

# CHOLINE

## What Does Choline Do?

Choline is a multipurpose nutrient that makes up part of the coating on cells, known as the cell membrane. It also plays a key role in:

- ▶ metabolism and energy production
- ▶ communication between different body systems, such as the muscle and nervous system
- ▶ brain development, memory, and mood

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### TIPS FOR GETTING MORE CHOLINE

- ▶ Make an omelet with broccoli and low-fat cheese.
- ▶ Use edamame and shiitake mushrooms in stir-fries.
- ▶ Include garbanzo beans, kidney beans, or lentils in soups and stews.
- ▶ Plan meals that include seafood (such as shrimp or salmon) 2 times per week.
- ▶ Try a side of collard greens or Swiss chard with steak or pork chops.



## Who Is at Risk for Choline Deficiency?

Many Americans consume less than the recommended amount of choline. However, deficiency is rare since the body is able to produce some choline of its own.

Pregnant women are at higher risk of choline deficiency, so it is important to ask a health-care provider if a prenatal vitamin is needed and includes enough choline.

## How Much Choline Do You Need?

### Recommended daily amounts of choline:

Children 4- to 8-years-old:	250 milligrams (mg)
Adolescents 9- to 13-years-old:	375 mg
Males 14-years-old and older:	550 mg
Females 14- to 18-years-old:	400 mg
Females 19-years-old and older:	425 mg

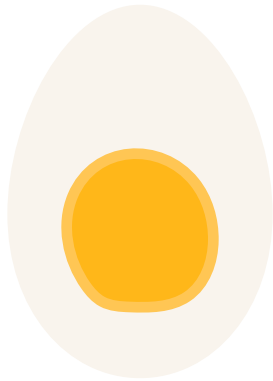
### For females who are pregnant or breastfeeding:

Females 14-years-old and older:	
during pregnancy:	450 mg
while breastfeeding:	550 mg

It is possible to consume too much choline. The Tolerable Upper Intake Level (UL) varies depending on age group. For adults (ages 19 and older), no more than 3,500 mg per day should be consumed.

Side effects of too much choline may include fishy body odor, nausea and vomiting, low blood pressure, and possible liver damage.

## Which Foods Have Choline?



Food	Milligrams (mg) per serving
Beef liver, pan-fried, 3 ounces	356
Egg, hard boiled, 1 large egg	147
Beef top round, separable lean only, braised, 3 ounces	117
Soybeans, roasted, ½ cup	107
Chicken breast, roasted, 3 ounces	72
Beef, ground, 93% lean meat, broiled, 3 ounces	72
Fish, cod, Atlantic, cooked, dry heat, 3 ounces	71
Mushrooms, shiitake, cooked, ½ cup pieces	58
Potatoes, red, baked, flesh and skin, 1 large potato	57
Wheat germ, toasted, 1 ounce	51
Beans, kidney, canned, ½ cup	45
Quinoa, cooked, 1 cup	43
Milk, low-fat (1%), 1 cup	43
Yogurt, vanilla, fat-free, 1 cup	38
Brussels sprouts, boiled, ½ cup	32
Broccoli, chopped, boiled, drained, ½ cup	31
Cottage cheese, fat-free, 1 cup	26
Fish, tuna, white, canned in water, drained in solids, 3 ounces	25
Peanuts, dry-roasted, ¼ cup	24
Cauliflower, 1-inch pieces, boiled, drained, ½ cup	24
Peas, green, boiled, ½ cup	24
Sunflower seeds, oil roasted, ¼ cup	19
Rice, brown, long-grain, cooked, 1 cup	19
Bread, pita, whole-wheat, 1 large (6½ inch diameter)	17
Cabbage, boiled, ½ cup	15
Tangerine (mandarin orange), sections, ½ cup	10
Beans, snap, raw, ½ cup	8
Kiwifruit, raw, ½ cup sliced	7
Carrots, raw, chopped, ½ cup	6
Apples, raw, with skin, quartered or chopped, ½ cup	2

Source: US Department of Agriculture, Agricultural Research Service. FoodData Central, 2019.