



OLDER ADULT

Chapter 14

NUTR 207 Module 12

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Learning Objectives

- Identify the factors aging that alter nutrition
- Identify the factors associated with successful and healthy aging.
- Discuss the nutrient needs of older adults.
- Assess the challenges associated with malnutrition, sarcopenia, regularly eating alone, dementia.
- Describe several specific drug–nutrient interactions.

Introduction

- Two motivating goals
 - Promote health
 - Slow aging
- The ratio of old people to young is increasing
 - Growing “old” happens day by day
 - Fastest-growing age group
- Factors influencing life expectancy

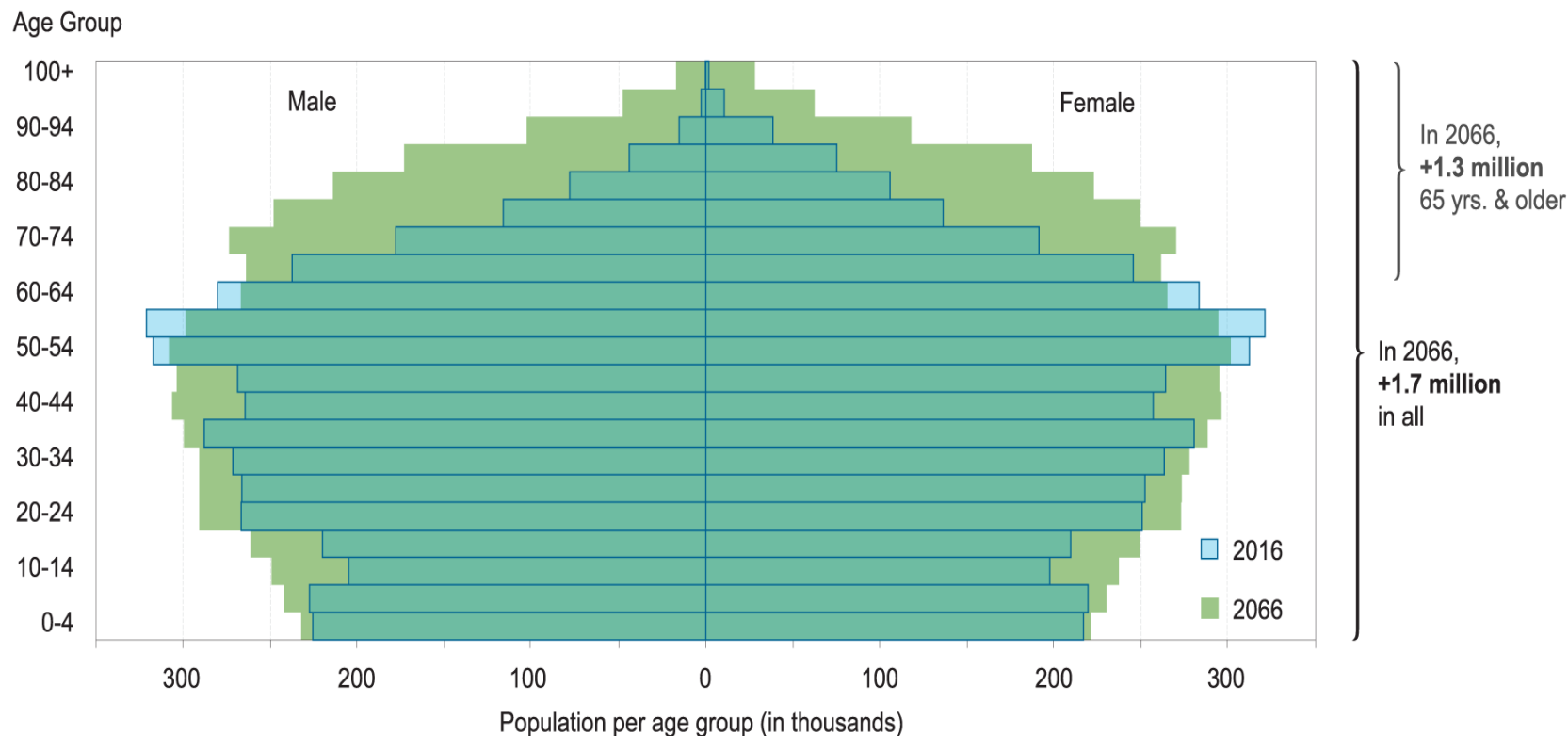


The Later Years Elderly

- Characteristics of those who reach an old age:
 - Nutrition and successful aging
- Life expectancy in Canada
 - 84 years of age for women
 - 80 years of age for men
 - 70 to 80 percent depends on health-related behaviours
 - 20 to 30 percent depends on genetics
- Life span
 - Estimated to be 130 years



Aging in Quebec



https://www.stat.gouv.qc.ca/salle-presse/communique/communique-presse-2019/juillet/juillet1911_an.html

Changes with Aging

Table 14–9

Changes with Age You Probably Must Accept

These changes are probably beyond your control:

- Greying of hair
- Balding
- Some drying and wrinkling of skin
- Impairment of near vision
- Some loss of hearing
- Reduced taste and smell sensitivity
- Reduced touch sensitivity
- Slowed reactions (reflexes)
- Slowed mental function
- Diminished visual memory
- Menopause (women)
- Loss of fertility (men)
- Loss of joint elasticity

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Table 14–10

Changes with Age You Probably Can Slow or Prevent

By exercising, eating an adequate diet, reducing stress, and planning ahead, you may be able to slow or prevent:

- Wrinkling of skin due to sun damage
- Some forms of mental confusion
- Elevated blood pressure
- Accelerated resting heart rate
- Reduced lung capacity and oxygen uptake
- Increased body fatness
- Elevated blood cholesterol
- Slowed energy metabolism
- Decreased maximum work rate
- Loss of sexual functioning
- Loss of joint flexibility
- Diminished oral health: loss of teeth, gum disease
- Bone loss
- Digestive problems, constipation

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Immunity and Inflammation

- Immune system loses function with age
- “Inflammaging”
- Inflammation—critical in supporting health
- Compromised by nutrient deficiencies
- Lower inflammation
 - Mediterranean diet pattern



Physical Changes of Aging that Affect Nutrition

Table 14–7

Physical Changes of Aging That Affect Nutrition

Digestive tract	Intestines lose muscle strength, resulting in sluggish motility that leads to constipation. Stomach inflammation, abnormal bacterial growth, and greatly reduced acid output impair digestion and absorption. Pain and fear of choking may cause food avoidance or reduced intake. Atrophic gastritis
Hormones	For example, the pancreas secretes less insulin and cells become less responsive, causing abnormal glucose metabolism.
Mouth	Tooth loss, gum disease, and reduced salivary output impede chewing and swallowing. Choking may become likely; pain may cause avoidance of hard-to-chew foods. (Dysphagia)
Sensory organs	Diminished sight can make food shopping and preparation difficult; diminished senses of smell and taste may reduce appetite, although research is needed to clarify this effect.
Body composition	Weight loss and decline in lean body mass lead to lowered energy requirements. May be preventable or reversible through physical activity.

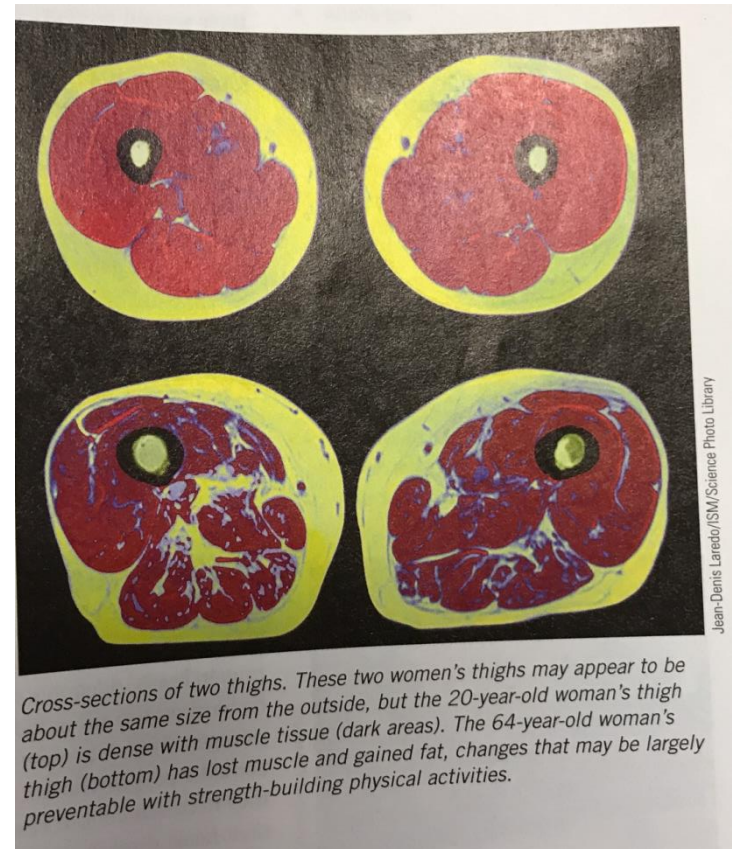
Tooth Loss and Other Physical Problems

- Difficult and painful chewing
 - Dentures
 - Limited food selections
 - Less dietary variety
 - Lower intakes of fiber and vitamins
- Swallowing issues:
Dysphagia: requires food texture changes
- Sensory losses and other physical problems
 - Vision, mobility, hearing, taste, and smell



Aging and Body Composition

- **Sarcopenia:** loss of muscle
- Bone loss & accumulation of fat is also common
- Consuming sufficient protein and engaging in regular physical activity helps maintain muscle mass
- Helps prevent frailty and falls by maintaining balance strength



Observation of Older Adults

Physiological age refers to a person's health status and may be different to their chronological age

Healthy Habits

- Eating well-balanced meals
- Engaging in physical activity daily
- Not smoking
- Not using alcohol, or using it in moderation
- Maintaining a healthy body weight
- Sleeping regularly and adequately
- Relieving stress; focus on a sense of purpose
- Having a community of family and friends



CANADIAN 24-HOUR MOVEMENT GUIDELINES FOR ADULTS (AGED 65 YEARS OR OLDER)

For health benefits, adults aged 65 years or older should be physically active each day, minimize sedentary behaviour, and achieve sufficient sleep.

A healthy 24 hours includes:

PHYSICAL ACTIVITY

Performing a variety of types and intensities of physical activity, which includes:



- **Moderate to vigorous aerobic physical activities** such that there is an accumulation of at least 150 minutes per week
- Muscle strengthening activities using major muscle groups at least twice a week
- Physical activities that challenge balance



- Several hours of **light physical activities**, including standing

SLEEP



Getting 7 to 8 hours of good-quality sleep on a regular basis, with consistent bed and wake-up times

SEDENTARY BEHAVIOUR



Limiting sedentary time to 8 hours or less, which includes:

- No more than 3 hours of recreational screen time
- Breaking up long periods of sitting as often as possible



Replacing sedentary behaviour with additional physical activity and trading light physical activity for more moderate to vigorous physical activity, while preserving sufficient sleep, can provide greater health benefits.



Progressing towards any of these targets will result in some health benefits.

Physical activity in the Later Years



- Physical activity
 - Improves basal metabolism, insulin sensitivity, appetite, intake, ambulation, mobility, independence, breathing!
 - Resistance training helps prevent some muscle loss with aging

Benefits of resistance training in physically frail elderly: a systematic review

Aim:

- Exercise is one of the most important components in frailty prevention and treatment. Therefore, we systematically reviewed the effect of resistance training (RT) alone or combined with multimodal exercise intervention on muscle hypertrophy, maximal strength, power output, functional performance, and falls incidence in physically frail elderly.

Methods

- MEDLINE, Cochrane CENTRAL, PEDro, and SPORTDiscus databases were searched from 2005 to 2017. Studies must have mentioned the effects of RT (i.e., included or not in multimodal training) on at least one of the following parameters: muscle mass, muscle strength, muscle power, functional capacity, and risk of falls in frail elderly.

Results

The initial search identified 371 studies and 16 were used for qualitative analysis for describing the effect of strength training performed alone or in a multimodal exercise intervention. We observed that RT alone or in a multimodal training may induce increases of 6.6–37% in maximal strength; 3.4–7.5% in muscle mass, 8.2% in muscle power, 4.7–58.1% in functional capacity and risk of falls, although some studies did not show enhancements.

Conclusion

- Frequency of 1–6 sessions per week, training volume of 1–3 sets of 6–15 repetitions and intensity of 30–70%1-RM promoted significant enhancements on muscle strength, muscle power, and functional outcomes. Therefore, in agreement with previous studies, we suggest that **supervised and controlled RT represents an effective intervention in frailty treatment.**

Nutrition in the Later Years

Needs become more individual with age

Energy recommendations: Often decrease with age

- After ~ age of 50, the intake recommendation for energy assumes about a 5% reduction in energy output per decade.
- BMR declines 1 to 2% per decade – reduced muscle & thyroid hormones
- Older adults need fewer kcalories. Nutrient requirements are high so:
 - **Nutrient -dense foods** are needed
- Ideal BMI range Age 70+: ~25 to 32

Nutrition in the Later Years



- Protein needs
 - DRI recommendations remain about the same
 -But research suggests more may be needed:
~1g/kg

- Carbohydrates and fibre
 - Sources should include ample amounts of whole grains, V/F
 - Recommendations: 25 grams fibre daily



Nutrition in the Later Years

- Fats and arthritis
 - Osteoarthritis
 - Associated with being overweight
 - Focus on body weight loss is helpful
 - Rheumatoid arthritis
 - Immune system malfunction
 - Focus on a diet low in saturated fats, high in fruit, vegetables, whole grains, and omega-3 oils from fish



Micronutrients

- RDA, AI, UL
- Age categories vary with micronutrient
 - 51-70y
 - ≥ 70 y
- Setting standards becomes more difficult with age due to individual differences including genetic differences, chronic diseases, and medications
- Individual's differences need to be taken into account

Summary of Nutrient Concerns in Aging

Table 14–8

Summary of Nutrient Concerns in Aging

Nutrient	Effects of Aging	Comments
Energy	Need decreases.	Physical activity moderates the decline. Risk of sarcopenia
Fibre	Low intakes make constipation likely.	Inadequate water intakes and physical inactivity compound constipation.
Protein	Needs stay the same. -or increase slightly.	Low-fat, high-fibre legumes and grains meet both protein and other needs.
Vitamin D	Increased likelihood of inadequate intake; skin synthesis declines.	Daily moderate exposure to sunlight may be of benefit.
Vitamin B₁₂	Malabsorption of some forms. Atrophic gastritis decreased intrinsic factor & hydrochloric acid	Foods fortified with synthetic vitamin B ₁₂ or a low-dose supplement may be of benefit in addition to a balanced diet.
Water	Lack of thirst and increased urine output make dehydration likely.	Mild dehydration is a common cause of confusion.
Iron	In women, status improves after menopause; deficiencies linked to chronic blood losses and low stomach acid output.	Stomach acid required for absorption; antacid or other medicine use may aggravate iron deficiency; vitamin C and meat enhance absorption.
Zinc	Intakes are often inadequate and absorption may be poor, but needs may also increase.	Medications interfere with absorption; deficiency may depress appetite and sense of taste.
Calcium	Intakes may be low; osteoporosis becomes common.	Lactose intolerance commonly prevents milk intake; substitutes are needed.

Water

- Thirst response and dry mouth
- Dehydration
 - Total body water decreases with age
 - Problems associated with dehydration
 - Prevention
 - At least six glasses of water daily



Psychological Changes with Aging

- Depression
 - Lose appetite and motivation to shop and cook
 - Support and companionship of family and friends
 - Alcohol use and binge drinking
- Economic changes
 - Living arrangements and income
- Social changes
 - Malnutrition most likely to affect those living alone
 - Especially men, low income and/or education
 - Loneliness

Aging and malnutrition

- Destructive spiral of sedentary behaviour and mental and physical losses in the elderly including:
 - Decreased physical ability to function
 - Diminished mental function
 - Malnutrition
 - Social withdrawal
 - Weight loss and sarcopenia



Predictors of Malnutrition in the Elderly

The **DETERMINE**

Predictors of
malnutrition in the
elderly:

Disease

Eating poorly

Tooth loss or oral pain

Economic hardship

Reduced social contact

Multiple medications

Invuntary weight loss or gain

Need of assistance with self-care

Elderly person older than 80 years

Food is Medicine

A closer look at the hidden impact of malnutrition.

have difficulties meeting their nutritional needs.

1 in 3 seniors

You can make the problem smaller. Early detection and intervention can make a difference.

Primary health care teams can work together to lessen the burden of malnutrition in our communities.

- Screen seniors for nutrition risk
- Chart risk factors
- Refer to a dietitian
- Educate patients/families
- Evaluate outcomes
- Network for supports

Here's what to look for:

- ▶ **Poor appetite**
 - ▶ Problems chewing and swallowing
 - ▶ Loss of taste or smell
 - ▶ Unintentional weight loss
 - ▶ Depression/anxiety/dementia
 - ▶ Difficulty in getting groceries and preparing meals
 - ▶ Not enough money for food
 - ▶ Eating alone



Canadian
Malnutrition
Task Force™

le Groupe de
travail canadien
sur la malnutrition™



Canadian Nutrition Society
Société canadienne de nutrition

For more tips and guidance on where to find additional support,
please visit: <http://nutritioncareincanada.ca/canadian-malnutrition-awareness-week>

Malnutrition Awareness Week™ is a mark of the American Society for Parenteral and Enteral Nutrition (ASPEN). Used with permission from ASPEN.

Impact of Malnutrition in elderly

Ways malnutrition limits a person's ability to function, and decreases quality of life:

- Impairs muscle function
- Decreases bone mass
- Compromises immunity
- Reduces cognition
- Poor wound healing-slowed recovery (surgery)
- Increases hospitalizations and length of stay



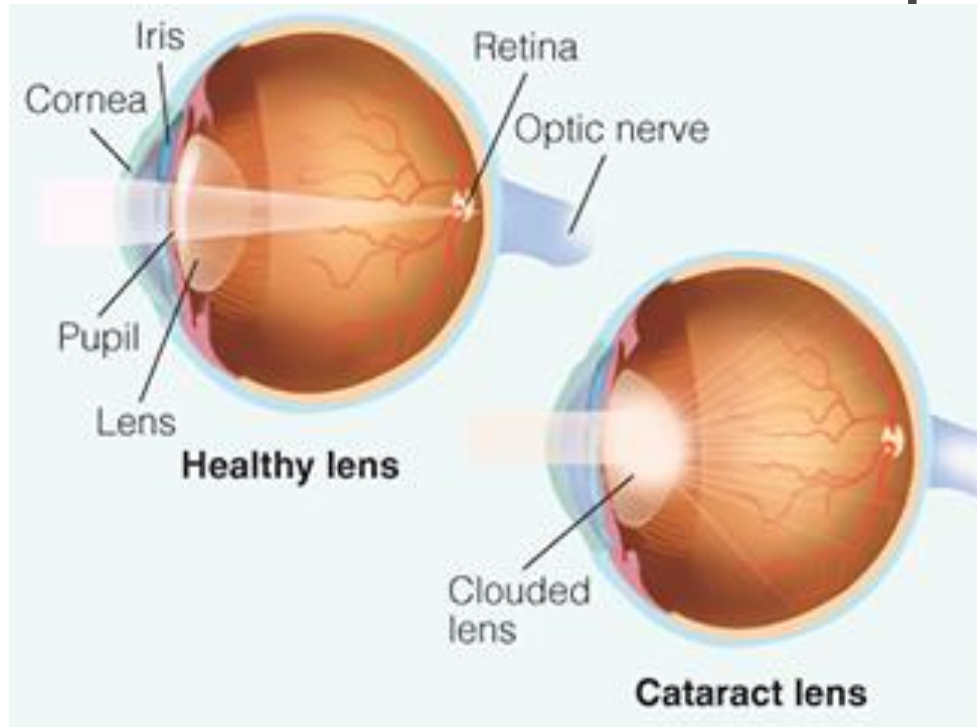
Help: Food assistance programs, nutrient and energy dense meals, break isolation, food safety,...

- <https://www.canada.ca/en/health-canada/services/food-safety-vulnerable-populations/food-safety-adults-ages-60-over.html>

Aging and Vision

- Cataracts
 - Age-related clouding of the lenses of the eyes
 - Lead to blindness if not surgically removed
 - Risk factors
 - Oxidative stress and antioxidants
- Macular degeneration
 - Leading cause of vision loss
 - Antioxidants and phytochemicals in fruits and vegetables

Healthy Lens and Cataract Lens Compared



The healthy lens (on the left) focuses light, producing clear, sharp images on the retina. A lens affected by cataracts (on the right) scatters the light, resulting in blurred vision.



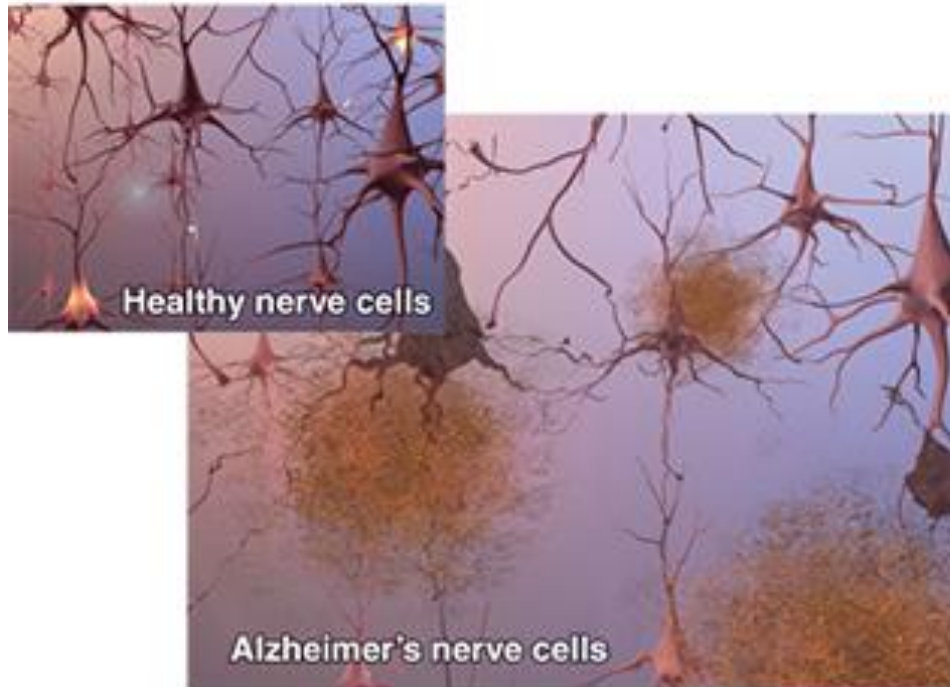
Vision through a healthy lens (on the left) is crisp and clear, whereas vision through cataracts (on the right) is cloudy.

The Aging Brain

- Dementia
 - Affects 15 percent of adults over 70
 - Several types
 - *Alzheimer's disease*: Abnormal deterioration in areas of brain that coordinate memory and cognition
- Characteristic changes with age
 - Loss of neurons
 - Decreased blood supply
- Nutrient deficiency
 - Lack of key nutrients impacts memory, cognition



Alzheimer's Vs. Healthy Brain



Plaques—clumps of beta-amyloid protein pieces—block cell-to-cell synapse signals. Tangles—twisted strands of protein—destroy the cell transport system. As plaques and tangles block essential nutrients from reaching the nerve cells, they eventually die.



As nerve cells die, the brain shrinks and loses its ability to think, plan, remember, and form new memories. The fluid-filled spaces within the brain grow larger.

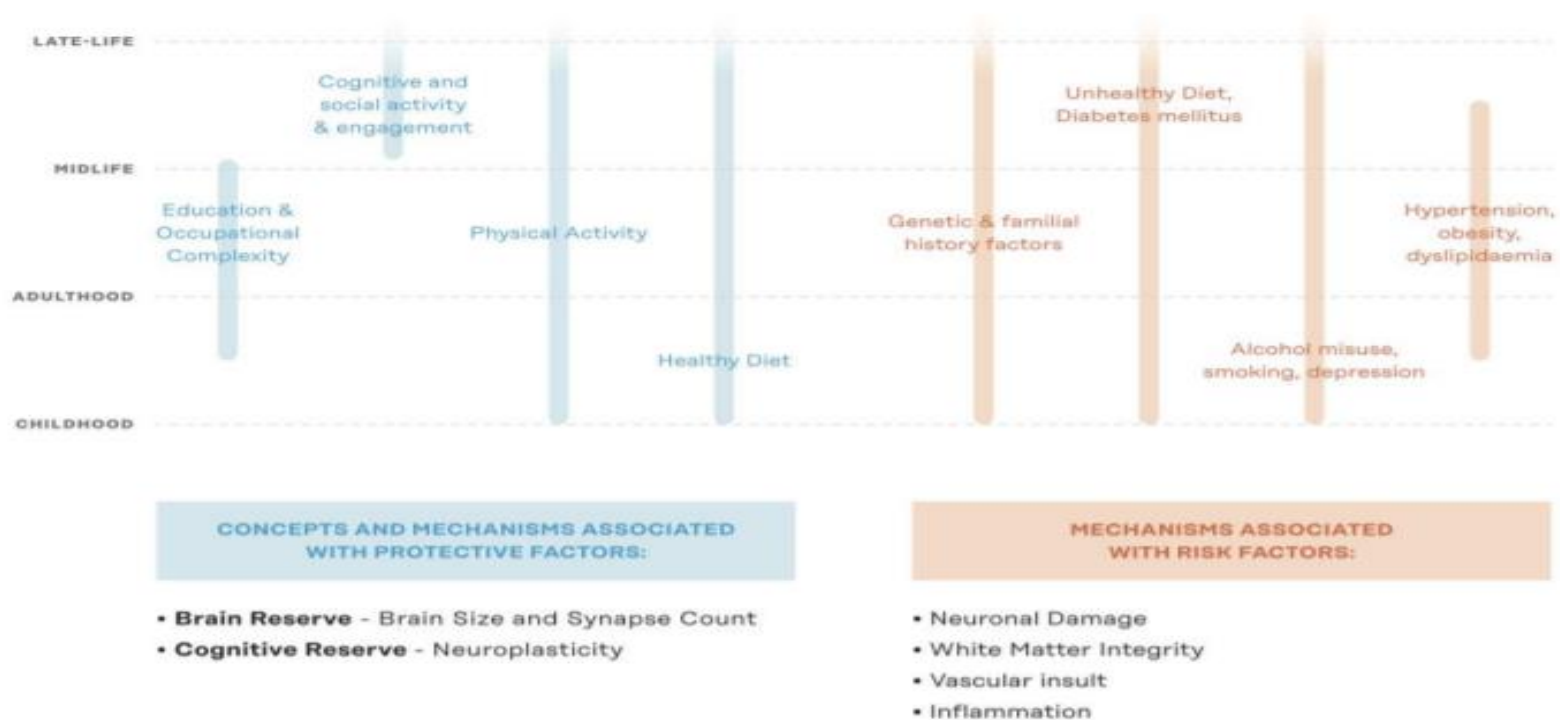


Figure 1. Lifespan protective and risk factors for ADRD. ADRD = Alzheimer's disease & related dementias; Figure adapted from Kivipelto et al., 2018 [19].

This study provides a comprehensive overview of completed and prospective non-pharmacological

Can Foods or Supplements Affect the Course of Alzheimer's Disease (AD)?

- Research has revealed only a weak link between nutrition and Alzheimer's disease
- MIND diet = Mediterranean-DASH Intervention for Neurodegenerative Delay

Components of the MIND Diet

Green Leafy Vegetables	Aim for 6 or more servings per week
Other Vegetables	Include at least 1 or more vegetable servings each day (in addition to the green leafy vegetable)
Berries	Aim for 2 or more servings per week
Nuts	Aim for 5 or more servings per week
Olive Oil	Make this your primary cooking oil
Whole Grains	Include 3 or more servings per day
Fish	Include at least once per week
Poultry	Include in 2 or more meals per week
Wine	Aim for no more than 1 glass per day

Can Foods or Supplements Affect the Course of Alzheimer's Disease?

Table 14–11

Possible Associations between Nutrition and Alzheimer's Disease

Dietary Component	Association
Omega-3 fatty acids (e.g., from fish*)	Positive
Antioxidant vitamins (e.g., vitamins C and E)	Positive
B vitamins (e.g., vitamin B ₁₂ , folic acid)	Unclear
Mediterranean-style diet	Positive

**Be mindful of the potential of high levels of toxic minerals, such as mercury, and follow the Government of Canada's guidelines (e.g., fish consumption advisories at <https://www.canada.ca/en/environment-climate-change/services/pollutants/mercury-environment/health-concerns/fish-consumption-advisories.html>).*

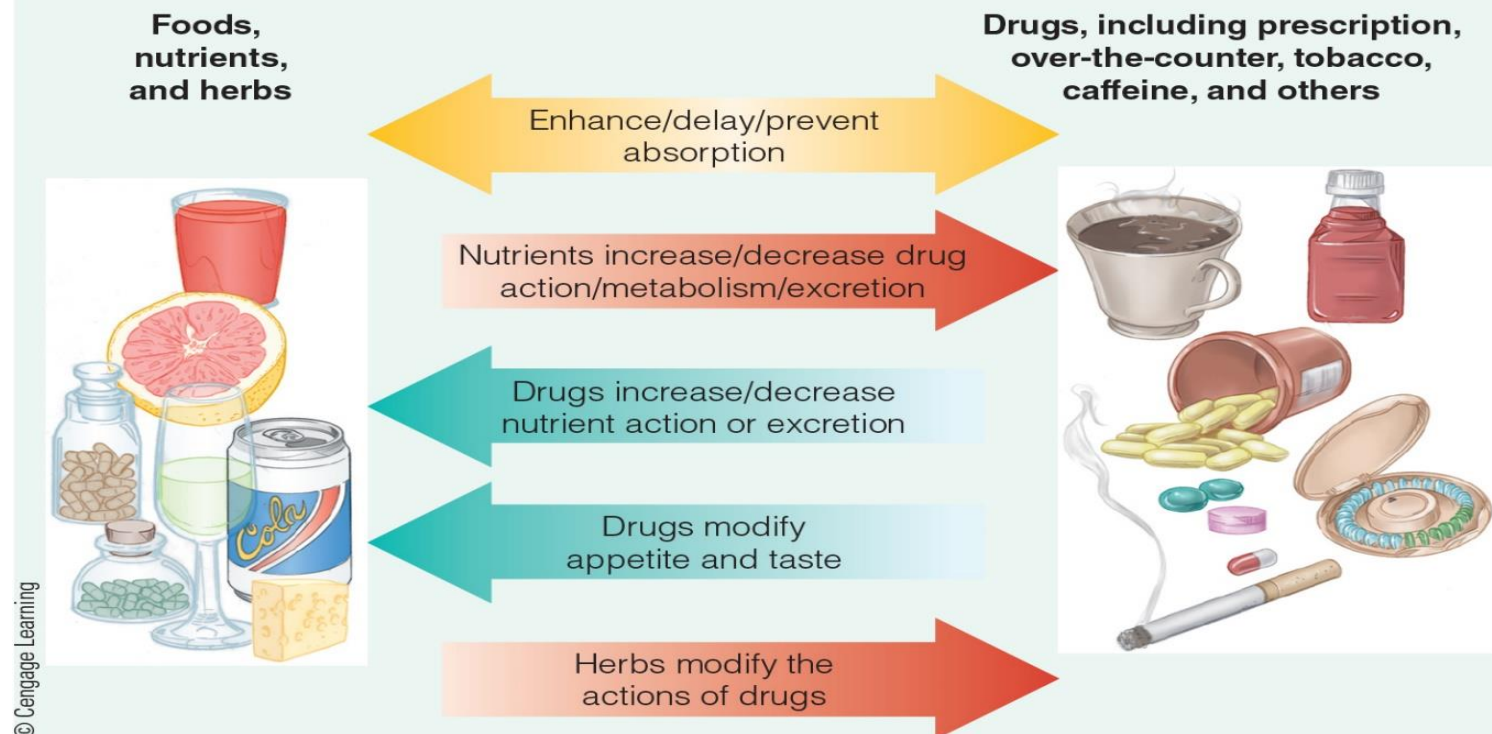
Source: Modified from A. Otaegui-Arrazola and coauthors, Diet, cognition, and Alzheimer's disease: Food for thought, European Journal of Nutrition 53 (2014):1–23.

**The protein fragments are called beta-amyloid.*

Controversy: Nutrient–Drug Interactions: Who Should Be Concerned?

Figure C14–1

Food, Drug, and Herb Interactions



Eat a variety of healthy foods each day

Have plenty
of vegetables
and fruits

Eat protein
foods

Make water
your drink
of choice

Choose
whole grain
foods



Discover your food guide at

Canada.ca/FoodGuide

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Eat well. Live well.

Healthy eating is more than the foods you eat



Be mindful of your eating habits



Cook more often



Enjoy your food



Eat meals with others



Use food labels



**Limit foods high in sodium,
sugars or saturated fat**



Be aware of food marketing

6 Tips for Healthy Aging

As you age, doing these six things will improve your chances of staying healthy and preventing chronic disease.



GOOD LUCK WITH THE FINAL!

