

Mushroom Council Nutrition Research Update

September 2007

Updates provide Mushroom Council members, the mushroom industry and the Nutrition Research Advisory Panel (Panel) with the latest information on the status of Mushroom Council funded nutrition research. The following reports submitted by the researchers are provided as evidence of the work conducted and to assist the Panel in evaluating the integrity of the science involved. The researchers' information is proprietary and confidential. For more details on a specific study, contact Mary Jo Feeney, MS, RD, FADA, Nutrition Consultant, mj.feeney@earthlink.net.

To activate the links, cut and paste the URLs into your browser.

Mushrooms and Health Global Public Relations Initiative

In order to increase demand for mushrooms worldwide, a "Mushrooms and Health Global Public Relations Initiative Initiative)." has been created with funding from the Australian Mushroom Growers' Association (AMGA) and the Mushroom Council. The Initiative provides the scientific underpinning for public relations efforts undertaken and customized by each country to communicate the health benefits of eating mushrooms. Core components of the Initiative include a validated research document describing the state of mushroom research and health; the development of a sustainable system to keep the research document current, searchable and accessible by the industry, media and health professional community; and the identification of eminent scientists who can lend credibility to the research efforts and provide expertise in outreach efforts.

A special meeting held immediately prior to the 4th International Medicinal Mushroom Conference introduced the Initiative to conference attendees. Greg Seymour, AMGA General Manager and project manager of the Initiative, Catherine Ogilvie, Edelman, and Mary Jo Feeney, manager of the operational aspects of the Initiative, gave presentations summarizing the purpose of the Initiative, how it is envisioned to work, how such endeavors have worked in other food marketing models, how different countries and individuals can participate, and what will happen next. Copies of the presentations can be requested from mj.feeney@earthlink.net. Current efforts are focused on identifying a group or institution to conduct the literature review on mushrooms and health benefits.

Nutrition Research Advisory Panel

To identify potential nutrition research projects for 2008, the Mushroom Council issued a general "Letter of Interest" to currently funded researchers. A total of 8 responses were received and are being reviewed by the Research Advisory Panel.

Anti-aromatase Activity of Phytochemicals in White Button Mushrooms
Shiuan Chen, PhD. Department of Surgical Research, Beckman
Research Institute of the City of Hope, Duarte, CA. Completed and

published Cancer Research 2006.

[http://cancerres.aacrjournals.org/cgi/content/abstract/66/24/12026.](http://cancerres.aacrjournals.org/cgi/content/abstract/66/24/12026)

A Translational Breast Cancer Prevention Trial of Mushroom Powder in Postmenopausal Breast Cancer Survivors and Phase Ib Trial of Mushroom Powder in Biochemically Recurrent, Hormone Naïve Prostate Cancer. Shiu-an Chen, PhD. Department of Surgical Research, Beckman Research Institute of the City of Hope, Duarte, CA.

These two small clinical trials will investigate mushrooms' effect on aromatase inhibition in postmenopausal breast cancer survivors, and effect on PSA levels in men previously diagnosed with prostate cancer. Funding, provided by both the Australian Mushroom Grower's Association and the Mushroom Council, is for two years. While these studies have been approved, they have not yet begun pending preparation of the freeze dried mushroom powder samples by Guelph Food Technology Center (GFTC) for the preclinical phase.

Dr. Chen's research to date has determined that mushrooms inhibit aromatase in cell cultures and animal studies. The primary objective of the breast cancer prevention trial is to determine whether a whole food extract of white button mushrooms can inhibit aromatase in postmenopausal breast cancer survivors. In addition, the study will determine the amount of mushroom extract that effectively suppresses aromatase-induced estrogen biosynthesis in postmenopausal women and thus determine a suggested dose of whole food extract of white button mushrooms in humans for aromatase inhibition.

The prostate cancer study will assess the feasibility and any toxicity of prolonged therapy with mushroom powder preparation at six different dose levels in prostate cancer patients with biochemical recurrence after local therapy. Men chosen for the study will have rising PSA levels as the only evidence of recurrent or progression of the disease.

Both studies will also collect a variety of additional information on participants such as markers of bone and heart health in the women since estrogen is protective for those conditions.

Weight Management

Lawrence J. Cheskin, MD Johns Hopkins Bloomberg School of Public Health, Baltimore, MD. Completed 2007. Manuscript submitted.

Does Substitution of Meat Products With White Button Mushrooms Have Potential For Weight Reduction? Studies of the Level of Short and Intermediate-Term Caloric Compensation, Satiety, and Dietary Satisfaction among Lean and Obese Men and Women.

A manuscript was submitted for publication in the journal *Appetite*. Acceptance and publication date are unknown at this time. Key findings of the research are described in the previous update on Cheskin found at

[http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc.](http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc)

Weight Management

**Mark Kern, PhD, RD, San Diego State University, San Diego, CA.
Completed and report submitted 2007. Manuscript planned.**

Role of Mushrooms Included in a Low Carbohydrate Diet on Weight Loss, Blood Lipids and Satiety. Completed and final report submitted to the Mushroom Council. Manuscript planned.

This study compared the effects of energy restricted very low carbohydrate diets, one rich in plant foods and mushrooms (VLCPM), one similar to typical "popular" low carbohydrate diets rich in animal foods (VLCA), to a traditional calorie restricted low fat (LF) diet based on the Food Guide Pyramid on weight loss and several metabolic responses. The Key Findings were described previously in the update on Kern found at:

http://www.mushroomcouncil.org/docs/NutritionResearchQ4UpdateOct_Dec.doc

Immunity Research

**Margherita Cantorna, Keith R. Martin, Sanhong Yu and Veronika Weaver,
Penn State University. Manuscript submitted.**

Modulation of biomarkers of inflammation by mushrooms commonly consumed in the United States.

Drs. Cantorna and Martin have submitted a manuscript for publication to *Experimental Biology and Medicine* and anticipate a response regarding the status in another month.. For key findings of this study, see report on Cantorna found at

http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc.

Solo Kuvibidila, PhD, Oklahoma State University.

Modulation of defensin production by mushroom extracts in human cell lines. This research is also supported by a grant from USDA/NutriCore.

See previous update on Kuvibidila:

http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc

Dr. Kuvibidila reports that she has begun writing a manuscript on the effects of white button and maitake mushroom extracts on alpha-defensin 1-3 production by HL60 cells but wants to include information on the mechanism involved. Her institution does not have the equipment needed to measure cell markers so she is considering using the facilities of another institution in her area.

Dr. Kuvibidila has written up the data on white button and maitake mushroom extracts on TNF-alpha secretion but is waiting for information on shiitake and portabella before completing the manuscript.

Dr. Kuvibidila is conducting some preliminary studies at the request of her institution's Animal Care and Use Committee prior to beginning the animal studies. She reports that she has submitted a grant proposal related to mushroom extracts, alpha defensins and tumor cell killing to the National Institutes of Health, and anticipates submitting other proposals related to mushrooms, gut associated immunity and aging, and inflammation and bone metastasis.

Dayong Wu, MD, PhD, USDA Human Nutrition Research Center on Aging at Tufts University. Completed 2007. Published in the *Journal of Nutrition* (2007) 137:1472-77.

“Dietary Supplementation with White Button Mushroom Enhances Natural Killer Cell Activity in C57BL/6 Mice” was presented during the mini-symposium on immunity and nutrition April 29 during Experimental Biology 2007. In addition, the research was published in the June issue of the *Journal of Nutrition*. See the Journal’s website <http://jn.nutrition.org/cgi/content/abstract/137/6/1472> for the abstract. Dr. Wu’s research was reported in the June 12 *Nutraingredients* newsletter: <http://www.nutraingredients.com/news/ng.asp?n=77273-mushrooms-immune-health-antioxidant>, the October issue of *Men’s Health*, and the September 12 issue of *Woman’s Day*.

For key findings, see previous update on Wu found at http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc.

**Immunity Research – Vitamin D Enhanced Mushrooms
Mona S. Calvo, PhD, CFSAN, FDA**

Optimizing vitamin D2 and ergosterol content of white button and portabella mushrooms: Effects on innate immune response and mammary tumor development in rodents.

Mona S. Calvo, PhD, is directing the Food and Drug Administration (FDA), Office of Applied Research and Safety Assessment, Center for Food Safety and Applied Nutrition’s (CFSAN) study “Optimizing vitamin D2 and ergosterol content of white button and portabella mushrooms: Effects on innate immune response and mammary tumor development in rodents.”

Through an agreement with Mushrooms Canada/Canadian Mushroom Growers’ Association, the Guelph Food Technology Center (GFTC) is supplying the 22 kg freeze dried UVB light treated and 12 kg freeze dried control mushrooms for this study. Verification of the D2 content of the UVB treated and untreated mushrooms by Dr. Mattila is nearly completed and Dr. Calvo’s research is anticipated to begin by the end of October.

**Post-Harvest UV-B Treatment Study
John S. Roberts, Ph.D., and Tara McHugh, Ph.D. Western Regional Research Center, U.S. Department of Agriculture, Agricultural Research Service, Albany, CA. Manuscript planned.**

The Processed Foods Research Unit at the USDA-ARS, Western Regional Research Center in Albany, CA conducted a study to determine the optimum conditions for UV-B treatment of mushrooms. For key findings, see update on Roberts/McHugh found at http://www.mushroomcouncil.org/docs/NutritionResearchQ2UpdateApril_June07.doc.

Drs. Roberts and McHugh are drafting a manuscript which is anticipated to be completed during the next quarter.

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