There Is No Toxic Vitamin A or Iron In Multivitamins Sold in US Natural Food Stores

by Michael Mooney, August, 2010

In response to rumors about some vitamins and minerals, such as vitamin A (retinol) and iron being "toxic," be assured that there are no toxic doses of vitamin A or iron in any multivitamin sold in natural food stores in the United States.

How can I say this? Simple. The United States National Academy of Sciences Institute of Medicine has very conservative definitions of what nutrient doses may cause toxic effect with long-term use. This safe-dose level was arrived at after reviewing thousands of studies conducted over dozens of years.

This definition tells us what vitamin and mineral doses could cause toxicity.
Lowest Observed Adverse Effect Level (LOAEL) - a dose where toxicity "*…may occur rarely, but for some sensitive sub-groups it does occur"* when taken over a period of time;

For vitamin A, the Lowest Observed Adverse Effect Level is 21,600 IU. Since there are no multivitamins sold in the United States that contain more than 5,000 IU of vitamin A (retinol), there is no toxic vitamin A in any multivitamin sold in the United States. Therefore, Vitamin A in multivitamins only supports overall health.

For iron, the Lowest Observed Adverse Effect Level is 100 mg. Since there are no multivitamins that contain more than 40 mg of iron that are sold in the United States, there is no toxic iron in any multivitamin in natural foods stores in the United States.

The same thing is true for all the other vitamins and minerals that are contained in multivitamins sold in the United States, as shown by the table on the next page. The bottom line is that natural foods stores are only selling products that make us healthier, not "toxic" products.

Vitamin A And Birth Defects: Vitamin A Can Reduce Birth Defects
A question about toxicity related to birth defects was created in 1995, when a study by Rothman caused a misunderstanding that vitamin A above 10,000 IU per day could cause birth defects. [1] This quickly reverberated throughout the natural products industry and the medical community, causing the world scientific community to re-evaluate vitamin A's role in pregnancy.

Therefore, Sharon Ross of the FDA, with scientists from the National Cancer Institute, the National Institutes of Health, and Harvard Medical School re-evaluated all studies that looked at vitamin A and pregnancy, including the Rothman study. They subsequently dismissed the Rothman study, saying "*"…there are a number of methodological questions concerning the study that prevent reaching the conclusion that the dosages of vitamin A (10,000 IU) examined in the study cause certain types of birth defects."* [2]

Subsequently, the World Health Organization dismissed the Rothman study, too, saying *"It is safe to give fertile woman as much as 10,000 IU per day at any time during pregnancy."* They further said, birth defects occur *"only at levels above 30,000 IU."* They then concluded, *"… supplements of vitamin A that are close to, but less than 10,000 IU/day… that are given as a component of a multivitamin, are much more likely to be associated with reduced, rather than increased, risk of malformations."* [3]

However, the confusion created by the Rothman study had already reverberated through the natural products industry causing many vitamin manufacturers to replace vitamin A with beta carotene.

Beta Carotene Cannot Substitute for Real Retinol Vitamin A
They apparently don't know that below 21,600 IU/day there are no reports of even minor side-effects from Vitamin A supplementation. (See safety table below). They substitute beta-carotene because they mistakenly believe that beta-carotene converts to Vitamin A easily in the body, as needed.

Surprisingly, only about half of Americans absorb and convert beta-carotene into vitamin A in their bodies. [4] [5] For those that can, conversion can be as low as 29 to 1. [6] [7] [8] So 12,000 IU of beta carotene would convert to 413 IU of retinol vitamin A. This can leave beta-carotene-only takers with a serious vitamin A deficiency.

If you want to get the U.S. Government's Daily Value (DV) of Vitamin A (5,000 IU), and if your body can actually convert the beta-carotene, you may need to take as much as 145,000 IU of beta-carotene to get the Daily Value of vitamin A.

Since beta carotene does not absorb or convert well enough to consistently provide vitamin A activity, we must take real retinol vitamin A or risk vitamin A deficiency-syndrome diseases. Vitamin A deficiency compromises the health of the eyes, lung, bones, skin and immune system.

The World Health Organization recommends that pregnant women take real retinol vitamin A because a vitamin A deficiency in pregnancy is associated with a 74 percent increased chance of premature delivery, [9] and serious problems for the baby, including life-long chronic lung disease, [10] blindness or vision problems, [11] [12] [13] and deficient immune function with an increased potential for illness or death from neonatal infections such as diarrhea, measles and respiratory infections like pneumonia.[14]

Optimal retinol intake is recommended because it guarantees the best potential for a full-term birth and the health of baby's eyes, lungs, immune system and the promise of a healthy, productive happy life.

This is a call for natural products manufacturers to bring back real retinol vitamin A.

Sincerely,
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Notes for the Vitamin and Mineral Safety Table on the next page.

DV: Daily Value (Previously RDA - Recommended Daily Allowance)
U.S. Government recommended level for good health and prevention of deficiency diseases. These dosages represent the minimum amount necessary for good health as determined by the National Academy of Sciences, acting for the U.S. Government. New nutritional research is leading some researchers and clinicians to estimate that these doses may not be high enough to support optimal health in today's stressful world.

LOAEL: Lowest Observed Adverse Effect Level
No adverse effects ever reported below this level. These dosages were determined by the Food and Nutrition Board of the Institute of Medicine to be safe for almost everyone, but "may require the application of a safety factor to calculate safe intake" for people with unusual vitamin or mineral sensitivities.

MTD: Minimum Toxic Dose
No deaths reported but some kind of toxicity is possible from one single dose at this level. These dosage levels were published in Pharmacy Times Vitamin Safety Index, May, 1985, as conservative estimates of the minimum single doses that may cause toxic effects (side effects).

The table provides (1) US Government minimum recommendations for vitamins and minerals, (2) the Lowest Observed Adverse Effect Level (LOAEL) for vitamins and minerals, and (3) The Minimum Toxic Dose (MTD).

NUTRIENT		**Daily Value** Minimum For Health	**LOAEL** Lowest Observed Adverse Effect Level	**MTD** Dose Where One Exposure May Cause Toxicity
Vitamin A	IU	5,000	21,600	25,000 – 50,000
Vitamin C	MG	60	None	2,000 – 5,000 Causes diarrhea, not true toxicity
Vitamin D	IU	400	3,800 Scientists say raise to 10,000	50,000
Vitamin E	IU	30	None	1,200 No published data supports this notion
Vitamin K	MCG	80	None	None given
Thiamine (Vit B1)	MG	1.5	None	300
Riboflavin (B2)	MG	1.7	None	1,000
Niacin (B3)	MG	20	1,000 500 Slow Release	1,000
Niacinamide (B3)	MG	20	3,000	None given
Pyridoxine (B6)	MG	2	500	2,000
Folic acid	MCG	400	None	400,000
Vitamin (B12)	MCG	6	None	None given
Biotin	MCG	300	None	50,000
Pantothenic acid (B5)	MG	10	None	10,000
Calcium	MG	1,200	5,000	12,000
Iron	MG	18	100	100
Iodine	MCG	150	None	2000
Magnesium	MG	400	None	6,000
Zinc	MG	15	60 mg	500
Selenium	MCG	70	910	1,000
Copper	MG	2	None (~385)	100
Manganese	MG	2	None	None given
Chromium (III)	MCG	120	None	None given
Molybdenum	MCG	75	None	None given

[1] Rothman K, and associates. Teratogenicity of high vitamin A intake. New England Journal of Medicine 1995 Nov 23; 333 (21); 1-5.
[2] Ross SA and associates. Retinoids in embryonal development. Physiological Reviews, Vol. 80, No. 3, July 2000, pp. 1021-1054.
[3] World Health Organization Micronutrient Initiative. Safe vitamin A dosage during pregnancy and lactation. World Health Organization 1998 WHO/Nut/98.4
[4] Lin Y, and associates. Variability of the conversion of beta-carotene to Vitamin A in women measured by using a double-tracer study design. American Journal of Clinical Nutrition 2000 Jun;71(6):1545-54.
[5] Hickenbottom SJ, and associates. Variability in conversion of ß-carotene to Vitamin A in men as measured by using a double-tracer study design. American Journal of Clinical Nutrition 2002 May:75(5): 900-907.
[6] Tang G. Bioconversion of dietary provitamin A carotenoids to vitamin A in humans. American Journal of Clinical Nutrition 2010 Mar 3.
[7] Hickenbottom SJ, and associates. Variability in conversion of ß-carotene to Vitamin A in men as measured by using a double-tracer study design. American Journal of Clinical Nutrition 2002 May:75(5): 900-907.
[8] Solomons NW. Plant sources of proVitamin A and human nutriture: How much is still too little? Nutrition Reviews 1999 Nov;57(11):350-361.
[9] Radhika MS, and associates. Effects of vitamin A deficiency during pregnancy on maternal and child health. British Journal of Gynecology 2002 Jun;109(6):689-93.
[10] Hustead VA, and associates. Relationship of vitamin A (retinol) status to lung disease in the preterm infant. Journal of Pediatrics, 1984 Oct;105(4):610-5.
[11] Weigland UW, and associates. Safety of vitamin A: recent results. International Journal of Vitamin and Nutrition Research 1998;68(6):411-416.
[12] Miller RK, and associates. Periconceptional vitamin A use: how much is teratogenic? Reproductive Toxicology 1998 Jan-Feb;12(1): 75-88.
[13] Zagre NM, and associates. Changes in vitamin A intake following the social marketing of red palm oil among children and women in Burkina Faso. Sante 2002 Jan-Mar;12(1):38-44.
[14] Azais-Braesco V, and associates. Vitamin A in pregnancy: requirements and safety limits. American Journal of Clinical Nutrition 2000 May;71(5 Suppl):1325S-233S.