PHIPPS

Nutrition and Immunity

THE HEINZ ENDOWMENTS
HOWARD HEINZ ENDOWMENT • VIRA I. HEINZ ENDOWMENT

UPMC HEALTH PLAN

Maris Altieri, RD

Outline:

1. What is Our Immune System?
2. Risk Factors for Weakened Immune System
3. Nutrients and Immunity
4. The Microbiome
5. Fact Checking Herbal Supplements

PHIPPS

What is Our Immune System?

Humans have two types of immune systems:

- **Innate immunity** is a first-line defense from pathogens that try to enter our bodies, achieved through protective barriers.

- **Adaptive or acquired immunity** is a system that learns to recognize a pathogen. It is regulated by cells and organs in our body like the spleen, thymus, bone marrow, and lymph nodes.

PHIPPS

What is Our Immune System?

Other conditions that trigger an immune response:

- **Antigens**
  - Allergens
- **Inflammation**
  - Release of histamines, may generate pain, swelling and release of fluids
- **Autoimmune disorders**
  - Lupus, rheumatoid arthritis, type 1 diabetes, celiac
- **Immunodeficiency disorders**
  - AIDS, leukemia, multiple myeloma

PHIPPS

What Factors Depress Our Immune System?

- Older age
- Environmental toxins
- Poor diet
- Chronic diseases
- Chronic mental stress
- Lack of sleep and rest

PHIPPS

Nutrition and Immunity

- Focus on whole diet, **no singular food offers special protection**
- Essential micronutrients for immune response include but are not limited to:
  - zinc, selenium, iron, copper, folic acid, and vitamins A, B6, C, D, and E
- **Protein** helps build antibodies and immune system cells and plays an important role in healing and recovery

PHIPPS

Micronutrient Highlight: Vitamin C

- helps build healthy skin, which is a barrier to microorganisms, and helps protect cells from damage due to its role as an antioxidant.

- High-heat cooking temperatures or prolonged cook times can break down the vitamin C. This nutrient is water-soluble and can seep into cooking liquid

- **Sources:** Citrus fruits (oranges, grapefruits, tangerines), strawberries, papaya, bell peppers, and Brussels sprouts

- **Megadosing vitamin C:**
  - Studies have shown that absorption of vitamin C decreases to less than 50% when taking amounts greater than 1000 mg

PHIPPS

Micronutrient Highlight: Vitamin D

- Vitamin D helps with properly regulating immune cell function and reducing inflammation

- A meta-analysis of randomized controlled trials that compared the effects of vitamin D2 and D3 supplements on blood levels found that D3 supplements tended to raise blood concentrations of the vitamin more and sustained those levels longer than D2.

- **Sources**: Fortified foods (milk, cereal, orange juice), fatty fish (salmon, mackerel, tuna), and sunshine

PHIPPS

Micronutrient Highlight: Vitamin E

- Protects immune cells from damage due to its role as an antioxidant.
- Because vitamin E is found in a variety of foods and supplements, a deficiency in the U.S. is rare.
- **Sources:** Almonds, sunflower seeds, peanut butter, vegetable oil, spinach, and broccoli

PHIPPS

Micronutrient Highlight: Vitamin A

- Vitamin A keeps the skin, tissues in the mouth, stomach, and intestines, and the respiratory system healthy, and it helps regulate the immune system.

- It is fat-soluble, meaning that any amount not immediately needed by the body is absorbed and stored in fat tissue or the liver. If too much is stored, it can become toxic.

- **Sources:** Colorful foods like carrots, sweet potatoes, broccoli, spinach, pumpkin, squash, and cantaloupe

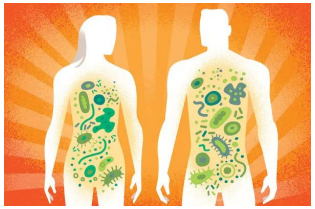
PHIPPS

Micronutrient Highlight: Zinc

- Zinc supports creation of new immune cells, which contributes to the body's ability to heal from wounds.
- Excess zinc can interfere with the absorption of iron and copper
- **Sources**: Lean meats, chicken, turkey, crab, oysters, milk, whole grains, seeds
- **Zinc lozenges**: A Cochrane review of clinical trials found that zinc lozenges did not prevent colds, but if taken within a day of the onset of cold symptoms (sore throat, sniffles), the lozenges could tame its severity

PHIPPS

The Microbiome



- The microbiome is an internal metropolis of trillions of microorganisms or microbes that live in our bodies, mostly in the intestines
- The gut is a major site of immune activity and the production of antimicrobial proteins
- **Probiotic foods**: Kefir, yogurt with live active cultures, fermented vegetables, sauerkraut, tempeh, kombucha tea, kimchi, and miso.
- **Prebiotic foods**: Garlic, onions, leeks, asparagus, Jerusalem artichokes, dandelion greens, bananas, and seaweed. However, a more general rule is to eat a variety of fruits, vegetables, beans, and whole grains for dietary prebiotics.

PHIPPS

Herbal Supplements

Echinacea: Taking echinacea after catching a cold has not been shown to shorten its duration, but taking it while healthy may offer a small chance of protection from catching a cold

Garlic: Those taking the garlic supplement for 3 months had fewer occurrences of the common cold than those taking a placebo, but after contracting the cold virus, both groups had a similar duration of illness

Tea catechins: Two randomized controlled trials found that green tea capsules produced less cold/flu symptoms or incidence of flu than a placebo; however both studies were funded or had author affiliations with tea industries

Elderberries: Clinical research shows that some elderberry extracts might reduce flu-like symptoms. No published research studies have evaluated the use of elderberry for COVID-19.

PHIPPS

Sources

1. Childs CE, Calder PC, Miles EA. Diet and Immune Function. *Nutrients*. 2019 Aug 16;11(8).
2. Green WD, Beck MA. Obesity impairs the adaptive immune response to influenza virus. *Annals of the American Thoracic Society*. 2017 Nov;14(Supplement 5):S406-9.
3. Guillin OM, Vindry C, Ohlmann T, Chavatte L. Selenium, selenoproteins and viral infection. *Nutrients*. 2019 Sep;11(9):2101.
4. Wessels I, Maywald M, Rink L. Zinc as a gatekeeper of immune function. *Nutrients*. 2017 Dec;9(12):1286.
5. Molendijk I, van der Marel S, Maljaars PW. Towards a Food Pharmacy: Immunologic Modulation through Diet. *Nutrients*. 2019 Jun;11(6):1239.
6. Caballero S, Pamer EG. Microbiota-mediated inflammation and antimicrobial defense in the intestine. *Annual review of immunology*. 2015 Mar 21;33:227-56.
7. Li XV, Leonardi I, Iliev ID. Gut mycobiota in immunity and inflammatory disease. *Immunity*. 2019 Jun 18;50(6):1365-79.
8. Chandra RK. Nutrition and the immune system: an introduction. *The American journal of clinical nutrition*. 1997 Aug 1;66(2):460S-3S.
9. Hemilä H, Louhiala P. Vitamin C for preventing and treating pneumonia. *Cochrane database of systematic reviews*. 2013(8).
10. Martineau AR, Jolliffe DA, Hooper RL, Greenberg L, Aloia JF, Bergman P, Dubnov-Raz G, Esposito S, Ganmaa D, Ginde AA, Goodall EC. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ*. 2017 Feb 15;356:i6583.
11. National Center for Complementary and Integrative Health. Echinacea. https://www.nccih.nih.gov/health/echinacea. Accessed 4/2/20.
12. Karsch-Völk M, Barrett B, Kiefer D, Bauer R, Ardjomand-Woelkart K, Linde K. Echinacea for preventing and treating the common cold. *Cochrane Database of Systematic Reviews*. 2014(2).
13. Lissiman E, Bhasale AL, Cohen M. Garlic for the common cold. *Cochrane Database of Systematic Reviews*. 2014(11).
14. Furushima D, Ide K, Yamada H. Effect of tea catechins on influenza infection and the common cold with a focus on epidemiological/clinical studies. *Molecules*. 2018 Jul;23(7):1795.

PHIPPS

Thanks!

Any questions?

You can find us at:

Email: letsmove@phipps.conservatory.org

Website: letsmovepittsburgh.org

Facebook: facebook.com/letsmovepittsburgh/

PHIPPS