

**Nutrition and Aging in the Geriatric Patient**  
Presented by Natalie Ledesma, MS, RDN, CSO, CLT

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**Disclosure of Conflicts of Interest**

- Lilly Oncology: Speaker's Bureau
- Kate Farms: Speaker's Bureau
- Digestive Care, Inc.: Speaker's Bureau

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**Nutritional Challenges for the Elderly**

- Malnutrition – calorie, protein, micronutrients
- Sarcopenia
- Unintentional weight loss
- Hypochloridia
- Constipation
- Inflammaging
- UTIs

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A slide titled "Consequences of Malnutrition" with a red speech bubble on the left. On the right, there are six horizontal bars with the following text from top to bottom: "Weakened immune system", "Muscle loss", "Increased risk of hospitalization", "Impaired wound healing", "Impaired temperature regulation", and "Decreased ability to regulate fluid & electrolyte balance".

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A slide titled "To Prevent Malnutrition" with a red speech bubble on the left. On the right, there are seven horizontal bars with the following text from top to bottom: "Monitor weight", "Observe habits", "Keep track of medications", "Help with meal plans", "Use local services", "Make meals social events", and "Encourage regular physical activity".

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A slide titled "Hormones & Appetite in the Elderly" with a grid of six colored boxes. The top row contains: "Cholecystokinin (CCK) ↑" (orange), "glucagon-like peptide-1 (GLP-1) & peptide YY (PYY)" (green), and "Grehlin ↓" (teal). The bottom row contains: "Leptin ↑" (blue), "Insulin ↓" (purple), and "Interleukin (IL) 1, IL6 and Tumor Necrosis Factor alpha (TNF-α) ↑" (orange).

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### Micronutrients Commonly Low in the Elderly

- Vitamin B12** - decreased absorption, also Metformin and PPIs lower B12
  - Dietary sources - fish, meat, poultry, eggs, nutritional yeast
- Folate** - important for blood; key for methylation
  - Dietary sources - green leafy vegetables, beans/legumes
- Calcium** - bone health, blood pressure regulation
  - Dietary sources - collard greens, bok choy, kale, sesame seeds, blackstrap molasses, dairy
- Vitamin D** - improves calcium absorption, maintains BMD, anti-inflammatory, immunomodulator, may be protective against various chronic diseases
  - Dietary sources - cold-water fish, mushrooms\*
  - Dietary supplements 1000-5000 IU daily with food

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### Micronutrients Commonly Low in the Elderly (cont)

- Potassium** - helpful for HTN and kidney stones
  - Dietary sources - fruits & vegetables
- Magnesium** - cardiovascular health, immune function, blood sugar regulation, bone health
  - Dietary sources - green leafy vegetables, nuts & seeds, cocoa powder, whole grains
- Zinc** - critical for immune function, bone health, glycemic regulation, & taste
  - Dietary sources - oysters, fish, poultry, beans, tofu, nuts/seeds

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### Other Important Compounds for the Elderly

- Omega-3 fatty acids**
- Carnitine**
- Alpha lipoic acid**
- Coenzyme Q10**

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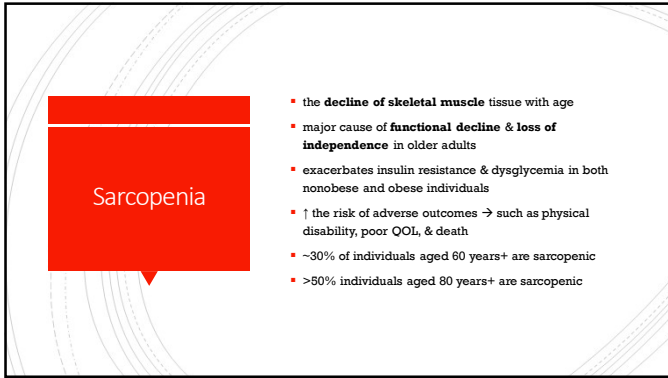
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**Sarcopenia**

- the **decline of skeletal muscle** tissue with age
- major cause of **functional decline & loss of independence** in older adults
- exacerbates insulin resistance & dysglycemia in both nonobese and obese individuals
- ↑ the risk of adverse outcomes → such as physical disability, poor QOL, & death
- ~30% of individuals aged 60 years+ are sarcopenic
- >50% individuals aged 80 years+ are sarcopenic

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**Nutritional Strategies for Sarcopenia**

- Mediterranean diet
- Protein 1.2-1.5 gm/kg BW
- Strength/resistance-based exercises
- Zinc
- Creatine
- HMB
- Magnesium
- Collagen

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**Unintentional Weight Loss**

- **Food first** approach
- Ensure **display** of meals look appetizing
- Create a pleasant dining **environment**
- **Increase calories** in the foods already being eaten
- Weight gain **smoothies/shakes** (store-bought or homemade)
- Consider appetite stimulants, if appropriate
- Consider tube feeding, if appropriate

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**Nutrition to Gain Weight - Protein**

- Fruit smoothies**
  - Contains any of the following:
    - Fruit
    - Almond milk, coconut milk, soy milk, coconut water, green tea
    - Yogurt or kefir
    - Protein powder (i.e., collagen peptides, bone broth, pea, whey, hemp, etc.)
    - Peanut butter or other nut butters
    - Ground flax, chia seeds
- Protein powder**
  - Add to:
    - Smoothies
    - Mashed sweet potatoes
    - Hot cereals (oatmeal, mixed grain cereal)
    - Rogee
    - Applesauce
    - Yogurt
    - Tomato sauce
- Drink supplements** (for example: Kate Farms, Orgain, Enso)
- Energy bars** (Atlas Bar, Aloha bar, Dang bar, Julien Bakery Pegan Bar, Rise Protein Bar)
- Eggs**

13

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**Nutrition to Gain Weight - Healthy Fats**

- Avocado**
- Nuts/seeds, nut/seed butters**
- Olives**
- Cold-water fish** (for example: salmon, herring, sardines, trout)
- Hummus**
- Coconut milk**
- Items made with olive, almond, macadamia nut, or avocado oil**

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**Difficulty with Chewing**

- Almond butter
- Applesauce/baked apples
- Avocado/guacamole
- Banana
- Beans/ bean dip
- Bone broth
- Eggs
- Fish
- Fruit smoothies
- Grits and/or polenta
- Hummus
- Kefir
- Lentils
- Mashed cauliflower
- Mashed sweet potatoes
- Oatmeal
- Peanut butter
- Protein shakes
- Rice
- Shredded chicken
- Souffle
- Soup
- Tofu
- Turkey ground
- Vegetable juice
- Vegetable purees
- Yogurt

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## Symptoms of Hypochlorhydria

- Bloating, belching, burning, flatulence immediately after meals
- Sense of fullness after eating just few bites of food
- Feeling as though food sits in stomach undigested for hours
- Food allergies &/or sensitivities
- Nausea after taking supplements
- Chronic intestinal parasites
- Chronic yeast infections
- Undigested food in stool
- Iron &/or B12 deficiency
- Acid reflux
- Adrenal fatigue
- Rectal itching
- Acne
- Dry skin/dandruff
- Weak, peeling & cracked fingernails



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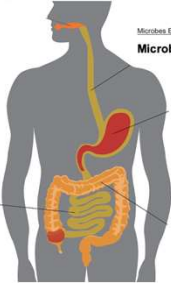
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Microbes, Environ, 2017 Dec; 27:32(4):300-313. doi: 10.1284/eme2.ME11017. Epub 2017 Nov 10.

**Microbial Ecology along the Gastrointestinal Tract.**

pH 1    4    7    10    13



Natalie Ledesma, MS, RD, CNS, CLT

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## Helpful for Hypochlorhydria



**Nutrition/Diet**


Smaller meals, more regularly

- Chew food thoroughly
- Reduce protein portion, especially meats
- Avoid beverages at meals, especially cold; sips OK



**Supplements**

ACV, bitters, betaine HCL  
Zinc carnosine  
Melatonin



**Lifestyle**

Acupuncture can help ("restore digestive fire")

Remain sitting upright for 60-120 minutes after eating to reduce reflux

Natalie Ledesma, MS, RD, CNS, CLT

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**Constipation**

- Dietary fiber
  - Chia seeds (1-4 tbsp daily)
  - Ground flax seeds (1-2 tbsp daily)
  - Sacha inchi seeds (1-4 tbsp daily)
  - Beets, beet juice, green juice, sunchokes, kiwi, prunes
- Coconut oil or MCT oil (1 tbsp daily)
- Adequate hydration
- Mg citrate (400-800 mg daily)
- Probiotics
- Triphala
- Movement/physical activity

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Fruits	Serving Size	Fiber Grams/Serving
Apple	1 medium	3.7
Banana	1 medium	2.8
Blackberries	½ cup	3.8
Blueberries	½ cup	1.9
Cantaloupe	1 cup	1.3
Figs (dried)	¼ cup	6.0
Grapefruit	1 medium	3.4
Grapes	1 cup	1.6
Guava	1 medium	4.9
Kiwi	1 medium	2.6
Orange	1 medium	3.1
Pear	1 medium	4.0
Persimmon	1 medium	6.0
Prunes	¼ cup	3.1

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Grains & Other Products	Serving Size	Fiber Grams/Serving
Amaranth	¼ cup dry	7.4
Barley	½ cup cooked	3.0
Beans, black	½ cup cooked	8.3
Beans, red kidney	½ cup cooked	8.2
Beans, garbanzo	½ cup cooked	5.0
Bran cereals	¼ cup	Check labels (5.0-22.0)
Brown rice	½ cup cooked	1.4
Bulgur	½ cup cooked	4.0
Cream of wheat	½ cup cooked	0.5
Oatmeal	½ cup cooked	2.0
Peanuts	¼ cup	2.9
Quinoa	¼ cup dry	2.5
White rice	½ cup cooked	0.3

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Vegetables	Serving Size	Fiber Grams/ Serving
Artichokes	1 medium	6.9
Beets	½ cup cooked	1.7
Broccoli	½ cup cooked	2.3
Brussel sprouts	½ cup cooked	2.0
Carrots	½ cup cooked	2.6
Kale	½ cup cooked	1.3
Lima beans	½ cup cooked	4.5
Peas, green	½ cup cooked	4.4
Spinach	½ cup cooked	2.2
Squash, winter-type	½ cup cooked	3.4
Sweet potatoes (yams)	½ cup cooked	2.7

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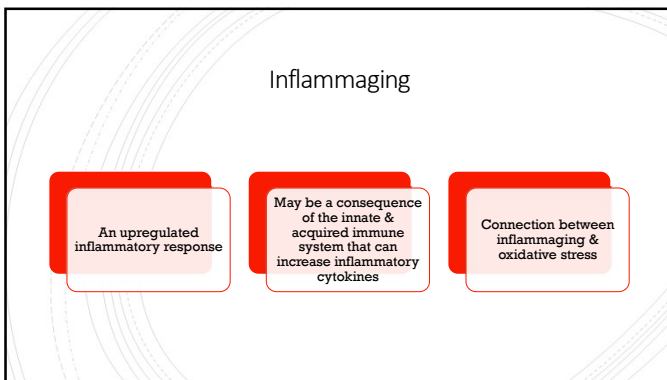
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International Journal of Molecular Sciences MDPI

Int. J. Mol. Sci. 2019, Sep; 20(18): 4472. PMCID: PMC6769561  
 Published online 2019 Sep 10. doi: 10.3390/ijms20184472 PMID: 31510091

**Inflammaging and Oxidative Stress in Human Diseases: From Molecular Mechanisms to Novel Treatments**

Li Zuo,<sup>1,2,3,\*</sup> Evan R. Prather,<sup>2</sup> Mykola Stetskiy,<sup>2</sup> Davis E. Garrison,<sup>2</sup> James R. Meade,<sup>2</sup> Timotheus J. Peace,<sup>1</sup> and Tingyang Zhou<sup>2,3</sup>

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**Abstract** Go to:

It has been proposed that a chronic state of inflammation correlated with aging known as inflammaging, is This review focuses on inflammaging and its contribution to various age-related diseases such as cardiovascular disease, cancer, neurodegenerative diseases, chronic obstructive pulmonary disease, diabetes, and rheumatoid arthritis.

rheumatoid arthritis. Recently published mechanistic details of the roles of reactive oxygen species in inflammaging and various diseases will also be discussed. Advancements in potential treatments to ameliorate inflammaging, oxidative stress, and consequently, reduce the morbidity of multiple disease states will be explored.

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Review > Ageing Res Rev. 2022 May 27;101596. doi: 10.1016/j.arr.2022.101596.  
Epub 2022 Feb 24.

### The role of nutrition in inflammaging

Paolo Di Giosia <sup>1</sup>, Cosimo Andrea Stamerra <sup>1</sup>, Paolo Giorgini <sup>2</sup>, Tannaz Jamialahmadi <sup>3</sup>,  
Alexandra E Butler <sup>4</sup>, Amirhossein Sahebkar <sup>5</sup>

Affiliations + expand  
PMID: 35219904 DOI: 10.1016/j.arr.2022.101596

**Abstract**  
**Background:** Old age is characterized by a peculiar low-grade, chronic, and "sterile" inflammatory state, which has been termed "inflammaging." This is believed to substantially contribute to the pathogenesis of several age-related diseases and to the progression of the ageing process. The

Dietary components may affect inflammation directly, counteracting the low grade age-related inflammation. In this regard, healthy diets, including the Mediterranean diet, are associated with lower concentrations of inflammatory mediators, like C-reactive protein (CRP) and Tumor Necrosis Factor- $\alpha$  (TNF- $\alpha$ ), that are hallmarks of inflammaging.

healthy diet, a higher intake of whole grains, vegetables and fruits, nuts and fish are all associated with lower inflammation. One area of promising research is the microbiome-ageing interaction. Indeed, dysbiosis plays a role in sub-optimal metabolism, immune function and brain function and contributes to the poor health and impaired well-being associated with ageing. Modulation of the gut microbiota has shown promising results in some disorders. Additionally, the discovery of several

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### How Inflammation Affects the Body?

"Inflammation is at the root of practically all known chronic health conditions"

- BRAIN**  
The inflammatory cytokines cause autoimmune reactions in the brain, which can lead to depression, autism, poor memory, Alzheimer's disease and MS.
- CARDIOVASCULAR**  
Inflammation in the heart & arterial & venous walls contributes to heart disease, strokes, high blood sugar (diabetes) and anemia.
- MUSCLE**  
Inflammatory cytokines can cause muscle pain and weakness. Can manifest as carpal tunnel syndrome, or polymyalgia rheumatica, to name a few.
- BONES**  
Inflammation interferes with the body's natural ability to repair bone mass, increasing the number of fractures & leading to conditions like osteoporosis.
- SKIN**  
Chronic inflammation compromises the liver & kidneys, resulting in rashes, dermatitis, eczema, acne, psoriasis, warts & fine lines.
- THYROID**  
Autoimmunity as a result of inflammation can reduce total thyroid receptor count and disrupt thyroid hormone function.
- LUNGS**  
Inflammation induces autoimmune reactions against the linings of airways. Can result in allergies or asthma.
- GI TRACT**  
Chronic inflammation damages our intestinal lining and can result in issues like GERD, Crohn's disease and Colic disease.
- KIDNEYS**  
Inflammatory cytokines restrict blood flow to the kidneys. Complications like edema, hypertension, nephritis & kidney failure can result.
- LIVER**  
Build-up of inflammation leads to an enlarged liver or fatty liver disease. Increased toxic load build-up in the body.

DRJOCKERS.COM  
DISRUPTOR OF CHRONIC DISEASE

26

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### Inflammaging – Signs & Symptoms

Bone loss	Muscle loss	Weakness and loss of strength	Weight gain and fat gain	Memory challenges
Mood swings	Brain fog	Muscle & joint pains	Digestive issues	Blood sugar fluctuations
Frequent illness & injuries	Fatigue	Sleep issues		

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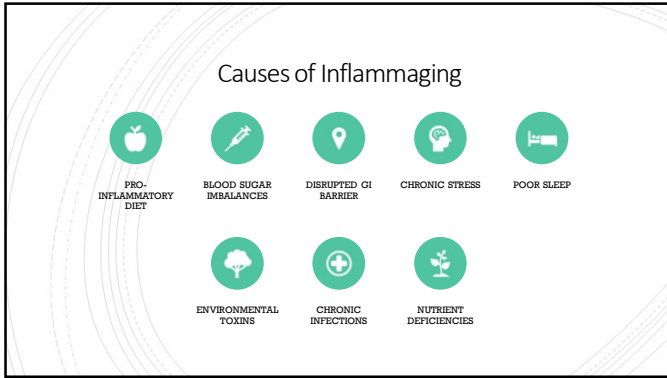
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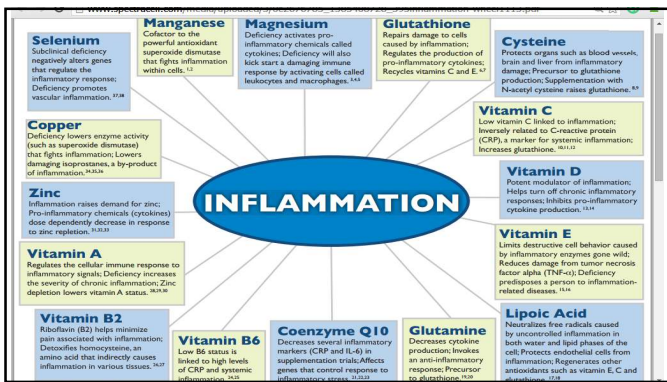
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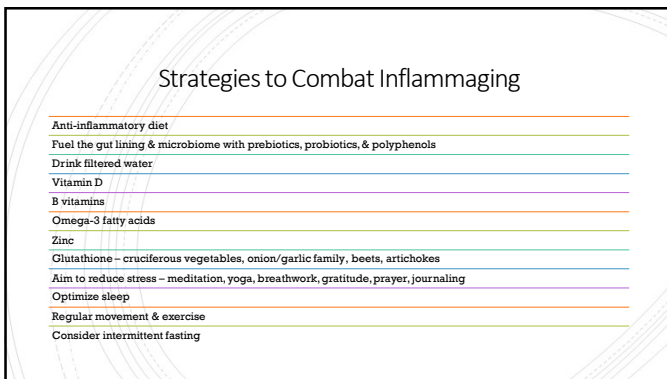
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### UTIs

- Adequate fluids
  - 1 mL fluid per calorie (based on caloric needs)
  - Urine output + 500mL/d (based on fluid balance)
- Probiotics (*Lactobacillus reuteri RC-14* & *Lactobacillus rhamnosus GR-1*)
- D-mannose
  - 1.5 grams twice daily for 3 days, and then once daily for 10 days
- 100% cranberry juice/cranberry capsules
  - dried powder 250-1500 mg daily
  - extract 120-1600 mg daily
  - juice 120-240 mL daily

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### Nutritional Suggestions for the Elderly

- Adequate protein to maintain muscle mass (1.2-1.5 gm/kg desired BW)
  - Fish, seafood, poultry, eggs, beans/legumes, collagen peptides, tempeh, tofu
- Encourage hydration
- Balanced meals
  - 50% vegetables; 25% protein; 25% carbohydrates
- Add fruits and vegetables to meals and snacks; look for frozen, canned, or ready-to-eat varieties if slicing and chopping is a challenge
- Dietary fiber for GI motility, blood sugar, cholesterol, & other chronic diseases
- Make eating a social event
- Physical activity for muscular strength, brain function, balance, bone health, & mood
  - Aim for 150 to 300 minutes of moderate-intensity aerobic activity and at least 2 days of muscle-strengthening activity per week
- Achieve &/or maintain a healthy body weight

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