NUTRITIONAL
Research Update
Volume 1, Issue 4

Vitamin A (Retinol)—Safe, Effective and Necessary for Pregnant Women

PREFORMED VITAMIN A (RETINOL): SAFE, EFFECTIVE AND NECESSARY DURING PREGNANCY

Research conclusively demonstrates that preformed vitamin A (retinol) at doses up to 10,000 IU per day is safe and beneficial during pregnancy. The following is a report on the available studies, including the conclusions and recommendations of the World Health Organization, and a clarification of misunderstandings about retinol supplementation during pregnancy.

MISUNDERSTANDINGS ABOUT RETINOL AND BIRTH DEFECTS

In 1995, a study by Rothman published in the New England Journal of Medicine raised concerns about birth defects and supplemental retinol. The Rothman study stated that "...an association [existed] between the consumption of >10,000 IU vitamin A/day from supplements and an increased risk of birth defects of all types."[1]

All other available studies said that retinol supplementation at 10,000 IU per day either did not cause birth defects or was associated with fewer birth defects.[2]

Even though the Rothman study's findings were considered controversial, concerns caused by this single study have confused the public and the natural products industry for several years.

Because of this confusion, scientists from the FDA, National Cancer Institute, National Institutes of Health, and Harvard Medical School published a review of all the available studies. They noted that the Rothman study was inconclusive: "...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]

WORLD HEALTH ORGANIZATION'S ANALYSIS

At the request of the World Health Organization, the International Vitamin A Consultative Group, a panel of scientists that advises the World Health Organization about retinol, assessed the Rothman study and the other available data and determined that no risk of birth defects occurred at 10,000 IU per day, stating:

"It is safe to give fertile women, independent of their vitamin A status, as much as 10,000 IU daily at any time during pregnancy."[3]

Subsequently, the World Health Organization produced a paper titled "Safe Vitamin A Dosage During Pregnancy and Lactation,"[4] which notes that it is generally understood that the mechanism by which retinol could cause birth defects is through the influence of high concentrations of retinol metabolites at critical points during the early development of the embryo. World Health Organization scientists stated that the concentration of retinol metabolites required to cause birth defects "...does not occur at vitamin A dosage levels of 10,000–15,000 IU, but only at levels above 30,000 IU."

The World Health Organization scientists also noted that the large registries of birth defects in Europe (the European Network of Teratology Information Services) and the US (maintained by the Centers for Disease Control and Prevention) have recorded no increase in birth defects that could be attributed to excessive intake of retinol or retinyl palmitate above 10,000 IU from multivitamins or single retinol supplements.

THE WORLD HEALTH ORGANIZATION RECOMMENDS RETINOL SUPPLEMENTATION

The World Health Organization recommends that all pregnant women in areas where vitamin A deficiency is likely should take supplemental retinol to ensure their baby's optimal health because retinol is critically needed for a healthy pregnancy.[4] Their recommendation is for a daily supplement of not more than 10,000 IU or a weekly supplement of not more than 25,000 IU.

Although a stereotype suggests that the places where women are likely to be retinol deficient are in the developing world, it is important to note that according to the most recent data from "What We Eat in America" (WWEIA), the dietary intake interview component of the National Health and Nutrition Examination Survey (NHANES), provided by the USDA on its Community Nutrition Map, only 45.7% of Americans get enough vitamin A from their diets.[5] Thus, almost 55% of women in the US who are not taking supplements with enough retinol are likely to be retinol deficient during their pregnancies.

RETINOL DEFICIENCY INCREASES RISK OF PRETERM BIRTH

Retinol deficiency is associated with a 74% increased chance of preterm delivery[6] and serious

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health problems for the baby, including chronic lung disease,[7] blindness or vision problems,[8, 9, 10] and deficient immune function with an increased potential for illness or death from neonatal infections such as diarrhea, measles and respiratory infections like pneumonia.[11]

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

THE WORLD HEALTH ORGANIZATION CONCLUDED IN THEIR REPORT:

"Recent studies strongly suggest that periconceptional supplements of vitamin A that are close to, but less than 10,000 IU/day, and that are given as a component of a multivitamin, are much more likely to be associated with reduced, rather than increased, risk of malformations."[4]

BETA-CAROTENE CANNOT SUBSTITUTE FOR RETINOL VITAMIN A

Because of the Rothman study, several vitamin manufacturers took retinol out of their prenatal formulas, leaving only beta-carotene. This change can cause a serious vitamin A deficiency because studies show that beta-carotene cannot adequately substitute for retinol. Preformed vitamin A, known as retinol, is well absorbed and efficiently used in the body. Beta-carotene is an antioxidant nutrient that is a provitamin, meaning it must be converted in the body into retinol. While beta-carotene and other carotenoids provide many health-supporting antioxidant effects in the body, they cannot be depended on as a source of vitamin A.

For instance, studies of healthy, well-fed men[12] and women[13] show that 45% experienced extremely poor beta-carotene absorption and extremely poor conversion of beta-carotene into retinol. Also, hypothyroid people are at particular risk of vitamin A deficiency because thyroid hormone is required for this conversion.[14, 15]

Additionally, beta-carotene conversion is now considered to be inadequate to consistently supply vitamin A in optimal levels even for people who do convert beta-carotene into retinol. For many years, beta-carotene had been thought to convert into retinol in the body at a rough average rate of 6 to 1 for healthy people.[16] This rate means that 10,000 IU of beta-carotene would convert to 1,666 IU of retinol. However, studies have shown that beta-carotene conversion is highly variable and in some people conversion may be as low as 29 to 1.[17, 18, 19, 20] This rate means that 10,000 IU of beta-carotene would only convert to 344 IU of retinol, far below the 5,000 IU recommended Daily Value that is required for a healthy full-term pregnancy and the health of the developing baby's eyes, lungs, bones, skin and immune system.

Some multivitamin manufacturers list beta-carotene as their vitamin A source even though it cannot be guaranteed to provide adequate vitamin A activity. Products that only contain beta-carotene can allow a serious vitamin A deficiency. Only real retinol vitamin A can satisfy the many needs for vitamin A.

SCIENTIFIC REFERENCES

1. Rothman K et al. Teratogenicity of high vitamin A intake. NEJM. 1995 Nov 23; 333 (21); 1-5.
2. Ross SA et al. Retinoids in embryonal development. Physiol Rev. 2000 Jul;80(3):1021-1054.
3. International Vitamin A Consultative Group. IVACG statement on safe doses of vitamin A during pregnancy and lactation.
4. World Health Organization Micronutrient Initiative. Safe vitamin A dosage during pregnancy and lactation. World Health Organization 1998 WHO/Nut/98.4.
5. Community Nutrition Mapping Project, CNMap, Version 2. United States Department of Agriculture.
6. Radhika MS et al. Effects of vitamin A deficiency during pregnancy on maternal and child health. BJOG. 2002 Jun;109(6):689-93.
7. Hustead VA et al. Relationship of vitamin A (retinol) status to lung disease in the preterm infant. J Pediatr. 1984 Oct;105(4):610-5.
8. Weigland UW et al. Safety of vitamin A: recent results. Int J Vitam Nutr Res. 1998;68(6):411-416.
9. Miller RK et al. Periconceptional vitamin A use: how much is teratogenic? Reprod Toxicol. 1998 Jan-Feb;12(1): 75-88.
10. Zagre NM et al. 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.
11. Azais-Braesco V et al. Vitamin A in pregnancy: requirements and safety limits. Am J Clin Nutr. 2000 May;71(5 Suppl):1325s-1333s.
12. Hickenbottom SJ et al. Variability in conversion of Is-carotene to vitamin A in men as measured by using a double-tracer study design. Am J Clin Nutr. 2002 May:75(5): 900-907.
13. Lin Y et al. Variability of the conversion of beta-carotene to vitamin A in women measured by using a double-tracer study design. Am J Clin Nutr. 2000 Jun;71(6):1545-54.
14. Mandal SK et al. Carotene and retinol levels in the diagnosis of hypothyroidism. J Assoc Physicians India 1985 Oct;33(10):654-655.
15. Aktkuna D et al. Beta-carotene, vitamin A and carrier proteins in thyroid processes. Acta Medica Austriaca 1993;20(1-2):17-20.
16. Olson JA. Bioavailability of carotenoids. Arch Latinoam Nutr. 1999 Sep;49(3 Suppl 1) :21S-25S.
17. Solomons NW. Plant sources of provitamin A and human nutriture: How much is still too little? Nutr Rev. 1999 Nov;57(11):350-361.
18. Wang Z et al. Beta-carotene-vitamin A equivalence in Chinese adults assessed by an isotope dilution technique. Brit J Nutr. 2004 Jan;91(1):121-31.
19. Brubacher GB et al. The vitamin A activity of beta-carotene. Int J Vitam Nutr Res. 1985;55(1):5-15.
20. Hickenbottom SJ. Dual isotope test for assessing beta-carotene cleavage to vitamin A in humans. Euro J Nutr. 2002 Aug:41(4):141-147.

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