NTR 306: Fundamentals of Nutrition

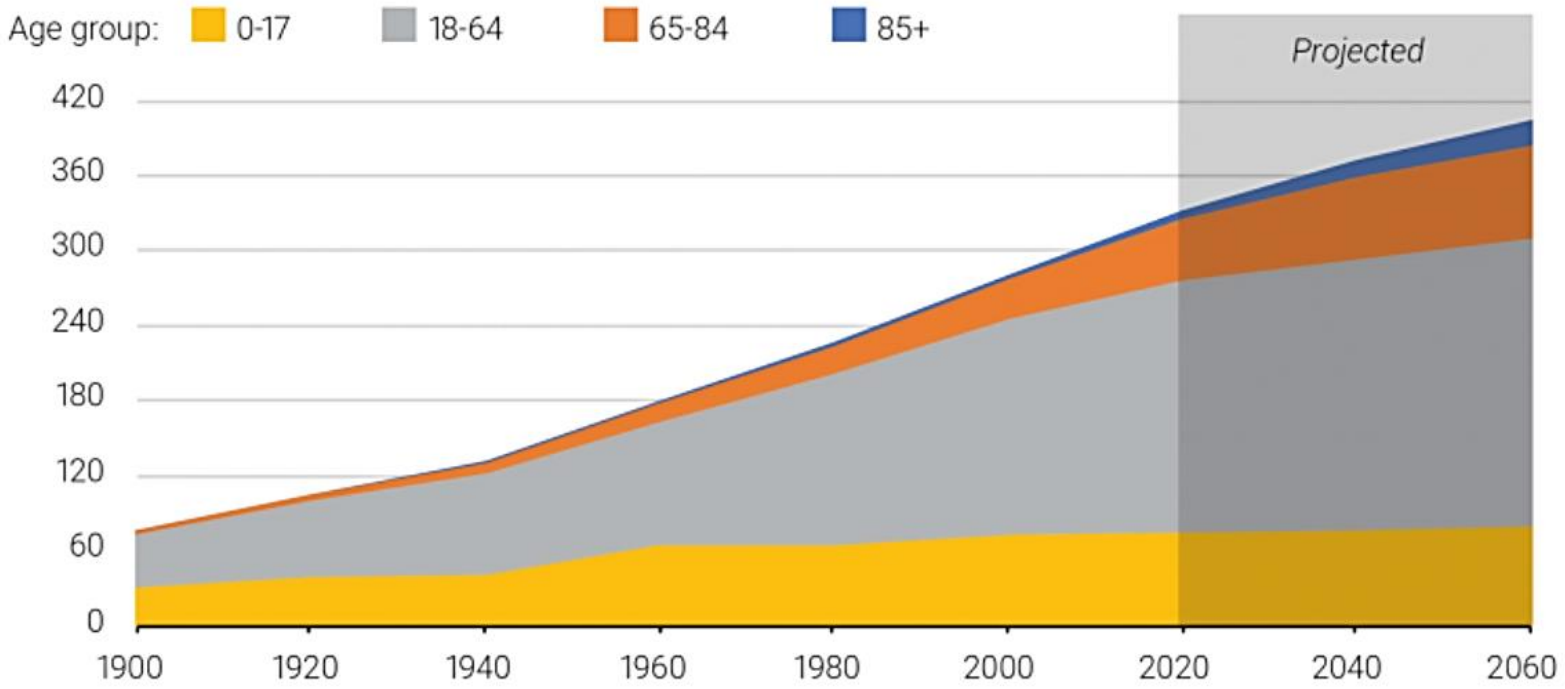
Life Cycle Nutrition: Part 2

Later Years (Chapter 17)

Introduction

- United States = aging nation (17% of current population 65 or older)
- 2060: estimated 25%

Figure 1. U.S. Population by Age Group (millions), 1900 to 2060

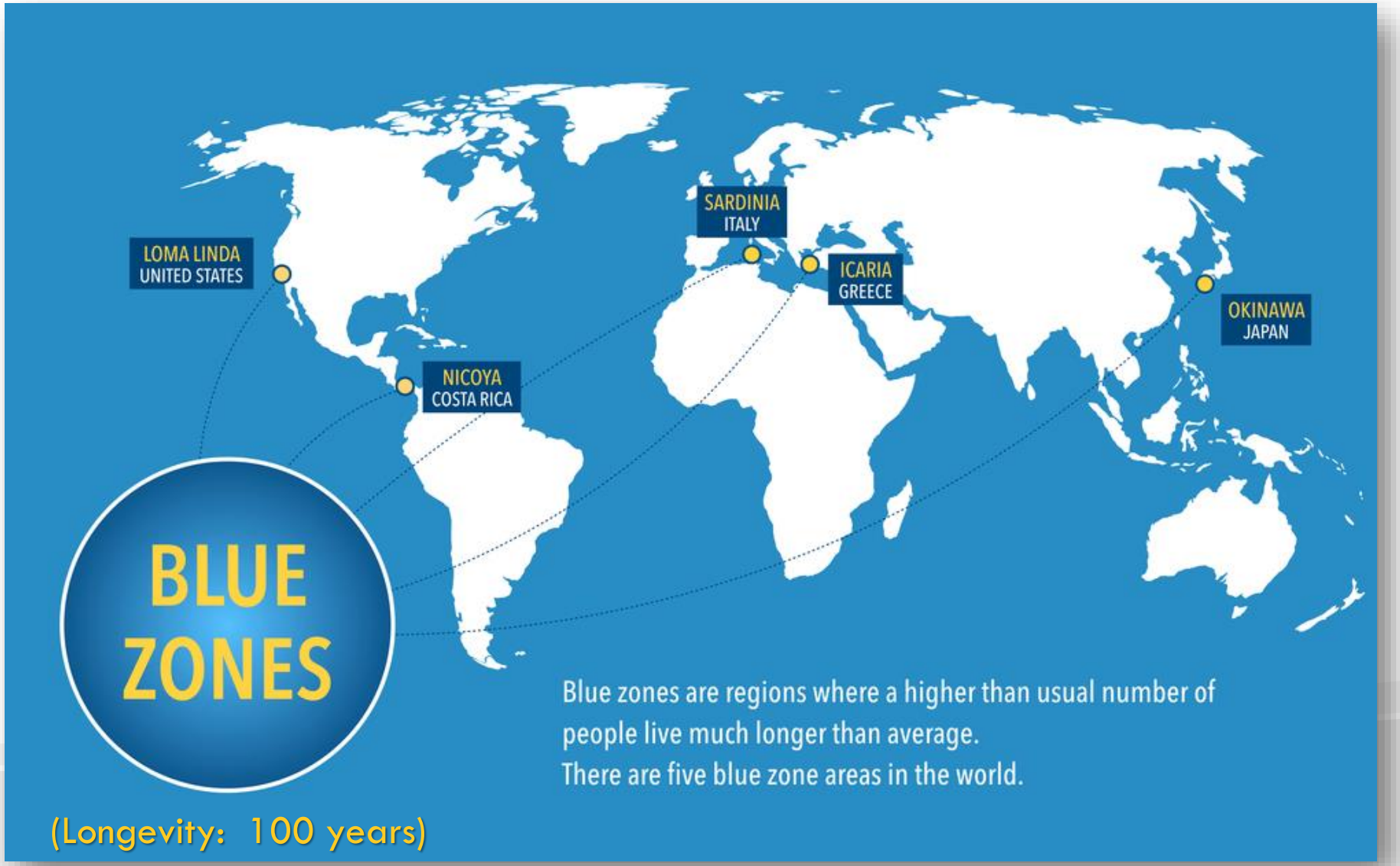


Source: U.S. Census Bureau, decennial censuses and vintage 2017 population projections (2020-2060).

<u>Lifespan</u>:

- 2022: Female: 79.1 years
  Male: 73.2 years
- 2060: 85.6 years (both)

Introduction



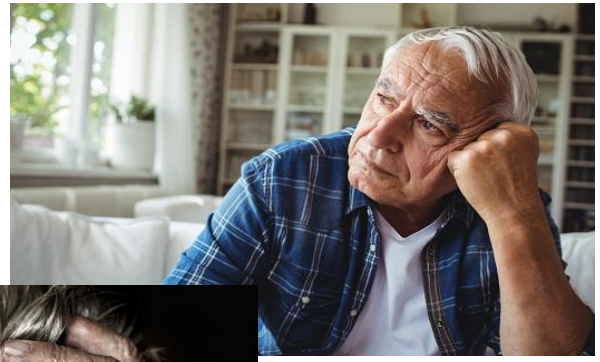
(Longevity: 100 years)

Fountain of Youth…?

- Factors influencing life expectancy:
  - Healthy, plant-based dietary pattern
  - Moderate, regular physical activity
  - Not smoking
  - Alcohol in moderation
  - Healthy body weight
  - Sleep
  - Life purpose
  - Stress reduction/coping
  - Strong spiritual, family, and social networks

InstaPoll

- What ‘loss’ do older adults fear the most?
  - Life
  - Independence
  - Memory
  - Finances
  - Relationships
  - Being Safe



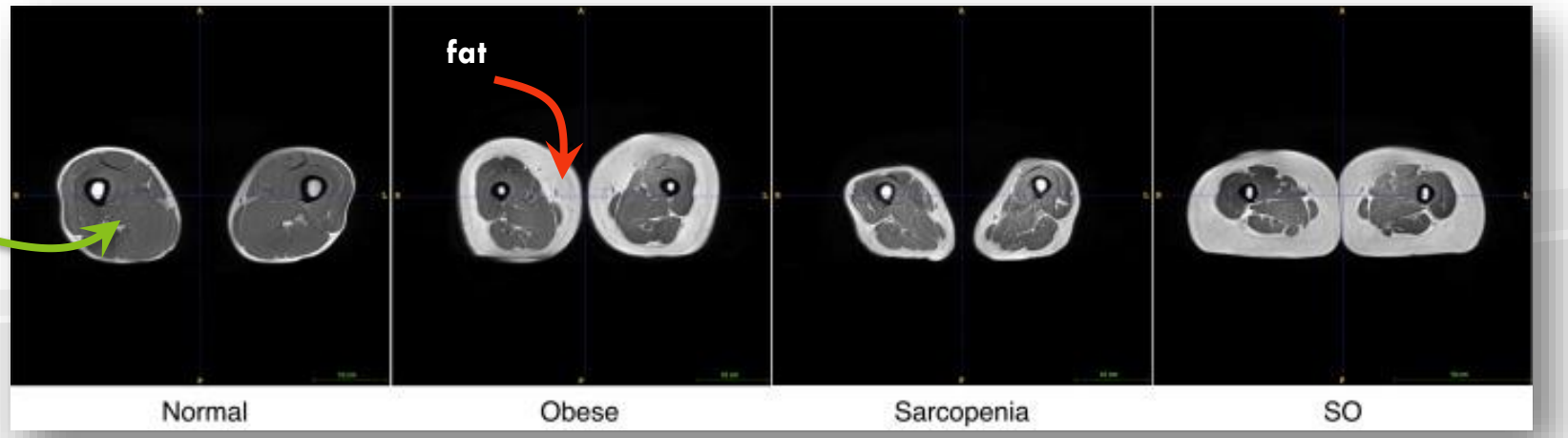
Motivating Goals of Older Adults

- **Remain independent (physically and mentally)**
- Slow aging (decrease ‘aches and pains’)
- Reverse chronic disease
- Promote health and well-being
- Physiological age ≠ chronological age
  - Physiological age reflects health status

Aging & Chronic Disease

Aging & Body Composition

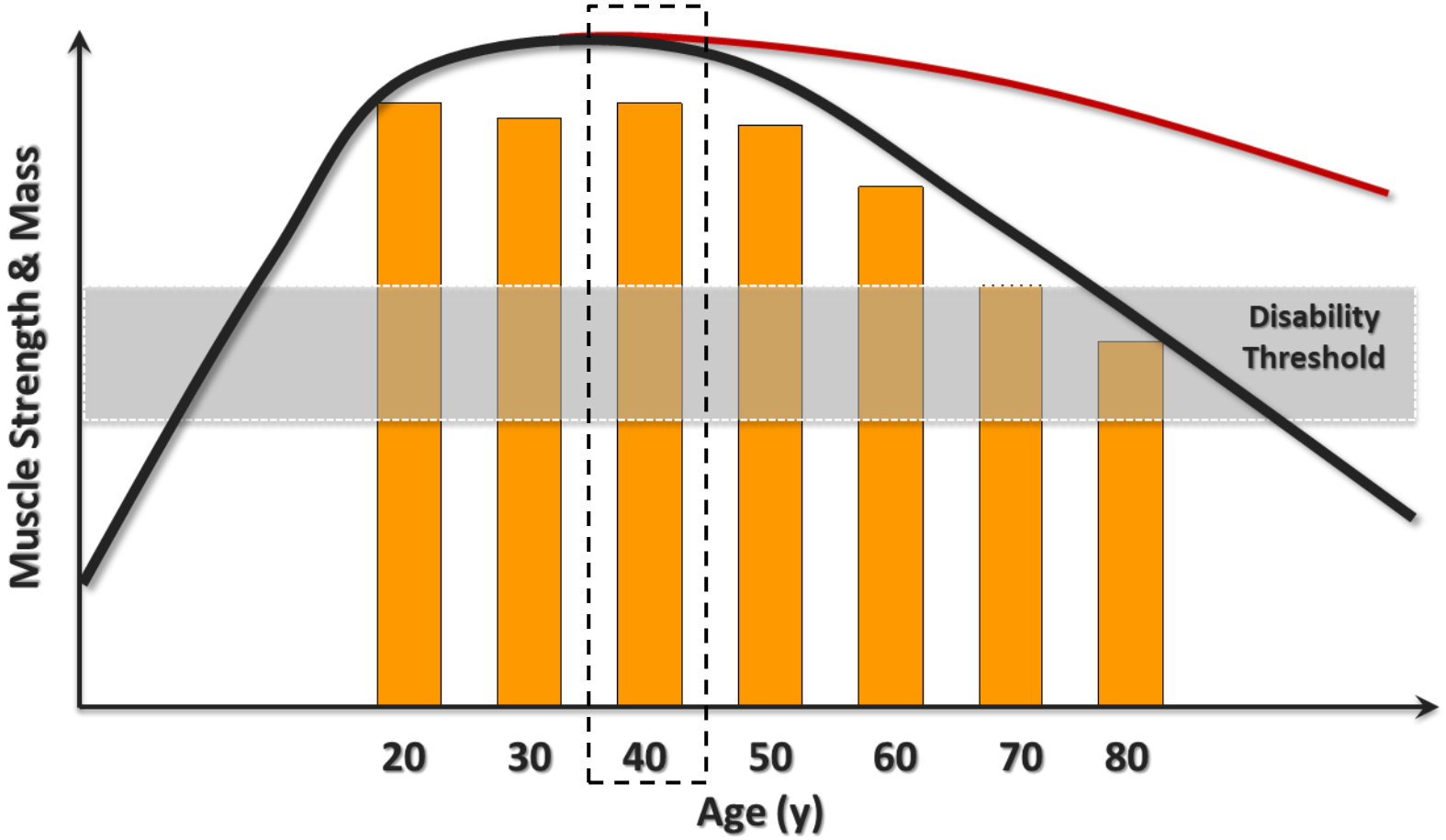
- With aging, significant:
  - Loss of bone density and muscle mass
  - Gain in body fat
  - Loss of functional strength and movement → daily tasks → loss of independence
- Sarcopenia = age-related involuntary loss of skeletal muscle mass & strength
  - Sarcopenic obesity = sarcopenia with obesity (35% of older adults have obesity)
    - ✓ Severe decline in functionality



Modified from https: Goodpaster et al, Frontera et al., Proctor DN, N Burd Presentation, FNCE

It's Not Too Late!

- When should we start caring/intervening?



- <u>*Lean Mass Losses*</u>
  - ✓ *1-2%/year*
  - ✓ *35-40%, 20-80 years*
- <u>*Strength Losses*</u>
  - ✓ *2.5-4%/year (more rapid)*

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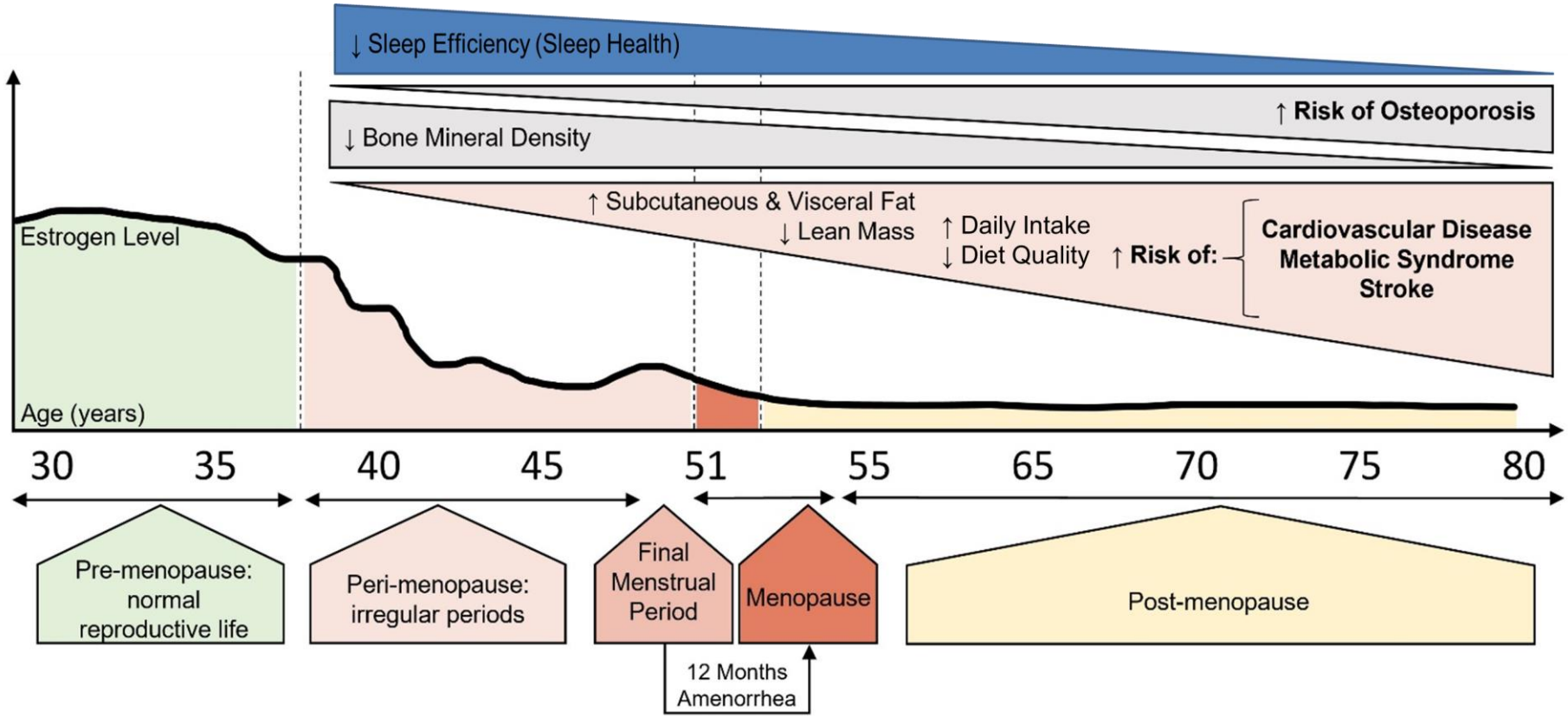
It's Not Too Late!

Life Transitions in Aging Women



Aging: Immunity & Inflammation

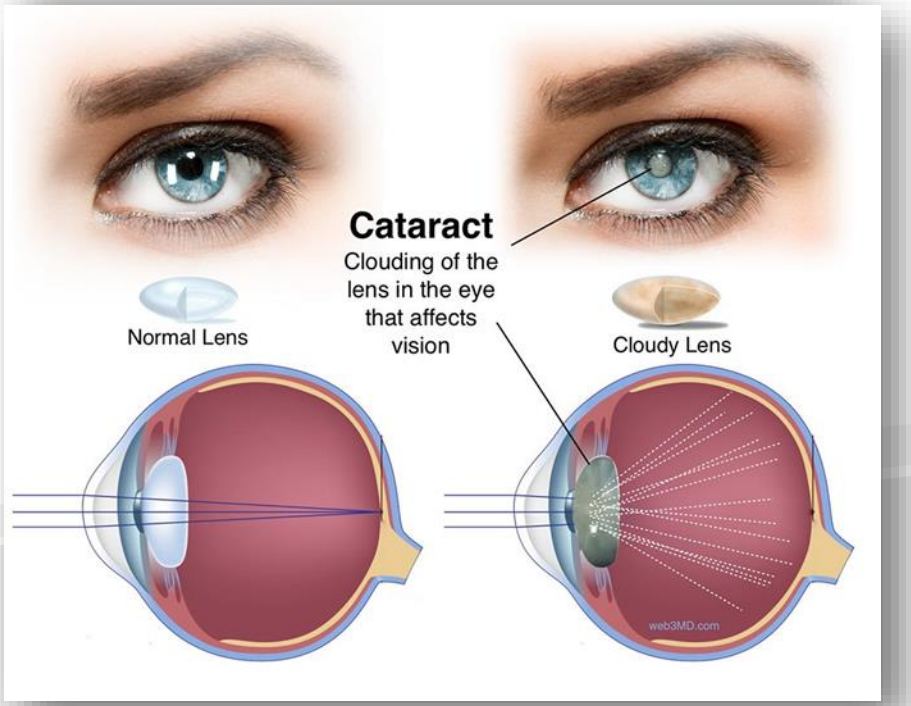
- Immune system loses function, overstimulated response to illness
  - "Inflammaging": inefficient and overactive response
- Inflammation = critical in supporting health
  - Immune system destroys invaders, repairs tissues
- Immune system = compromised by nutrient deficiencies
  - Older adults are vulnerable to infectious diseases

Aging, Oral Health, & GI Tract

- Dentures, tooth loss, gum disease
  - Difficult, painful, inefficient chewing
  - Limited food selections = less dietary variety
- GI Changes
  - Intestinal wall loses strength & elasticity; GI hormone secretions change = slow GI motility
- Symptoms
  - Constipation, decreased energy intake, unintentional weight loss
  - Atrophic gastritis: inflamed stomach, bacterial overgrowth, lack of HCl & intrinsic factor
  - Impaired digestion & absorption of nutrients
  - Dysphagia: difficulty swallowing

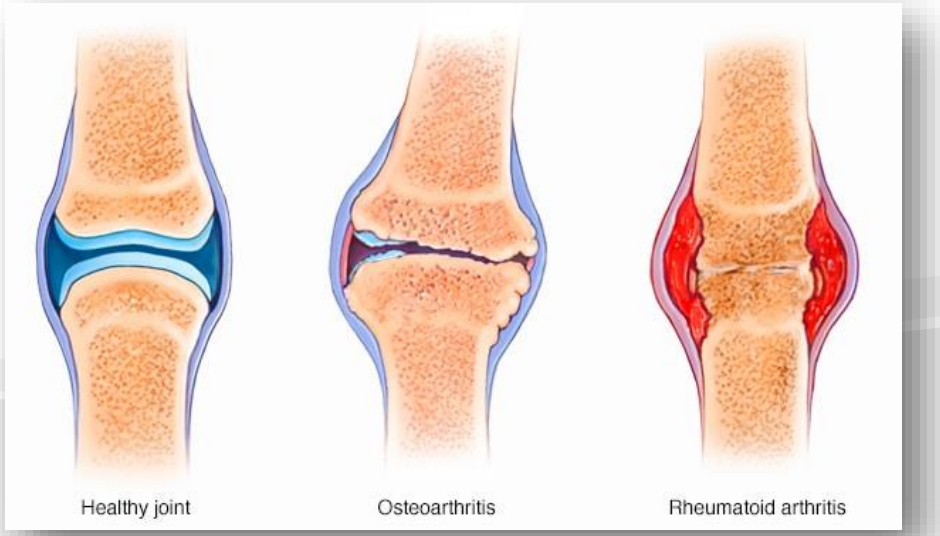
Aging & Vision

- Cataracts
  - Age-related clouding of lenses in eyes
  - Lead to blindness if not surgically removed
  - Risk factors: UV exposure, oxidative stress, injury, viral infections, toxic substances, genetic disorders
- Macular degeneration
  - Leading cause of vision loss
  - Oxidative stress from sunlight



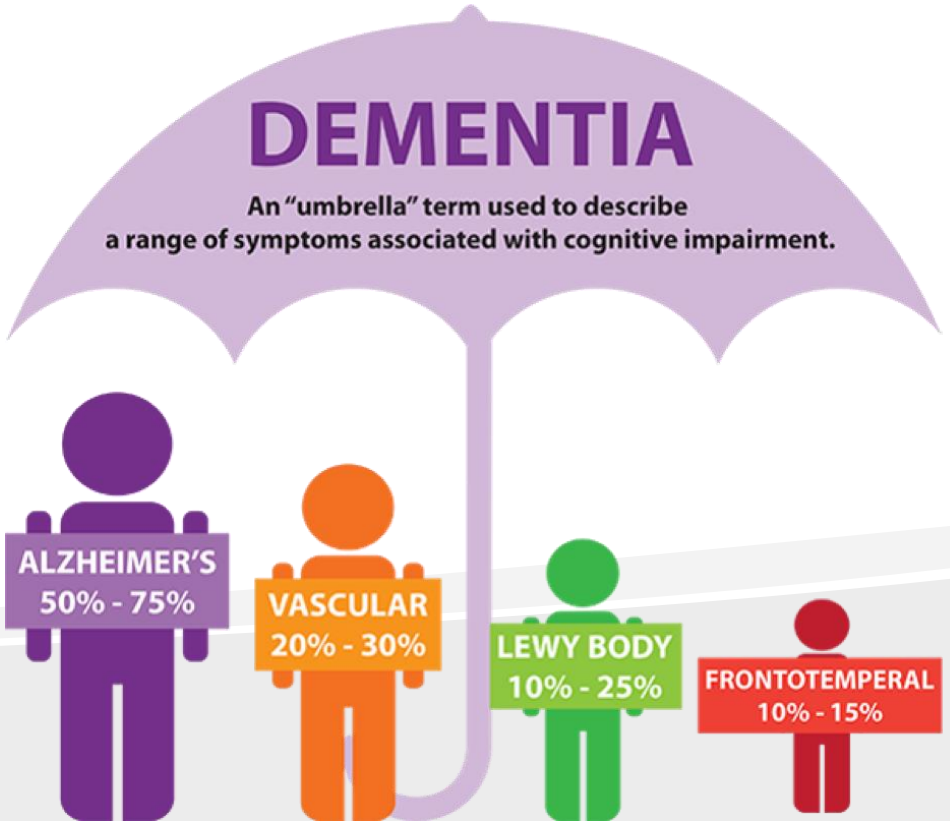
Aging & Arthritis

- Osteoarthritis
  - Deterioration of cartilage in the joints
  - Obesity can exacerbate; aerobic and strength training may help
- Rheumatoid arthritis
  - Immune system destroys bone and cartilage
- Gout
  - Deposits of uric acid in joints
  - Breakdown of purines (nitrogen-containing bases) from foods
  - Medication may be necessary



Aging & Brain Health (Dementia)

- Dementia affects 15% of adults over 70 years
- Characteristic changes with age
  - Loss of neurons
  - Decreased blood supply
- Brain structure
  - Brain shrinkage naturally occurs with age
  - Obesity may accelerate process
- Nutrients
  - Key dietary nutrients are precursors for synthesizing neurotransmitters
  - Deficiencies impact memory and cognition

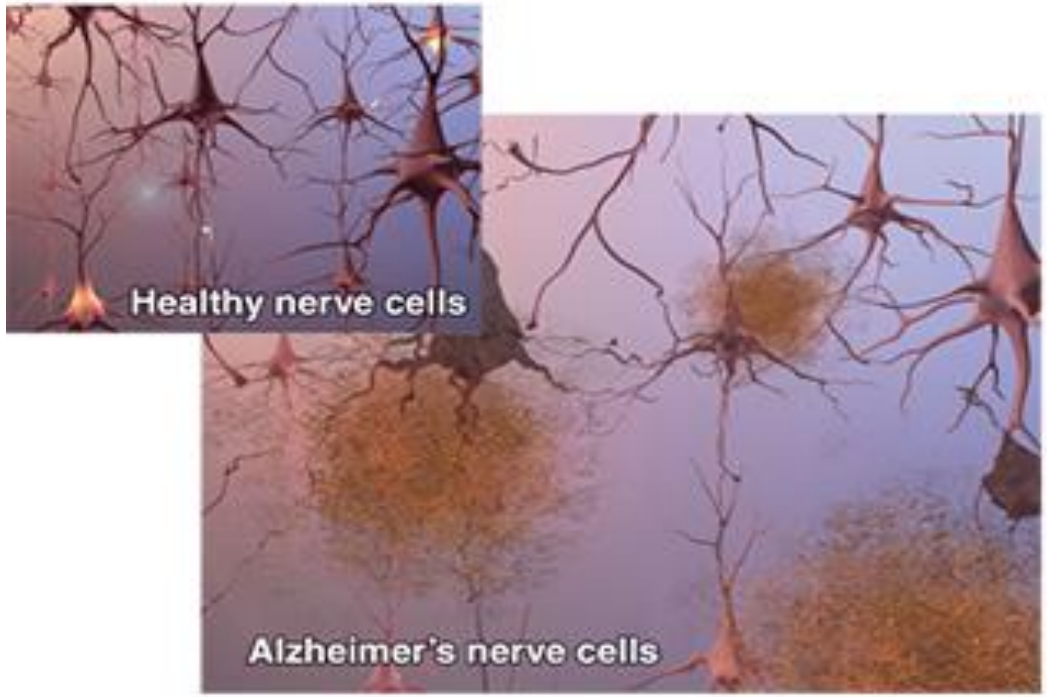


Alzheimer's Disease

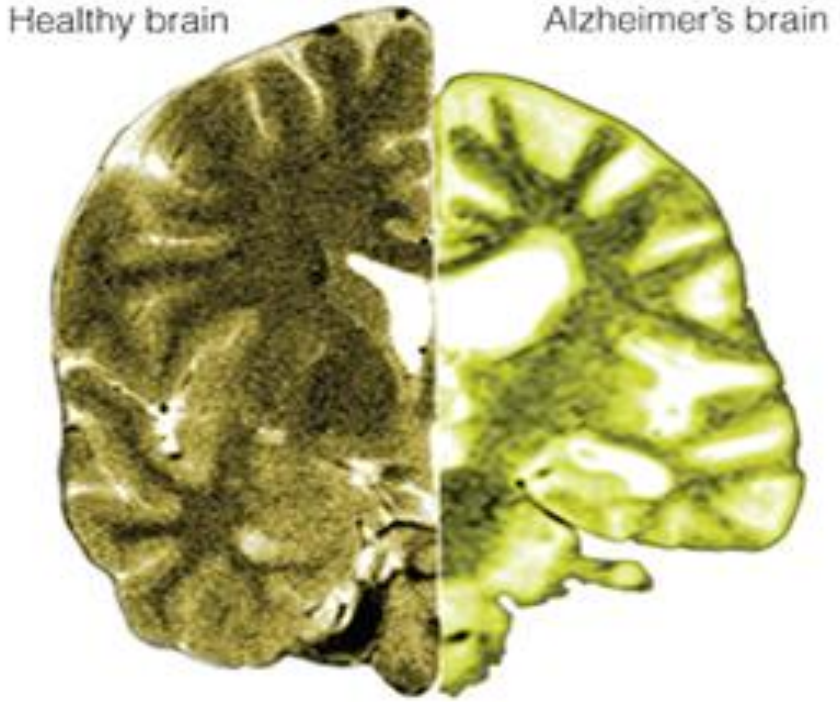
- Most common form of dementia
  - 6th leading cause of death in US
  - Nerve cells die and communication between nerves breaks down
- Characteristics
  - Loss of memory/reasoning, ability to communicate, and physical capabilities
- Risk factors and possible causes
  - Age
  - Genetic factors
  - Oxidative stress
  - Inflammation and diseases (CVD, type 2 diabetes, hypertension, obesity)

Alzheimer's & Brain Comparisons

- Plaques (clumps) block cell-to-cell synapse signals
- Tangles destroy the cell transport system
- Both block essential nutrients from reaching the nerve cells



- Nerve cells die & brain shrinks causing loss of the ability to think, plan, remember, etc.



Psychological Changes & Nutrition Status

- Depression
  - Loss of appetite and motivation to cook
  - Support and companionship of family and friends can help
- Economic changes
  - Living arrangements and income
- Social changes
  - Malnutrition most likely to affect those living alone
    - ✓ Especially men, low income and/or education
    - ✓ Loneliness directly related to nutritional inadequacy

Dietary Needs of Older Adults

- Energy needs decline 5% per decade
  - BMR declines 1-2% per decade
  - Females 60+: 1,600 – 2,200 kcals/d
  - Males 60+: 2,000 – 2,600 kcals/d
- Healthy Dietary Patterns recommended for older adults
  - Healthy American, Healthy Vegetarian, Mediterranean
- Special considerations (unique to older adults):
  - Protein
  - Vitamin B_{12}

Protein (Supplementation)

- Protein needs higher given muscle losses with aging (sarcopenia)
  - 1.2 g/kg body weight/day *should b*e the RDA for older adults
  - Protein shakes are ideal (due to: increased fullness, lack of appetite, chewing issues)

Increased dietary protein is associated with the following functional outcomes:

↑ *Lean Mass*

↑ *Grip Strength*

↑ *Lower Body Strength*

↑ *Physical Function*

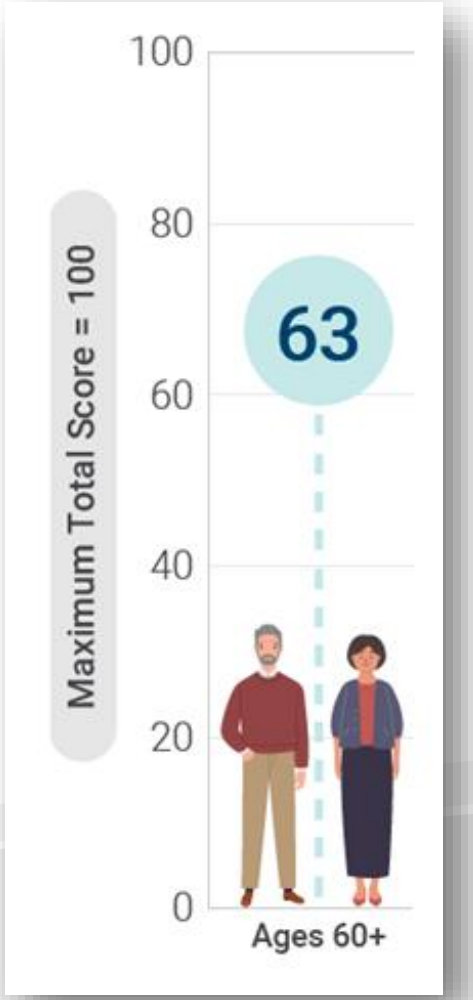
Higher protein diets (up to 1.6 g/kg body weight/day) are associated with healthy aging

Vitamin B_{12}

- Lower absorption with aging as a result of:
  - Medicine interactions
    - ✓ Metformin (T2D)
    - ✓ Prevacid/Prilosec, Nexium (Acid Reflux)
    - ✓ Colchicine (Grout)
  - Atrophic gastritis: inflammation of the gastric mucosa and reduction in intrinsic factor
    - ✓ 10-30% of adults over 50 years ols
- Recommendation: Fortified foods and B_{12} Supplements
  - Cereals, tofu, yogurt, milks, milk alternatives

Additional Nutrient Inadequacies

- >50% of older adults take dietary supplements
  - Benefit > harm (*but not a substitute for food*)
- Vitamin D
  - Associated with osteoporosis and dementia
  - Limited milk intake, limited sunlight, reduced synthesis
  - Supplements may be necessary
- Folate, Calcium, & Zinc
- Fiber
  - Improve constipation symptoms



Water

- Less response to thirst and dry mouth
- Dehydration
  - Total body water decreases with age
  - Problems associated with dehydration
    - ✓ Urinary tract infection, pneumonia, pressure ulcers, confusion, disorientation
  - Prevention:
    - ✓ At least 6 glasses of water daily
    - ✓ High-water content food