetes
- Anti-inflammatory and anti-cancer effects have been demonstrated in vitro
- Reduces formation of β-amyloid in animal models of Alzheimer’s disease
- Supplemental doses: 1-6 grams/day
- Contains coumarin, which may cause drug-drug interactions
Smart Coffee

- 1 cup of caffeinated black coffee
- 1/2 tablespoon coconut oil
- 1/4 teaspoon of cinnamon
Health Benefits of Resveratrol

Reduces inflammatory, metabolic, and oxidative stress

- Reduces chronic inflammation via inhibition of COX and NF-κB
- Reduces oxidative stress via de novo synthesis of antioxidant enzymes, SOD and catalase
- Reduces metabolic stress by increasing mitochondrial biogenesis and fat oxidation
- Resveratrol may prolong life in some animal models but so far no evidence of life extension in humans
Resveratrol Content in Selected Wines

Resveratrol content in a serving of wine ranges from 0.2 to 2.0 mg/L. Supplements contain anywhere from 100-500 mg.

- Pinot Noir—California: 5.01 mg/L
- Beaujolais—France: 3.55 mg/L
- Cabernet and Merlot—Chile: 1.56 mg/L
- Zinfandel—California: 1.38 mg/L
- Cabernet Sauvignon—California: 0.99 mg/L
Blueberries

Rich in polyphenols, blueberries are potent anti-oxidants

- Blueberries contain anthocyanins, a class of polyphenols that neutralize free radicals (ROS)
- Inhibit AChE, the enzyme that degrades acetylcholine
- Blueberries stimulate neurogenesis and enhance neuronal plasticity in the hippocampus
- Improve insulin sensitivity in obese subjects
The Mediterranean Diet
An anti-inflammatory diet that promotes brain health

- Meat, Sweets
- Poultry, Eggs, Cheese, Yogurt
- Fish and Seafood
- Fruits, Vegetables, Grains, Beans, Nuts, Olive Oil
- Physical Activity; Enjoy meals with others
Caloric Restriction
Decrease of 30% to 60% of ad libitum feeding without malnutrition

- Increases lifespan across a range of animal species
- CR improves memory, cognitive function and overall health in humans
- Little or no evidence that CR extends life in humans
Intermittent Fasting
An alternative to daily CR

- Nutrient strategy that alternatives brief periods (<24 hours) of fasting with non-fasting
- Improves blood glucose, lipid profiles and cognitive function
- CF and IF reduce inflammation, increase BDNF, improve insulin signaling, and inhibit mTOR
- These physiologic changes are similar to those seen with aerobic exercise
“When diet is wrong, medicine is of no use; When diet is correct, medicine is of no need”

~Ayurvedic Proverb
Supplements for Brain health

Nutritional Supplements are trustworthy healthy solutions
Anti-Inflammatory Stack

- 800 mg curcumin twice daily
- 2 mg pharmaceutical grade fish oil twice daily
- 2 pinches of black pepper mixed in 1 tablespoon of Greek yogurt (to enhance absorption of curcumin)
- 200 mg CoEnzyme Q10 twice daily
Supplement Stack for Energy

The combination of alpha-lipoid acid and acetyl-l-carnitine helps restore mitochondrial function.

- **Acetyl-l-carnitine**: 500 mg twice daily
- **Alpha-lipoic acid**: 300 mg twice daily
- **Green tea extract**: 200–400 mg twice daily
- **Co-Enzyme Q10**: 150 mg twice daily
- **B-complex** twice daily

Vitamin B Complex (folate, B12) reduce homocysteine and assist in metabolism of proteins, fats, and carbohydrates.
Homocysteine

A biomarker linked to heart disease, stroke, and cognitive decline

- Elevated homocysteine levels are a risk factor for brain atrophy, cognitive impairment, and dementia.
- B-vitamins serve as co-factors for enzymes that convert homocysteine into methionine.
- B-vitamin therapy may slow progression of MCI to AD by reducing homocysteine levels.
Bacopa

- Brahmi, an ayurvedic herb used to promote learning and memory
- Promotes release of acetylcholine in prefrontal cortex and increases antioxidant enzymes
- 300-450 mg/day of extract containing 55% bacosides
Ginko Biloba

- Believed to promote learning and memory
- In some studies GB improves attention in healthy adults
- 2012 meta-analysis found NO improvements in attention, memory or problem solving in healthy and memory-impaired populations
Coenzyme Q10

Ubiquinone, an electron carrier in the electron transport chain, is depleted with normal aging

- Lack of CoQ10 depletes cellular energy stores
- May reduce formation of β-amyloid
- Statin drugs may deplete levels of CoQ10
- Doses range from 100-300 mg daily
Acetyl-L-Carnitine
Carnitine shuttles fatty acids into mitochondria

- Protects endothelium from oxidative damage
- Enhances blood flow
- May slow progression of MCI and Alzheimer’s
- Dose: 1.5 to 3.0 grams/day
Alpha Lipoic Acid
A mitochondrial fatty acid used as cofactor in synthesis of ATP and a potent anti-oxidant

- Improves symptoms of diabetic neuropathy
- Improves insulin sensitivity
- Acts synergistically with acetyl-L-carnitine as antioxidant
- May slow progression of Alzheimer’s
- Dietary sources: Spinach, broccoli
- Supplemental doses: 300-900 mg/day
Berberine
A plant alkaloid used in TCM to treat diabetes

- Stabilizes blood glucose, and reduces triglyceride and LDL-cholesterol levels
- Mechanism of action: activates AMPK, thereby stimulating glycolysis and β-oxidation
- As effective as metformin in the treatment of type 2 diabetes; potential as a lipid-lowering agent
- Dosage: 300-400 mg 3-4x/day
Benefits of Aerobic Exercise
Regular physical activity builds a better brain

- Increases Brain-Derived Neurotrophic Factor
- Increases neurogenesis and synaptogenesis
- Increases brain volume in older adults
- Improves cognitive function
- Inoculates the brain against depression
- 75% MHR for 30 minutes, 5x/week
Aerobic Exercise Training Increases Brain Volume In Aging Adults

Blue regions: Gray matter volume was increased for aerobic exercisers
Yellow regions: White matter was increased for aerobic exercisers

Benefits of Resistance Training
Resistance training improves physical and cognitive function

- RT improves short-term memory in older adults
- RT improves insulin sensitivity and protects against the development of type 2 DM
- RT is the ONLY intervention that protects against age-related muscle loss
- 75-85% 1 RM weight, 10-15 total reps, once/week
Nutrition and Exercise Strategy for Protecting The Aging Brain

- **Resistance Training**: Once/week
  
- **Interval Training**: 2 sessions/week; 20 seconds work; 20 minutes total
  
- **Intermittent Fasting**: Fast for 12-18 hours 3x/week
  
- **Omega-3 Fatty Acids**: 4 grams of EPA+DHA daily
  
- **Leisurely Walks in Nature**: Leisuerly outdoor activities 5 days/week
Adequate sleep

What Happens When Your Brain Doesn’t Sleep?
Side effects of poor sleep

Many people suffer from these symptoms, but it's very rare that we make the connection between our overall health and the amount of sleep we're getting.

- Finding it hard to concentrate
- More forgetful than usual
- Getting stressed out/irritated more easily and more often
- Feeling more depressed than usual
- Increased appetite
- Decreased sex drive
Health Problems / Not Enough Sleep

- Stroke
- High Blood Pressure
- Type-2 Diabetes
- Learning Problems
- Memory Problems
- Heart Disease
- Obesity
- Metabolic Syndrome
- Mood Disorders
- Cancer
- Depression
- Premature Death
- Mental Disorders
- Insomnia
- Kidney Disease
- Shorter Life Span
- Low Metabolism
- Impaired While Driving
- Hormone Problems
- Get Sick More Often
- Without adequate sleep, you get sick, fat, and stupid.
NATIONAL HEALTHY SLEEP AWARENESS PROJECT

**GET 7-9 HOURS**

![Image of person sleeping]

**AVOID BEFORE BED**

- Beer
- Coffee
- Cigarettes

**SLEEP WELL BE WELL**

**MONDAY-SUNDAY**

- Keep a consistent sleep schedule

**SEEK HELP FOR POOR SLEEP**
How Much Sleep Is Enough?

The amount of sleep you need each day will change over the course of your life. Although sleep needs vary from person to person, the chart below shows general recommendations for different age groups.

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommended Amount of Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns</td>
<td>16–18 hours a day</td>
</tr>
<tr>
<td>Preschool-aged children</td>
<td>11–12 hours a day</td>
</tr>
<tr>
<td>School-aged children</td>
<td>At least 10 hours a day</td>
</tr>
<tr>
<td>Teens</td>
<td>9–10 hours a day</td>
</tr>
<tr>
<td>Adults (including the elderly)</td>
<td>7–8 hours a day</td>
</tr>
</tbody>
</table>

If you routinely lose sleep or choose to sleep less than needed, the sleep loss adds up. The total sleep lost is called your sleep debt. For example, if you lose 2 hours of sleep each night, you'll have a sleep debt of 14 hours after a week.
Brain Affected Areas in Alzheimer’s Disease
FACTORS THAT INCREASE RISK OF DEMENTIA

- Blood Pressure
- Blood Sugar
- Belly Size
- Inflammation
- Cortisol
- Stress
- Genetics
- Sedentary Lifestyle
Acetylcholine Pathways
Alzheimer’s Effects on the Brain

- Changes in neurotransmitter systems
  - Serotonin and acetylcholine
- Disrupts three processes that keep neurons healthy → memory failure + personality changes + difficulty with ADLs
  - Communication
  - Metabolism
  - Repair
- Results:
  - Loss of memory
  - Thinking & language skills
  - Behavioral changes
MEMORY TYPES AND BRAIN REGIONS

- **Working Memory**
  - Frontal Cortex
  - Parietal Cortex

- **Short- to Long-Term Memory**
  - Hippocampus

- **Declarative Memory**
  - Medial Temporal Lobe

- **Procedural Memory**
  - Cerebellum
Earliest Signs of Dementia

- Poor short-term memory
- Difficulty learning
- Difficulty with directions
- Decreased brain endurance

*If you have the symptoms, when did they start and how fast are they going?*
Symptoms of Cholinergic Pathways Degeneration

- Loss of photographic memory
- Difficulty with sense of directions
- Poor memory
- Memory lapses
- Poor verbal memory
- Slow mental speed
Signs of Cholinergic Pathways Degeneration

- Constantly losing keys, phone, etc.
- Constantly forget where car is parked
- Dependency on navigations system for directions
- Must write everything down
- Constantly forgetting appointments, tasks, etc.
Early Alzheimer’s Disease

Progressed Alzheimer’s Disease
Examples

Normal Aging
- A person might forget part of an experience.
- A person who forgets something will eventually remember the information.
- A person can follow instructions without difficulty.
- A person is able to use notes or reminders.
- A person can still manage their own personal care (bathing, dressing, grooming, etc.).
- A person is able to manage their finances.

Not Normal Aging
- A person with Alzheimer’s disease will forget the whole experience.
- A person with Alzheimer’s won’t recall the information at a later time.
- A person with Alzheimer’s disease is less and less able to follow instructions over time.
- A person with Alzheimer’s gradually become less able to benefit from memory aids or forgets to use them.
- A person with Alzheimer’s loses the ability to engage in these kinds of tasks.
- A person is unable to track spending, pay bills, manage savings/checking accounts.

Source: About.com Health's Disease and Condition, Carrie Hill, PhD
Transforming Your Aging Brain

Recommended Steps to Promote "Cognitive Health"

Source: Institute of Medicine

- Be physically active
- Reduce cardiovascular disease risk factors
- Review health and medications
Ageless Brain
A GOOD LIFE
IS WHEN YOU
SMILE OFTEN,
DREAM BIG,
LAUGH ALOT
AND REALIZE
HOW BLESSED
YOU ARE
FOR WHAT YOU HAVE.
12 Steps for Self Care

1. If it feels wrong, don’t do it.
2. Say “exactly” what you mean.
3. Don’t be a people pleaser.
4. Trust your instincts.
5. Never speak bad about yourself.
6. Never give up on your dreams.
7. Don’t be afraid to say “No”.
8. Don’t be afraid to say “Yes”.
9. Be KIND to yourself.
10. Let go of what you can’t control.
11. Stay away from drama & negativity.
12. LOVE.

Facebook.com/ChangeYourThoughtsToday
If you don't go after what you want, you'll never have it. If you don't ask, the answer is always no. If you don't step forward, you're always in the same place.
Above all, be the heroine of your life, not the victim.

One of the happiest moments in life is when you find the courage to let go of what you can’t change.