Vitamin A Nutrition & Your Health
Michigan State University Cooperative Extension Service
Judith V. Anderson, Foods and Nutrition
Issued September 1985
4 pages

discontinued

Nutrition & Your Health
Department of Food Science and Human Nutrition

by: Judith V. Anderson, *Dr. P.H., R.D.*
Extension Food and Nutrition Specialist

Vitamin A

Michigan State University • Cooperative Extension Service • E-1854 (New) September 1985

Why do you need vitamin A?

Vitamin A is essential to your body in four ways:

- It allows your eyes to adjust to low light settings, such as when you walk into a dark room.
- It is important for growth, particularly growth of bones and teeth, and is essential for fetal development.
- It helps maintain the health of the skin and the cells that line the mouth, digestive tract, lungs and other organs.
- It is necessary in both the male and female for proper development of sperm and eggs (ova).

Eyes. In dim light, vitamin A functions as a photoreceptor in the eyes. When light reaches our eyes, vitamin A sends out the nerve impulses that result in a visual sensation. This allows you to see objects in the dark.

Growth. Children need vitamin A for growth of muscles and bones. Adults need this vitamin to help maintain and replace cells in the body. Many cells of an adult's body are being replaced regularly, including epithelial cells in body linings, red blood cells and cells of the immune system.

Pregnant women also need vitamin A for growth and proper development of the fetus.

Skin. Vitamin A helps maintain healthy skin and is necessary for proper mucus secretion from internal linings. Mucus secretions protect these cells from attack by bacteria, stomach acid and other harmful substances. Healthy skin cells are an important aspect of the body's defense system.

Physicians have been trying to find out if large doses of vitamin A will help acne sufferers. Vitamin A therapy can help, but it does not cure acne. Vitamin A in large doses is quite dangerous—serious side effects may result from taking very high doses regularly. Physicians currently do not use vitamin A therapy for longer than five to six months because of these side effects. High doses of vitamin A should be taken only under careful supervision of a physician.

Are there different types of vitamin A?

Vitamin A in its natural form is found only in animal foods. Plants do not contain the active form of vitamin A but instead an inactive form known as carotene. Carotene is also called beta-carotene and pro-vitamin A. It can be converted by the body into active forms of vitamin A when it is needed. Vitamin A is stored by the body in the liver. Carotene is also stored in the liver, but most is found in fat cells.

What are recommended intakes?

The chart below indicates the amount of vitamin A recommended for people of various ages and life stages. Men and women differ in body size and consequently their need for vitamin A.

Recommended Dietary Allowance[1] of Vitamin A Daily

Age	Recommended Allowance, IU[2]
Infant, 0-6 mos.	1400
Infant, 6-12 mos.	2000
Children, 1-3 years	2000
Children, 4-6 years	2500
Children, 7-10 years	3500
Males, 11-18 years	5000
Females, 11-18 years	4000
Adult Males, 19-50+	5000
Adult Females, 19-50+	4000
Pregnant Women	5000
Lactating Women	6000

[1]Based on the 1980 Recommended Dietary Allowances established by the National Academy of Science. These allowances are considered adequate for maintaining good nutrition for healthy individuals in the U.S. population.

[2]IU stands for International Unit, which is one way of measuring vitamin A in food.

It is recommended that most of our vitamin A intake be obtained from dark green and yellow fruits and vegetables and lowfat animal

products. Higher fat animal sources of vitamin A, such as whole milk and liver, should be eaten less frequently. Beef and calves' liver are very high in vitamin A and should be eaten only one to two times a month. Most other meats, however, contain little or no vitamin A.

The charts on pages 2 and 3 list sources of vitamin A and carotene. The serving sizes are for adults. In general, a serving for a child (2-6 years) would be approximately half the adult serving size.

Can you eat too much or too little vitamin A?

The answer to both parts of this question is yes. Too little vitamin A can inhibit growth, especially of the skeleton, and can make a person more susceptible to disease. Inadequate vitamin A intake in a pregnant woman affects not only the growth of the fetus, but also proper tooth formation.

One of the earliest indications of insufficient vitamin A intake is the inability of the eyes to adjust to changes in light. This condition is known as night blindness.

Severe vitamin A deficiency is usually seen only in poverty situations. It can lead to very severe eye and skin problems.

Overconsumption of liver or high doses of vitamin A in the form of vitamin supplements can be very harmful. For people who do not eat liver, the greater risk is from taking high doses of supplements.

It is recommended that adults ingest no more than 25,000 IU of vitamin A each day. An occasional high intake is all right, but daily high intakes are harmful. Excess vitamin A is stored in the liver. When stores overflow, excess vitamin A goes into circulation in the body and produces toxic effects in many cells.

Signs of a toxic reaction to vitamin A will appear in just two to three months in adults taking 50,000 IU vitamin A each day, or in children taking 10,000 IU each day.

Early toxic symptoms are similar to those of a brain tumor. Increased pressure in the brain causes headaches and vomiting, blurred vision and a general lack of responsiveness. Liver and bone damage and death are possible at very high dosage levels.

Pro-vitamin A or carotene from vegetable and fruit sources will not impair health by causing toxic reactions. However, adults who continually consume more than 3,000 IU of vitamin A from

Food sources of vitamin A

(Animal sources)

Food	Serving Size	IU
Beef liver, *cooked*	2 oz.	30,280
Butter	1 tsp.	145
Calves' liver, *cooked*	2 oz.	18,530
Cheese, *cheddar or American*	1 oz.	275
Cheese, *cottage, creamed*	½ cup	210
Chicken liver, *cooked*	¼ cup	5,731
Chicken, *meat with skin*	3 oz.	80
Cod liver oil	1 Tbsp.	11,904
*Cream, *coffee*	1 Tbsp.	108
*Cream, *heavy whipping (unwhipped)*	1 Tbsp.	230
*Cream, *sour*	1 Tbsp.	113
Egg	1 med.	265
Ice cream, *10% fat*	2/3 cup	363
Ice milk, *hardened*	2/3 cup	142
Ice milk, *soft serve*	2/3 cup	117
Liverwurst	2 Tbsp.	1,790
Margarine	1 tsp.	156
Milk, *whole*	1 cup	350
Milk, *lowfat, 2%, fortified with vitamin A*	1 cup	500
Milk, *nonfat skim, ½% or 1%, fortified with vitamin A*	1 cup	500
Milk, *nonfat dry milk powder*	1/3 cup	537
Milk, *evaporated*	1/2 cup	405
Oysters	15 (¾ cup)	555
Sardines	3 oz.	190
Yogurt, *lowfat from skim milk*	1 cup	150
Yogurt *from whole milk*	1 cup	340

**Imitation creamers, whipped topping and sour cream have very little vitamin A and therefore should not be counted when calculating the vitamin A in your diet.*

Food sources of vitamin A

(Plant sources: *carotene*)

Food	Serving Size	IU
Apricots, *canned (water pack)*	½ cup	2,251
Apricots, *dried*	½ cup	7,085
Asparagus, *canned*	½ cup	940
Banana	1 average	226
Beans, lima, *cooked*	½ cup	198
Beans, snap green	½ cup	317
Blackberries, *fresh*	½ cup	144
Broccoli, *cooked*	½ cup	1,847
Brussels sprouts, *cooked*	½ cup	223
Cantaloupe, *fresh*	½ cup	2,720
Carrots, *cooked*	½ cup	9,881
Carrots, *raw*	1 medium	8,910
Corn, *cooked*	½ cup	289
Corn-on-cob, *cooked*	1 medium	308
Lettuce, bibb or leaf	½ cup	267
Lettuce, *chopped*	½ cup	91
Lettuce, crisp head	1/6 head	297
Orange	1 average	262
Orange juice	½ cup	246
Peaches, *canned, light syrup or water*	½ cup	549
Peas, green, *cooked*	½ cup	432
Pepper, green, *raw*	½ cup	315
Pumpkin, *canned*	½ cup	7,840
Spinach, fresh *(and other greens)*	½ cup	2,227
Squash, *summer, cooked*	½ cup	351
Squash, *winter, cooked*	½ cup	4,287
Sweet potatoes, *boiled*	½ cup	10,072
Sweet potatoes, *canned*	½ cup	7,800
Swiss chard, *raw*	½ cup	1,787
Tangerine	1 average	362
Tomatoes, *canned*	½ cup	1,084
Tomatoes, *fresh*	1 medium	333
Tomato juice	½ cup	976
Vegetable juice cocktail	½ cup	854

carotene sources may observe yellowish deposits on their hands and feet. This amount is equivalent to eating 1 carrot, or ½ cup of winter squash, sweet potato or pumpkin every day over a period of months. This yellow staining is not harmful to your health.

Does vitamin A or Beta-carotene prevent cancer?

The relationship between vitamin A, beta-carotene and the development of cancer is a current area of research. A growing body of evidence suggests a relationship between eating an adequate amount of dark green and deep yellow vegetables and protection against some forms of cancer. How vitamin A protects the body is unknown. If there is a benefit, it apparently comes from eating appropriate foods rather than taking vitamin A supplements. Eating foods that help maintain the body in good health helps protect the body against harmful agents. These relationships are still the subject of much research and have not yet been proven conclusively.

There is a growing body of evidence however, that suggests that increasing the consumption of dark green and deep yellow fruits and vegetables is beneficial to health. Vitamin A is not currently used as a treatment for cancer because of the toxic potential of massive doses.

Ways to increase your family's consumption of vegetables.

- Try serving vegetables raw rather than cooked. Eat them with a dressing or dip.
- Try mixing other greens, such as spinach or kale, with lettuce used for salads. Add green or yellow vegetables, such as peppers, broccoli tops or shredded carrots.
- Use more vegetables and less meat in meat-vegetable casseroles.
- Serve vegetables with a sprinkle of shredded or grated cheese.
- Choose vegetable juice cocktail instead of soda pop or sweet drinks. It is very low in calories, also.
- Keep carrot and other vegetable sticks in your refrigerator for instant snacks. Store them in water in a covered container to keep them fresh.

References

Olson, J.A. Vitamin A. Chapter 13 in *Present Knowledge in Nutrition.* Washington, D.C.: The Nutrition Foundation, 1984.

Leville, G.A.; Zabik, M.E.; and Morgan, K.J. *Nutrients in Foods.* Cambridge, Mass.: The Nutrition Guild, 1983.

Rivers, J.M., and Collins, K.K. *Planning Meals That Lower Cancer Risk: A Reference Guide.* Washington, D.C.: American Institute for Cancer Research, 1984.

Zile, M.H., and Cullum, M.E. The functions of vitamin A: Current Concepts. *Proceedings of the Society for Experimental Biology and Medicine,* 1983, 172:139-152.

MICHIGAN STATE UNIVERSITY ES COOPERATIVE EXTENSION SERVICE

MSU is an Affirmative Action/Equal Opportunity Institution. Cooperative Extension Service programs are open to all without regard to race, color, national origin, sex, or handicap. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824.

New 9:85-5M-KMF-CP, Price 20¢, Single Copy Free to Michigan Residents