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Sun Exposure Not Sufficient for Enough Vitamin D in Many Cases

Review Says Difficult to Meet Daily Requirements without Supplements or Fortification

July 15, 2013—Vitamin D supports the absorption of calcium, helping us maintain strong bones. Researchers believe vitamin D may also play an important role in preventing osteoporosis, high blood pressure, cancer, and several autoimmune diseases.

There are two forms of vitamin D important to humans: vitamin D-2 and vitamin D-3. Their chemical structure is somewhat different; however, their action and effect on the body is very similar. Vitamin D-2 is synthesized by plants. Vitamin D-3 is synthesized by humans in the skin when it is exposed to ultraviolet B rays from sunlight. Vitamin D-3 is also available from animal food products.

The U.S. Recommended Dietary Allowance for vitamin D is 15 micrograms per day. Traditionally, humans have gotten most of their vitamin D from the action of sunlight on their skin. However, a recent review, "Natural Vitamin D Content in Animal Products," published in *Advances in Nutrition*, notes that "in view of the current Western lifestyle with most daily activities taking place indoors, sun exposure is often not sufficient for adequate vitamin D production." The increasing use of sunscreens, prompted by growing concern over skin cancer, may also inhibit the body's ability to synthesize vitamin D.

In the United States, milk is typically fortified with vitamin D. Breakfast cereals are often fortified as well. Many countries, including EU countries, do not fortify foods with vitamin D, making it particularly difficult for consumers to get adequate levels. Even in the United States, consumers who tend to stay indoors and who eat limited or no fortified foods will have difficulty obtaining adequate levels of vitamin D without supplementation.

Authors Alexandra Schmid and Barbara Walther point out that the highest levels of vitamin D are found in fatty fish such as salmon, tuna, and mackerel. Concentrations of vitamin D are particularly high in fish liver. High levels of vitamin D are also found in offal, including kidneys and liver; however, these foods are less common in contemporary Western diets. Vitamin D concentrations in muscle meat are considerably lower. Eggs, butter, and cheese are other good sources of vitamin D.

Because recommendations for vitamin D intake have recently been increased considerably, the possibility of satisfying these recommendations with food sources has become quite difficult, particularly for consumers who spend much of their time indoors and who do not eat fortified foods. The authors of this review call for research to improve and optimize the vitamin D content in dairy products and meat to

ensure that all consumers receive adequate levels of vitamin D, particularly in countries that do not fortify foods with vitamin D.

Is the Iron in Red Meat Causing Type 2 Diabetes?

Review finds that compounds in processed red meat may be the real culprit

Ten percent of all adults in the world have type 2 diabetes, accounting for 12% of global health care spending. Unfortunately, as obesity levels continue to rise, epidemiologists and public health researchers predict that rates of type 2 diabetes will continue to climb as well. Recently, scientists have been examining the role of iron in the development of type 2 diabetes, sparked by the observation that diabetes is often associated with elevated levels of serum ferritin, a protein that stores and enables the body to use iron. Moreover, diabetes frequently develops in individuals with diseases associated with excess iron intake.

There are two types of dietary iron: heme iron and nonheme iron. Heme iron is found in animal products such as red meat, fish, and poultry. Nonheme iron is derived from plants such as beans and lentils. Iron-fortified cereals typically contain nonheme iron. Research has found no link between nonheme iron intake and diabetes. On the other hand, research has found an association between heme iron intake and the risk of type 2 diabetes, an association that is particularly strong with the consumption of iron-rich red meats.

The authors of "Red Meat, Dietary Heme Iron, and Risk of Type 2 Diabetes: The Involvement of Advanced Lipoxidation Endproducts," a review published in the July 15, 2013 issue of *Advances in Nutrition,* set out to examine the current research in order to determine why consumption of red meat products with high levels of heme iron might be linked to diabetes.

The authors noted that humans have evolved to consume a plentiful supply of iron from diets rich in muscle tissue from meat. Why then should heme iron be linked to an increased risk of type 2 diabetes? According to the authors, "it seems unlikely to be due to elemental iron itself, considering the high levels consumed in ancient diets and the body's ability to regulate dietary absorption of both heme and nonheme iron to match requirement."

According to the review, processed meats such as hot dogs, sausages, and bacon may increase the risk of type 2 diabetes as a result of their higher levels of advanced glycation endproducts (AGEs). AGEs represent a group of compounds known to have inflammatory and pro-oxidant effects in the body. They are produced during the processing and cooking of red meat. Heme iron also plays a role in the formation of AGEs, which likely explains the positive association between heme iron and diabetes.

In conclusion, the authors found that iron-rich red meats in general do not appear to be strongly linked to an elevated risk of developing diabetes. However, once these meats are subject to high heat and processing, they develop compounds that do appear to make consumers more prone to type 2 diabetes.

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