

Healthy Behaviors for a Healthy Immune System



Image source: freepik.com, 2020

The Immune System

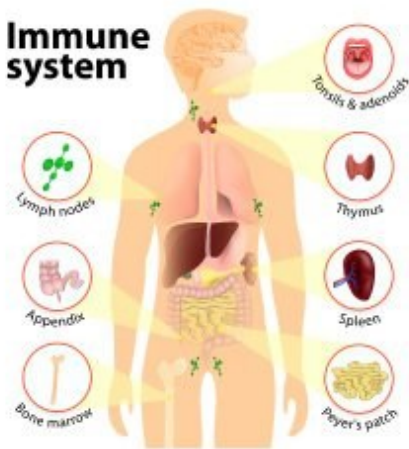
The immune system's goal is to protect the body. It is comprised of special cells, tissues, and organs that work together to help the body fight infections and other diseases. It works to keep foreign substances out of the body, destroys harmful microorganisms, and limits the extent of harm cause if they do enter the body.

The immune system's memory cells keep a record of all microorganisms it has defeated, which allow it to recognize and destroy the microbes quickly if it reencounters them. Immune cells are continually circulating throughout the body in the blood and in a specialized system of vessels called the lymphatic system.

Lymph nodes are small glands that filter and destroy microorganisms. They contain immune cells that analyze foreign invaders and then send white blood cells to fight off the invader. There are hundreds of lymph nodes throughout the body, which can be found in your neck, armpits, and groin. If lymph nodes become swollen and tender, the body is likely fighting an infection.

Bone marrow is vital to the immune system. It makes and releases billions of new blood cells every day into the bloodstream. All immune cells originate in the bone marrow, including the T and B lymphocytes. The B lymphocytes remain in the marrow to mature, while T lymphocytes travel to the thymus.

Immune system



Main Parts of the Immune System

The immune system is comprised of special cells, tissues, and organs that work together to help the body fight infections and other diseases.

- White blood cells
- Antibodies
- Lymphatic system
- Spleen
- Bone marrow
- Thymus

Fact: The thymus will have produced all the T cells an individual needs by the end of puberty. This small gland, located above the heart, is only active during puberty. It then slowly shrinks and is replaced by fat and connective tissue.

Infections can occur when microorganisms such as bacteria, viruses, parasites, or other foreign matter enter the body. Harmful microorganisms can make you ill or cause damage by multiplying and attaching healthy cells. Your immune system will work to protect you from illness or disease when this occurs.

Leukocytes are also known as white blood cells. They are a key part of the immune system.

Microorganisms: An organism that can be seen only through a microscope.

Microorganisms include bacteria, fungi, and viruses.



Image source: pixabay, 2020



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Understanding Immunity for a Healthy Immune System

Types of Immunity

Innate Immunity: This is the immunity you were born with. It will protect you against all antigens. This part of the immune system includes physical barriers such as your skin, tears, sweat, saliva and mucous produced by the skin and mucosal lining throughout your body. These physical barriers can prevent some microorganisms from entering the body.

Acquired or adaptive Immunity: This immunity develops with exposure to various antigens. Therefore, it takes time to develop. Once you have been exposed to an antigen, your immune system builds a defense against that specific antigen. It can learn, adapt, and remember the specific antigens it encounters.

Then, if or when it encounters the antigen again, it can respond more quicker and more effectively, then after the first exposure. The white blood cells responsible for acquired immunity are the B-cells and T-cells.

Passive Immunity: This immunity is short-term and results from the introduction of antibodies from another person. An example of this is the immunity infants have when antibodies are transferred from their mother. These antibodies disappear within 6-12 months.

Immunodeficiency: Immunodeficiency disorders occur when the body's immune response is reduced or absent. Immunodeficiency disorders may affect any part of the immune system. Immunodeficiency can be inherited or can arise as a result of medical treatment or be caused by another disease.

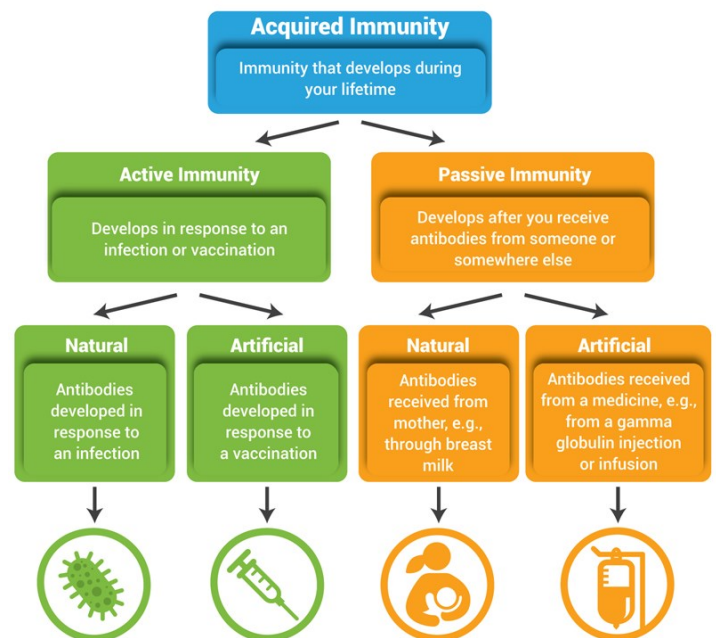



Image source: clinicalinfo.hiv.gov, 2020

 **Antigens:** Antigens are substances that can cause an immune response by identifying substances in or markers on cells within the body. There are different types of antigens. Exogenous antigens can enter the body from outside, by way of ingestion, inhalation, or injection. Examples of these include microorganisms, chemicals, toxins, allergens, pollens, etc.

Auto-antigens are normal cells that are mistakenly attacked by the immune system, leading to autoimmune diseases.

Recommendation: Adults 18 years and older should get between 7 to 9 hours of sleep each night.



Antibodies: Antibodies are proteins made by the immune system in response to antigens, to fight infections. They will bind with the antigen to fight off microorganisms, such as bacteria and viruses. Antibodies can take days or weeks to develop in the body following exposure to an antigen.

Fact: During exercise, the body releases dopamine, endorphins, norepinephrine, serotonin. These brain chemicals play an important part in reducing your perception of pain, regulating your mood, helping you to better manage stress.

Immune Cells for a Healthy Immune System

White blood cells (WBC): Are part of the body's immune system. WBCs help protect against infections and have a role in inflammation, and allergic reactions. Another name for WBCs is leukocytes. These cells are made in the bone marrow and found in the blood and lymph tissue.

Some white blood cells have a short life, lasting only 1 to 3 days, therefore your bone marrow is always making more.

Think of white blood cells as your immunity cells. They flow through your bloodstream to fight viruses, bacteria, and other foreign invaders that threaten your health.

When your body is in distress and a particular area is under attack, white blood cells rush in to help destroy the harmful substance and prevent illness.

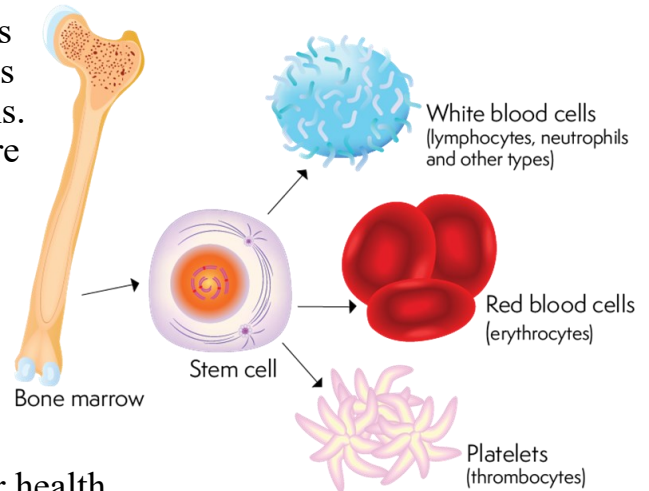


Image source: lymphoma-action.org.uk, 2020

Types of White Blood Cells

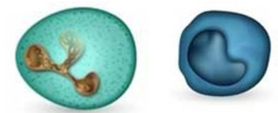
Monocytes: These cells have a longer lifespan than many other white blood cells and help to break down bacteria.

Lymphocytes: Create antibodies to fight against bacteria, viruses, and other potentially harmful invaders.

Neutrophils: These cells kill and digest bacteria and fungi. They are the most abundant type of white blood cell and your first line of defense when fighting an infection.

Basophils: These small cells sound an alarm when microorganisms invade your blood. They secrete chemicals such as histamine, a marker of allergic disease, that help control the body's immune response.

Eosinophils: Attack and kill parasites and cancer cells, as well as help with allergic responses.



Lymphocytes are a type of white blood cell and one of the body's main immune cells. These cells are made in the bone marrow and found in our blood and lymph tissue. There are three major categories of lymphocytes: B lymphocytes (B cells), T lymphocytes (T cells) and Natural killer (NK) cells. There are different types of B cells and T cells and they each have a specific role in the body and the immune system.

B-cells: Produce antibodies.

T-cells: Attack antigens and help control the immune response. Release cytokines.

Natural Killer Cells: Kill infected cells and attack a variety of abnormal cells.

Cytokines are proteins produced by cells in the body that work as messengers between cells. There are different types of cytokines, and they each have a specific role in the body and the immune system. They help to regulate the immune systems and various inflammatory responses.

Inflammation: Inflammation is part of the healing response and thus plays a role in the immune system.

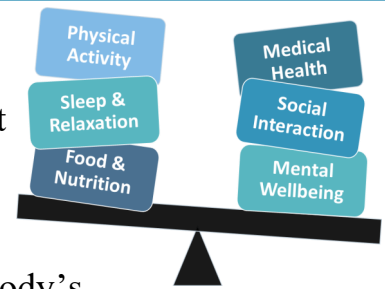
The inflammatory response occurs anytime tissues are injured by bacteria, viruses, trauma, toxins, heat, or any other cause. Cells of the immune system travel to the site of injury or infection and cause inflammation.

Healthy Behaviors for a Healthy Immune System

Lifestyle

Our lifestyle consists of our day-to-day behaviors and have a direct relationship with our health. Living a healthy lifestyle can help prevent chronic diseases and long-term illnesses. A healthy lifestyle includes consistently consuming nutritious foods, engaging in regular physical activity, effectively managing stress, and getting adequate sleep.

Adopting a healthy lifestyle is the best strategy to strengthening your body's natural defenses and keep your immune system strong and healthy.



Physical Activity Guidelines

Moderate Intensity

- 150-300 minutes/week
- Muscle-strengthening activities
 - 2 or more days a week
 - Work all major muscle groups
 - Legs & hips
 - Back & abdomen
 - Chest, shoulders, & arms

Vigorous Intensity

- 75-150 minutes/week
- Muscle-strengthening activities
 - 2 or more days a week
 - Work all major muscle groups
 - Legs & hips
 - Back & abdomen
 - Chest, shoulders, & arms

Break it down - 10 minutes at a time
A mix of moderate- and vigorous-intensity aerobic activity

Physical Activity

There are many health benefits of physical activity or exercise. It helps control weight, strengthens muscles and bones, helps lower blood pressure, improves cholesterol levels, reduces anxiety, improves brain function and mood, and improves sleep quality.

Exercise also plays a role in the immune response.

During and after physical activity, pro and anti-inflammatory cytokines are released, and lymphocyte circulation increases. The amount and type of cytokines released will vary according to the size of the muscle involved and the regularity, duration, and intensity of exercise. Because exercise increases blood and lymph flow, it also boosts immune cells' circulation throughout the body. These immune cells are then able to find harmful bacterial and viruses and get rid of them. Therefore, no matter our age or health status, everyone should make physical activity a priority.

The three primary forms of exercise are aerobic, strength training, and flexibility or stretching. Your exercise routine should include a mixture of all three forms.

Aerobic Exercise: Provides many health benefits. It increases the heart rate and breathing rate, providing the heart and lungs a workout while increasing endurance. Additionally, it helps relax blood vessel walls, lowers blood pressure, burns body fat, lowers blood sugar levels, reduces inflammation, boosts mood, and increases HDL cholesterol. Aim for at least 30 minutes a day of aerobic physical activity.

Strength Training: Muscle loss is a natural process of aging. Therefore, it is essential to make strength training a priority. In addition to strengthening your muscles, it will stimulate bone growth, improve balance and posture, reduce stress, and assist with weight control. Set a goal to engage in muscle-strengthening activities two to three times/week.

Flexibility/Stretching:

As we age, our muscles shorten and don't function properly, leading to the loss of flexibility of the muscles and tendons. This process increases the risk of muscle cramps and pain, muscle damage, and joint pain, as well as the risk of falls.

Regular stretching helps maintain flexibility, range of motion and reduces pain and risk for injury. Set a goal to stretch daily or at a minimum 4 times/week.



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Healthy Behaviors for a Healthy Immune System



Sleeping Well

Adequate, quality sleep is essential for our health and wellbeing. Sleep impacts every aspect of our being. It is vital for our brain and heart health, mood and physical function, and our immune system.

Sleep contributes to both innate and adaptive immunity. During sleep, the body releases cytokines to fight infection and inflammation. Without adequate sleep, the body produces fewer cytokines making you more susceptible to illness.

When individuals have difficulties such as insomnia, sleep apnea, or issues snoring that interfere with sleep, they should speak with their healthcare provider. Individuals who do not get adequate sleep are at risk of developing obesity, heart disease, high blood pressure, and diabetes.

Sleep Hygiene

Sleep hygiene refers to your sleep habits. Your sleep environment and your behaviors throughout the day, especially those before bedtime, can significantly impact your quality of sleep. Making a few adjustments in your sleep hygiene can help you get a goodnight's sleep.

Managing Stress

How we deal with and manage stress is important to our health because stress affects the immune system's ability to fight off antigens. As part of the stress response, hormones are released to help the body recover. However, chronic stress weakens the immune system, increasing susceptibility to infection, disease and increasing the time it takes to recover from an illness or injury.

Tips to Improve Your Quality of Sleep

- Create a relaxing bedtime routine.
- Have a consistent bedtime. Go to bed early enough to get at least 7 hours of sleep.
- Go to bed at about the same time each night, and get up at the same time each morning, including on the weekends.
- Avoid large meals, caffeine, and alcohol before bedtime. Caffeine will persist for several hours after consumption and can interfere with your sleep.
- Create a good sleep environment: Keep your bedroom dark, quiet, relaxing, and at a comfortable temperature, between 60-67 °F.
- Turn off electronic devices at least 30-60 minutes before bedtime. Electronic devices emit blue light, reducing melatonin levels, making it more difficult to fall asleep.
- Get the recommended amount of exercise. Being physically active during the day can help you fall asleep more easily at night and help you have quality sleep.



Gain insight into what situations make you feel stressed and plan ahead how you can cope with them. Making healthy choice when dealing with stressful situations and decrease your stress levels.

Tips to Manage Stress

- Eat healthy. Reduce caffeine and added sugar, increase fruits and vegetables.
- Get regular exercise.
- Get quality sleep.
- Stay hydrated.
- Limit/avoid alcohol intake

Nutrition for a Healthy Immune System

When you think about preventing or managing a cold or illness, maybe you think about a certain food or drink. Orange juice? Soup? Or maybe lemon lime soda? Some of their components, such as certain vitamins or minerals, may play a role in immune support. However, it's important to know that



there is no one food or drink that has the capability to prevent or cure illness. To maintain a healthy immune system, focus on a combination of micronutrients, antioxidants, prebiotics, probiotics, water and a wide variety of food intake



Micronutrients are essential to the development, maintenance and optional functioning of our immune cells, but when the nutrient is not there, or not there in the right amounts, it can lead to risk of infection.

Macronutrients

- Carbohydrate
- Protein
- Fat

Micronutrients

- Vitamins
- Minerals

Micronutrients - Play a Critical Role in Immune Function

Minerals:

Iron, selenium, copper and zinc

Vitamins:

A, C, D, E, folic acid, B2, B6 and B12

Antioxidants - Play a Critical Role in Immune Function

Vitamins A, C, & E, selenium, carotenoids and lycopene

Antioxidants can be man-made or natural substances that may prevent or delay some types of cell damage. This cell damage is caused by free radicals, which are produced naturally in the body during the metabolism process. Free radicals can contribute to age-related diseases, such as heart disease, cancer, or diabetes. Antioxidants fight off free radicals. They are our bodies defense system!!



Images: Pixabay

Prebiotics and Probiotics Play a Critical Role in Immune Function

About 70% of your immune system lives in your gut! Gut bacteria (which may be called gut flora or microbiota) helps your immune system's T-cells develop. T-cells are one of our body's main types of immune cells.

Prebiotics

The "food" for probiotics
Bananas, onions, garlic, honey, etc.

Probiotics

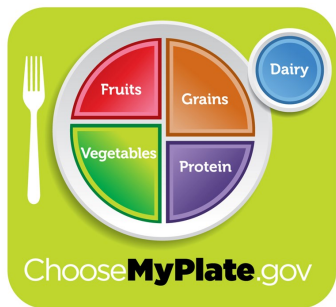
Live "good" bacteria
Yogurt, kefir, kombucha, etc.

Additional Notes:



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Nutrition for a Healthy Immune System



Follow MyPlate and Hydrate!

When it comes to feeding yourself with the best defense, it boils down to eating a wide variety of foods and maintaining hydration.

- Use MyPlate as your guide and include a variety of whole grains, fruits, vegetables, lean proteins, and dairy every day.
- Drink water; choose low or no-sugar drinks, and drinks with important nutrients

Should I take a Supplement or Herbal Remedy?

For the general population, no. But, if your physician determines that you are at risk of nutrient deficiency or tests indicate that you are deficient in a certain micronutrient, than a supplement may be warranted. Remember, just as no food or drink can prevent or cure illness, no supplement or herbal remedy can either.

Additional Resources:

USDA 2025 Dietary Guidelines for Americans: www.dietaryguidelines.gov/

CDC Healthy Eating: www.cdc.gov/healthyweight/healthy_eating/index.html

USDA MyPlate: www.myplate.gov/myplate-plan



Image source: Pixabay, 2020

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Created by:

Diane Reinhold, MPH, MS, RDN, University of Illinois Extension, Educator, Nutrition & Wellness
Serving Jo Daviess, Stephenson & Winnebago Counties

Jenna Smith, MPH, RDN, University of Illinois Extension, Educator, Nutrition & Wellness
Serving Livingston, McClain and Woodford Counties

12/2020

Taste Recipes



Image source: TasteofHome, 2020

Spinach & Orzo Salad

Prep time: 20 minutes **Total time:** 1 hour 20 minutes
Servings: 6, ½ cup servings

Directions

1. Wash hands with warm water and soap.
2. Prepare orzo according to package directions, drain and rinse with cold water.
3. Rinse, drain and pat-dry spinach. Tear into bite sized pieces. Place spinach in medium bowl.
4. Wash, drain & dry cherry tomatoes. Cut into halves or quarters.
5. Finely dice red onion, add to spinach.
6. Add pine nuts and feta cheese to salad.
7. In a separate bowl whisk together balsamic vinegar, extra virgin olive oil, pepper, and basil.
8. Add dressing to vegetable mixture and gently toss to coat.
9. Cover and refrigerate for at least 1 hour prior to serving cold.

Ingredients

- 1 (12 ounce) package orzo pasta
- 1 package fresh baby spinach
- 1 cup cherry tomatoes
- 1/3 medium red onion
- ¾ cup pine nuts
- 1 cup crumbled feta cheese
- ½ teaspoon dried basil
- ½ teaspoon black pepper
- ½ cup extra virgin olive oil
- ½ cup balsamic vinegar

Nutrition Information per serving: 390 calories, 26.9 grams total fat, 25 mg cholesterol, 349 mg sodium, 49 grams total carbohydrates, 3.3 grams dietary fiber, 15.8 grams protein.

Fresh Kale & Vegetable Salad

Prep time: 25 minutes **Total time:** 30 minutes
Servings: 5, ½ cup servings

Ingredients

- 2 tablespoons fresh lemon juice
- 1 tablespoon cider vinegar
- 4 teaspoon olive oil
- 1 teaspoon maple syrup
- 2 teaspoons fresh ginger root, chopped
- 2 Tablespoons red onion, diced
- 2 cups kale, chopped
- ½ cup cauliflower, chopped
- ½ cup broccoli, chopped
- ½ cup red cabbage, shredded
- ¼ cup fresh cilantro, chopped
- ½ cup carrots, shredded

Directions

1. Wash hands with warm water and soap.
2. Wash and prep vegetables.
3. Combine lemon juice, vinegar, olive oil, maple syrup, and ginger in large bowl; whisk well.
4. Add kale, cauliflower, broccoli, cabbage, carrots, onion, and cilantro to dressing, toss to coat well.

Nutritional Information per serving: 60 calories, 4 grams total fat, (0.5 grams saturated fat), 0 mg cholesterol, 20 mg sodium, 5 grams carbohydrates, 1 gram dietary fiber, 1 gram protein



Image source: Julia'sAlbum, 2020



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