



## **Mushrooms Have Vitamin D**

Many of us are aware that vitamin D is essential for bone health and strong teeth. Although there are many gaps in our understanding of other health effects of vitamin D, new research suggests that higher levels of the vitamin may also be important for helping to prevent chronic diseases and conditions including certain cancers, heart disease, diabetes and multiple sclerosis.<sup>1</sup> Lately scientists have been finding that many of us may not be getting enough vitamin D, particularly if we live in more northern climates, are older, spend most of our time indoors, have darker skin or have diets low in the vitamin.<sup>2</sup>

We get our vitamin D from two sources: exposure to sunlight, which allows the body to produce its own vitamin D using ultraviolet light and cholesterol in the skin; and a limited number of food sources including fortified milk, fish, eggs and mushrooms. Mushrooms are the only vegetable that contain natural vitamin D. They contain a compound called ergosterol that is turned into vitamin D in the body.<sup>3</sup>

Currently, the Adequate Intake (AI)\* for vitamin D for adults to age 50 is 5 mcg per day (200 IU). It increases to 10 mcg (400 IU) per day for those 51-70 years and 15 mcg (600 IU) per day for those older than 70 years. Health Canada encourages everyone over the age of 50 to take a daily supplement of 400 IU of vitamin D.<sup>4</sup> It is important to note however that vitamin D can be toxic in excess amounts so caution is imperative. The Tolerable Upper Limit (UL) for safety currently recommended by the Food and Nutrition Board, Institute of Medicine National Academies is 50 mcg (2000 IU) per day for adults.<sup>5</sup> This includes both vitamin D from food sources and supplements. Some medications such as corticosteroids, weight loss and cholesterol-lowering drugs, can interfere with the absorption of vitamin D.<sup>6</sup> If you are unsure about how much vitamin D you should be getting consult with your physician, pharmacist or a registered dietitian.

A 100 gram serving (approximately ½ cup) of sliced fresh raw white mushrooms has 7 IU of vitamin D.<sup>7</sup> Remember that every little bit adds up to better health. Recent studies have shown that the level of vitamin D in both white and brown mushrooms can be boosted significantly by exposure to ultraviolet light.<sup>8</sup> Ongoing research is being conducted to determine the appropriate UVB light dosage to increase the vitamin D content of fresh mushrooms up to 100% of the Daily Value or 400 IU.<sup>9</sup>

### ***Fresh Mushrooms Can Help!***

#### Combating Cancer

- A double-blind, randomized, placebo-controlled trial published in 2007 in the American Journal of Clinical Nutrition found that women who took a calcium

supplement that contained 1100 IU vitamin D had a significantly lower incidence of cancer over 4 years compared to women taking a placebo.<sup>10</sup>

- Another study found that colorectal cancer mortality was inversely related to higher blood levels of vitamin D.<sup>11</sup>
- While this is great news, much more research is needed to confirm these results.

#### Diabetes Defense

- Researchers in the U.K. found that dietary vitamin D supplementation was associated with a reduced risk of type 1 diabetes in children.<sup>12</sup>
- Analysis of data from the Nurses' Health Study in the U.S. found that a combined daily intake of >1200 mg calcium and >800 IU vitamin D was associated with a 33% lower risk of type 2 diabetes compared to an intake of <600 mg calcium and 400 IU vitamin D.<sup>13</sup>

#### Potential Possibilities

- Results from the Iowa Women's Health Study showed an inverse relationship between both dietary and supplemental vitamin D and risk of rheumatoid arthritis.<sup>14</sup>
- A study conducted at the Harvard School of Public Health in Boston found evidence that vitamin D intake may have a protective effect on risk of developing multiple sclerosis in women.<sup>15</sup>

#### *Mushrooms Make a Difference*<sup>16</sup>

- Add 1 cup sliced white button mushrooms to your green salad.  
**Benefit: - boost vitamin D by 13 IU**
- Use ½ cup sliced shiitake mushrooms instead of sausage in pasta sauce or on pizza.  
**Benefit: - boost vitamin D by 96 IU**
- Layer ¾ cup sliced sautéed fresh white mushrooms onto grilled steak or chicken.  
**Benefit: - boost vitamin D by 17 IU**

#### *Make it with Mushrooms:*

- Add finely chopped fresh white button mushrooms to your favorite savoury muffin mixture.
- For a healthy and quick snack, quarter fresh white button mushrooms and serve with a low-fat salad dressing or dip.
- Give your next wrap or sandwich some extra crunch by including some delicate enoki mushrooms.
- Use your mushroom trimmings to add incredible flavor to soups, stews and gravies by making and freezing mushroom stock. (simmer chopped onion, carrot and celery with trimming (stems, gills) from a variety of mushrooms and water; strain; cool and portion into freezer-safe containers for later use)
- Include finely chopped fresh white button, portabella or shiitake mushrooms in meatloaf and hamburger patties for more flavour.

#### *Recipe Suggestion:*

**Grilled Mushroom, Cheese and Spinach Panini** (recipe on [www.mushrooms.ca](http://www.mushrooms.ca))

For more mushroom nutrition information, great tips and delicious recipes visit [www.mushrooms.ca](http://www.mushrooms.ca).

For more about vitamin D visit [www.vitaminD.org](http://www.vitaminD.org) or Health Canada website at [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca).

\* Adequate Intake (AI): established when evidence is insufficient to develop a Recommended Dietary Allowance (RDA) and is set at a level assumed to ensure nutritional adequacy.

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<sup>1</sup> Zitterman A. Review article: Vitamin D in preventive medicine: are we ignoring the evidence? *British Journal of Nutrition* 2003;89:552-572.

<sup>2</sup> PhD, MD, Holick MF. High Prevalence of Vitamin D inadequacy and Implications for Health. *Mayo Clin Proc.* 2006;81(3):353-373.

<sup>3</sup> Mahan LK & Escott-Stump S. Krause's Food Nutrition & Diet Therapy, 11<sup>th</sup> Edition, Saunders, 2004. Chapter 4 – Vitamins, page 83-88.

<sup>4</sup> Press Release. June 15, 2007 Vitamin D and Health Information Update, accessed at [www.hc-sc.gc.ca/ahc-asc/media/advisories-avid/2007/2007\\_72-eng.php](http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avid/2007/2007_72-eng.php).

<sup>5</sup> National Academy of Science, 2002. Dietary Reference Intake Tables. Accessed at the United States Department of Agriculture, Food & Nutrition Information Center website. PDF table of copies is provided. Accessed at: [http://fnic.nal.usda.gov/nal\\_display/index.php?info\\_center=4&tax\\_level=2&tax\\_subject=256&topic\\_id=1342](http://fnic.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=2&tax_subject=256&topic_id=1342).

<sup>6</sup> National Institutes of Health. Dietary Supplement Fact Sheet: Vitamin D. Accessed at [http://ods.od.nih.gov/factsheets/VitaminD\\_pf.asp](http://ods.od.nih.gov/factsheets/VitaminD_pf.asp)

<sup>7</sup> USDA National Nutrient Database for Standard Reference <http://www.nal.usda.gov>

<sup>8</sup> Beelman R, Kalaras M. Post-harvest Vitamin D Enrichment of Fresh Mushroom. Department of Food Science. Penn State University.

[http://www.mushroominfo.com/nutrition/PSU\\_Vit\\_D\\_Mushroom\\_Study.pdf](http://www.mushroominfo.com/nutrition/PSU_Vit_D_Mushroom_Study.pdf)

<sup>9</sup> Ibid.

<sup>10</sup> Lappe JM, Travers-Gustafson D, Davies KM, Recker, RR and Heaney RP. Vitamin D and calcium supplementation reduces cancer risk: results of a randomized trial. *Am J Clin Nutr* 2007;85:1586-91.

<sup>11</sup> Freedman DM, Looker AC, Change SC and Graubard BI. Prospective study of serum vitamin D and cancer mortality in the United States. *J Natl Cancer Inst.* 2007;99(21):1594-602. [abstract only]

<sup>12</sup> Hyppönen E, Läärä E, Reunanen A, Järvelin MR, and Virtanen SM. Intake of vitamin D and risk of type 1 diabetes: a birth-cohort study. *Lancet* 2001;358(9292):1500-3. [abstract only]

<sup>13</sup> Pittas, AG, Dawson-Hughes B, Li T et al. Vitamin D and Calcium Intake in Relation to Type 2 Diabetes in Women. *Diabetes Care* 2006;29(3):650-656.

<sup>14</sup> Merlino LA, Curtis J, Mikuls TR, et al. Vitamin D Intake Is Inversely Associated With Rheumatoid Arthritis. *Arthritis and Rheumatism* 2004;50(1):72-77.

<sup>15</sup> Munger KL, Zhang SM, O'Reilly E et al. Vitamin D intake and incidence of multiple sclerosis. *Neurology* 2004;62(1):60-5. [abstract only]

<sup>16</sup> USDA National Nutrient Database for Standard Reference, Release 19, 2006 at <http://www.ars.usda.gov/ba/bhnrc/ndl>.