



**RDN Resources for Consumers:**

# Vegetarian Nutrition and Immune Health

The immune system is a complex network of cells, tissues, and organs that work together to protect the body. It identifies and works to kill foreign invaders, known as antigens. The innate parts of the immune system are present from birth and include blood cells that can identify bacteria and viruses, as well as skin and membranes in the nose and mouth that act as physical barriers. Immunity is also acquired after the body has been exposed to a particular antigen and the immune system has learned to recognize it; this means the body can now resist that particular infection. This is referred to as the adaptive immune system.

An important part of the adaptive immune system is the gut microbiome which consists of the bacteria that live in your digestive tract. The foods you eat can affect these bacteria and studies show that people following vegetarian or vegan diets have different types or quantities of gut bacteria than those who eat meat. This may be due to differences in fiber intake. Vegetarian diets are often high in fiber which comes only from plant foods.

**Vegetarian Diets and the Immune System**

Good nutrition is important for a healthy immune system and several nutrients in particular help it function properly. These are fiber, the omega-3 fatty acid alpha lipoic acid (ALA), zinc, magnesium, iron, folate, and vitamins A, B6, B12, C, D, and E. While meeting recommended intakes of these nutrients is important, consuming higher amounts doesn't seem to provide additional benefits to the immune system.

Vegetarian diets are generally higher in fiber, vitamins A and E, folate, and iron than diets that include meat. In addition, some studies have found that vegan diets are higher in vitamin C than omnivore diets.

Intakes of vitamins B12 and D, zinc, and some omega-3 fatty acids including eicosapentanoic acid (EPA) and docosahexaenoic acid (DHA) are lower in vegetarians and vegans than nonvegetarians in some studies. While iron intake of vegetarians and vegans is usually comparable to or higher than nonvegetarians, studies have found that iron stores may be lower because the type of iron found in plant foods is not as accessible to the body.

**Role of Nutrients in the Immune System**

NUTRIENT	RDA M/F, 19-50 years	ROLE IN IMMUNE FUNCTION	FOOD SOURCES	
Vitamin A	900 mcg/ 700 mcg	Supports immune system cells and skin health.	<b>Leafy green vegetables</b> Kale Collards Spinach	<b>Orange, red and yellow vegetables and fruits</b> Baked sweet potato Carrots Squash Mango Cantaloupe
Vitamin C	90 mg/ 75 mg	Supports the health of immune cells and skin integrity by stimulating collagen production.	<b>Vegetables</b> Kale Bell pepper Broccoli (cooked) Potato Spinach	<b>Fruits</b> Strawberries Kiwi Orange Guava

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Vitamin E	15 mg	Supports healthy skin and immune cell activity.	<b>Nuts and Seeds</b> Sunflower seed kernels Almonds Hazelnuts Peanuts Pecans Peanut butter	<b>Fruit and Vegetables</b> Avocado Tomato sauce  <b>Vegetable Oils</b> Wheat germ oil Sunflower oil Safflower oil
Vitamin D	15 mcg (600 IU)	Helps many different types of immune cells grow and develop properly.	<b>Nuts and Seeds</b> Hemp seeds Pumpkin seeds Pine nuts Cashews Sunflower seeds	<b>Legumes</b> Soybeans Tofu Lentils Black beans Chickpeas
Iron	11 mg/18mg	Supports immune cell function and aids in chemical signaling between immune cells for optimal communication.	<b>Nuts and Seeds</b> Pumpkin seeds Cashews  <b>Other Foods</b> Fortified Cereal Blackstrap molasses Dark chocolate	<b>Grains and Legumes</b> Amaranth Tofu White beans (cooked) Lentils (cooked) Fruits and Vegetables Prune juice Potato, with skin (baked)
Alpha-linolenic Acid	1.6g/1.1g	Is a component of the membranes of immune cells. Helps manage inflammatory responses in the body.	<b>Seeds and oils</b> Flaxseed oil Chia seeds	Walnuts Flaxseed
Fiber	25g	When fermented by gut bacteria, has been shown to decrease inflammatory markers in the body. Plays a role in gut health and immune support throughout the body.	<b>Fruits</b> Dried prunes Orange Apple  <b>Vegetables/Beans</b> Kidney beans Split peas Lentils Peas, green Carrots Kale Spinach, cooked	<b>Grains</b> Brown rice Whole-wheat bread Oatmeal Shredded wheat  <b>Nuts</b> Almonds Walnuts

### Example of an Immune System-Supporting Vegetarian Menu

#### Breakfast

##### **Overnight Oats**

- ½ cup rolled oats
- 1 cup fortified soy milk
- ½ cup strawberries
- 1 tbsp chia seeds
- 1 tbsp hemp seeds
- 1 ½ tbsp nut butter
- 1 cup of vitamin D fortified orange juice

#### Snack

##### **Raw veggies with hummus**

- ½ cup sliced bell pepper
- ½ cup sliced carrots
- ½ cup hummus

#### Lunch

##### **Vegetable Wrap**

- 1 whole-grain tortilla
- ¼ cup guacamole
- ½-1 cup leafy greens (kale, spinach, etc)
- 4oz tempeh
- ½ tomato, sliced
- ½-1 cup sprouts

##### **Side of fruit**

- Ex: 1 banana, 1 orange, 1 cup grapes

#### Snack

##### **Yogurt with chopped nuts and dried fruit**

- 5oz yogurt

- 1 oz chopped nuts

- ¼ cup dried fruit

#### Dinner

##### **Chickpea Sweet Potato Curry with brown rice**

- ½ cup chickpeas
- ½ cup diced tomatoes
- ½ cup coconut milk
- ¼ cup sweet potato
- ¼ cup carrots
- ¼ cup broccoli
- 1 cup spinach
- ½ brown rice