



# Mushrooms and Health Global Initiative Bulletin

“An ISMS Global Initiative”

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### Initiative Project Team

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- Glenn Cardwell, Accredited Practising Dietitian, Nutrition Impact P/L, Australia
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- Heidi Gengler, Vice President, Edelman Public Relations, United States

### Year Two – A Message from Greg Seymour



One year ago, February 2008, *Bulletin* #1 described the Mushrooms and Health Global Initiative launched during the International Medicinal Mushroom Conference (IMMC4, Slovenia). In keeping with this “new year,” it is time to look again at the purpose of the Mushrooms and Health Global Initiative.

The Initiative is designed to communicate the health benefits of including mushrooms more regularly in consumers’ diets. Many of us are already involved in industry organizations, university or other sponsored research centers that focus and encourage communication between scientists. This is a very important function – but differs from the consumer communications focus of the Initiative.

The Initiative’s primary target audience includes those in public relations and marketing; the secondary target are those in the media. Both of these target audiences help carry our message to consumers.

This external communications focus is important because market research shows that a key driver of increased mushroom consumption will be consumer awareness of the specific health attributes of mushrooms. This will then result in changing consumer perception of mushrooms and move mushrooms from being considered a discretionary purchase driven by recipe or meal ingredient lists to an **essential** purchase driven by the results of health research. This will drive behavioural change that will result in consumers purchasing more mushrooms, more regularly and thus increase consumption.

The Initiative primarily promotes the health benefits of mushrooms as a fresh, whole food – while recognizing that other forms also are of interest in developing a greater awareness of edible fungi as an important component of the world’s diet. A project of the Initiative was a critical evaluation of scientifically valid, published research linking mushroom consumption to human health. *Mushrooms and Health*, prepared under direction of Dr. Peter Roupas ([www.csiro.au](http://www.csiro.au)), is a resource document the Initiative Team uses to respond to inquiries and to prepare summaries and releases to key influencers and the media.



Distributing this *Mushrooms and Health Global Initiative Bulletin* within our industry is to be sure as many of us – and others with whom you share this *Bulletin* – know what’s happening in mushrooms and health research. ISMS posts the *Bulletin* on its website so you can refer others to this important resource: <http://www.isms.biz/>.

Most importantly, we want the *Bulletin* to generate feedback from scientists and other stakeholders about mushrooms and health research and to share promotion ideas and activities. Having hundreds of eye, ears, and mouths focused on communicating the role of mushrooms and health is a powerful tool. See “Mushroom publicity around the globe” that describes the results of public relations activities to increase awareness of the role of mushrooms and health. These efforts may spark an idea for you to use in your county.

Send examples of how you are using information in the *Bulletin* to the Editor, [info@mushroomsandhealth.com](mailto:info@mushroomsandhealth.com)

### ***Mushroom Publicity around the Globe***



#### ***United Kingdom – Mushroom Swap Diet***

*Thanks to Team member John Collier for sharing this information.*

The “Mushroom Swap Diet” made headlines in the United Kingdom (UK) early this year. By simply swapping meat for mushrooms in just four meals a week as part of a healthy balanced diet, 10 volunteers in a north London diet study group managed to lose an average 12.7 pounds (5.8 kgs) over 5 weeks.

The study, commissioned by the United Kingdom’s Mushroom Bureau, built on the previous research sponsored by the U.S. Mushroom Council (Cheskin L et al. Lack of energy compensation over 4 days when white

button mushrooms are substituted for beef. *Appetite* 2008; 51:50-57) which found that substituting meat for mushrooms in familiar recipes may be effective in the fight against obesity and more appealing to many people than making more dramatic or restrictive diet changes.

Stephen Allen, marketing manager at Monaghan Mushrooms who also heads up the marketing activity for the Mushroom Bureau, worked with the London-based public relations firm Mustard Communications on the publicity. According to Mr. Allen: “Each January members of the UK media are hungry for stories with a health and wellbeing theme. What made this story particularly interesting and newsworthy was the fact that we were able to make it a human interest story. By including pictures of the volunteers and relaying their own personal experiences we were able to make Dr Cheskin’s work very real and relevant to the millions of mushroom consumers in the UK who’d love to lose a bit of weight. We’ve had lots of success with over 20 different newspaper groups in the UK carrying the story. We’re confident this will lead to an increase in consumption and an increase in awareness of the anti-obesity benefits of mushrooms.”

One participant who lost 19 pounds (8.6 kgs.) and 4.2% of her body fat over the five weeks claimed: Everyone’s been complimenting me on how great I look and I have to say I feel fantastic too. I’ve been on loads of diets but this is the first one that’s actually worked for me - I love my food and the Mushroom Swap Diet still allows me to enjoy my meals. I’m amazed by how much weight I’ve managed to lose.”

For more information about the mushroom healthy eating plan, the outline of the plan and a selection of recipes, visit [www.mushroom-uk.com](http://www.mushroom-uk.com/)). Some examples of media coverage include: <http://www.telegraph.co.uk/health/healthnews/4013291/Mushroom-diet-could-help-shed-pounds.html>; <http://www.financialexpress.com/news/mushroom-diet-could-help-shed-pounds/404241/>; <http://www.express.co.uk/posts/view/77535/How-a-mushroom-diet-will-help-you-to-slim>.



**Australia – Teamwork Globally, PR Locally**

*Thanks to Team members Glenn Cardwell and Chris Rowley for preparing this report.*

When Doctors Sliva and Jedinak, from Indiana University in the US, reported that common edible mushrooms were seen to inhibit breast and prostate cancer cells (See Research of Interest page 4), the Australian mushroom industry saw an opportunity for publicity. Although the report in the *International Journal of Oncology* included button, enoki, shiitake and oyster mushrooms, any good news about any edible mushroom would benefit the local growers of *Agaricus* button mushrooms.

When Glenn Cardwell contacted Dr Sliva directly via email, he was quick to respond to the submitted questions. Chis Rowley then created a press release based on the research and sent it out mid-December. The story was picked up by three major Sunday papers and four regional papers.

Past experience suggests that that if a mushroom story is accompanied by a photograph it is usually a photo of an *Agaricus* mushroom from the Australian Mushroom Growers Association photo library, independent of the type of mushroom mentioned in the story. In this case, the research was about four different mushrooms, yet only the button mushroom was featured in photos.

The story was also picked up in the news section of two major radio stations. What then surprised us was that a Brisbane radio station contacted Dr Sliva direct and did a live interview.

In publicity, timing is everything. Capitalizing on the holiday temptation to eat a bit too well, Chris Rowley issued a January 1 release with tips to help weight control. A common story for the media. Australian press releases often mention the low kilojoule content and the filling capacity of the mushroom. The main paper in Western Australia used the press release on the mushroom's ability to control appetite two weeks after it was first issued. On one occasion a paper used one of our press releases six months after it went out. A good health story is timeless.

Informing our global colleagues of international research and story ideas, gives us all inspiration to communicate the mushroom health message to our local market. The small study mentioned at the beginning of this article (*International Journal of Oncology*) was coupled with additional information and support of the researchers – which then gave the impetus to a story in Australia. Collaboration means that we all benefit.



**Australia by way of Canada – Cookbook to Fight Cancer with Mushroom Recipes**



Glenn Cardwell shares a review of a Canadian cookbook featured a best selling Australian paper. *Cooking with Foods that Fight Cancer*, a collaboration

between scientists and chefs, describes the relationship between nutrition science and cancer, and how food may disrupt the disease process. Authors Drs Beliveau and Gingras are researchers with the University of Quebec at Montreal, where Beliveau holds the Chair in the Prevention and Treatment of Cancer. Click on the link for the review that includes a recipe for Spring rolls with enoki mushrooms. [http://blogs.smh.com.au/lifestyle/chewonthis/archives/2009/01/making\\_food\\_an\\_ally\\_against\\_ca.html](http://blogs.smh.com.au/lifestyle/chewonthis/archives/2009/01/making_food_an_ally_against_ca.html).



**United States – Mushrooms Win Praise from Major Media**

*Thanks to Team member Heidi Gengler for sharing this information.*

January is typically a cold, dark month for most of North America, hence the U.S. Mushroom Council launched its “The Winter Blues” campaign. The goal of the program was to surround consumers and engage with them about the many hidden treasures of mushrooms. The public relations program, including print, broadcast and online outreach, focused on vitamin D research and highlighted the North American “winter blues” season. Online engagement around mushrooms, a large component of the 2009 program, launched in late January with the TasteofHome.com [consumer recipe contest](#),

the introduction of the [Mushroom Channel](#) (a live blog full of mushroom nutrition information, recipes, and insight from every day consumers), and the Mushroom Channels' presence on [Twitter](#) (a live online "chat forum").


As a result of the online launch, the U.S. Mushroom Council to-date has garnered nearly 80 "followers" on Twitter and has connected consumers with mushroom growers, nutritionists, and more. Highlight quotes from consumers about Twitter and the Mushroom Channel include:

- "I had noooo idea that the Maitake mushroom was that high in Vit. D. I need a lot of D in the winter (lack of sun)." (note, this was a blogger who has a featured recipe on the Mushroom Channel)
- "Microwave the mushrooms first for a few minutes to remove some of the water from the mushrooms and then fry, ENJOY!" (note, this is from a grower helping a consumer with mushroom cooking tips)

Finally, mushrooms were featured on the "The Ellen DeGeneres Show" early in February. "The Ellen DeGeneres Show" is one of the highest-rated daytime talk shows with an estimated audience of 5 million Americans, which includes online viewers. The outgoing talk-show host mentioned mushrooms as a superfood, rich in vitamin D, delicious, nutritious and inexpensive. Additionally, "mushroom" was her "mystery word" for her celebrity game (a game where Ellen provides clues about the word until the celebrity guesses it). View the YouTube video [here](#).

Separately, the Good Housekeeping Research Institute highlighted Dole Portobello mushroom caps and slices with [vitamin D](#) among its first annual Very Innovative Products (VIP) Awards (*Good Housekeeping* February 2009). The product award comes at a time when vitamin D is among one of the hottest topics in healthcare today.

### Research of Interest

 Jedinak A and Sliva D. "Pleurotus ostreatus inhibits proliferation of human breast and colon cancer cells through p53-dependent as well as p53-independent pathway." *International Journal of Oncology* 2008;33:1307-1313.  
[http://www.spandidos-](http://www.spandidos-publications.com/ijco/article.jsp?article_id=ijco_33_6_1307)

[publications.com/ijco/article.jsp?article\\_id=ijco\\_33\\_6\\_1307](http://www.spandidos-publications.com/ijco/article.jsp?article_id=ijco_33_6_1307).

This research investigated the effect of extracts from *Agaricus bisporus* (portabella), *Flammulina velutipes* (enoki), *Lentinula edodes* (shiitake) and *Pleurotus ostreatus* (oyster) on the growth of breast and colon cancer cells. *P. ostreatus* was the most potent, suppressing proliferation of MCF-7, MDA-MB-231 breast cancer cells and HT-29, HCT-116 colon cancer cells without affecting proliferations of epithelial mammary MCF-10A and normal colon FCC cells. Cell cycle regulatory genes modulated by *P. ostreatus* are described.



Adams LS, Phung S, Wu X, Ki L and Chen S. "White button mushroom (*Agaricus bisporus*) exhibits

antiproliferative and proapoptotic properties and inhibits prostate tumor growth in athymic mice." *Nutrition and Cancer* 2008; 60(6); 744-756.

<http://www.ingentaconnect.com/content/routledge/nc/2008/00000060/00000006/art00006;jsessionid=31dgr1i2io31p.alexandra?format=print>.

This research investigated the effects of white button mushroom extract and a major component, conjugated linoleic acid (CLA), on prostate cancer cell lines *in vitro* and mushroom extract *in vivo*. According to the researchers, the study illustrates the anticancer potential of phytochemicals in mushroom extract both *in vitro* and *in vivo* and supports the recommendation of white button mushroom as a dietary component that may aid in the prevention of prostate cancer in men.

According to the study, in all the cell lines tested, mushroom dose-dependently inhibited cell proliferation and induced apoptosis within 72 hours of treatment. *In vitro*, CLA inhibited proliferation in the prostate cancer cell lines. DU 145 and PC3 prostate tumor size and tumor cell proliferation decreased in nude mice given the mushroom extract, whereas tumor cell apoptosis increased compared to pair-fed controls.

Microarray analysis of tumors identified significant changes in gene expression in the mice fed mushroom extract compared to the pair-fed controls. Gene network analysis identified changes in networks involved in cell death, growth and proliferation, lipid

metabolism, the TCA cycle and immune response.



Myung, K, Narciso JA and Manthey JA. "Removal of furanocoumarins in grapefruit juice by edible fungi." *Journal of Agricultural and Food Chemistry*, 2008, 56 (24), pp 12064–12068.  
<http://pubs.acs.org/doi/abs/10.1021/jf802713g>

This study evaluated the addition of some edible fungi to grapefruit juice to help reduce the interaction between furanocoumarins and certain medications.

Furanocoumarins (FCs) in the human diet irreversibly inhibit human cytochrome P450 3A4 (CYP 3A4) and are responsible for the "grapefruit/drug" interaction phenomenon. The researchers previously reported that FCs in grapefruit juice (GFJ) bind to autoclaved *Aspergillus niger*, and reduced the GFJ inhibition of CYP 3A4. However, *A. niger* is not an edible fungus. In this study, autoclaved *Morchella esculenta*, an edible ascomycete, removed much of the FC content in GFJ, resulting in decreased inhibition of CYP 3A4 activity by the GFJ. *Monascus purpureus*, *Pleurotus sapidus*, and *Agaricus bisporus*, were also evaluated for their binding with two of the major FCs in GFJ, 6',7'-dihydroxybergamottin (DHB) and bergamottin (BM). These autoclaved edible fungi removed these FCs from GFJ, similar to *M. esculenta*, indicating that binding is a general, passive interaction between FCs and fungal hyphae. The removal of FCs was independent of pH in GFJ. Dried fungal material of *M. esculenta* was also effective in removing FCs from GFJ samples prepared from both fresh grapefruit and GFJ concentrate.

### Vitamin D research

Ramagopalan SV, Maugeri NJ, Handunnetthi L et al. "Expression of the multiple sclerosis-associated MHC Class II Allele *HLA-DRB1\*1501* is regulated by vitamin D." *PLoS Genetics* 2009; 5(2).  
<http://www.plosgenetics.org/article/info:doi/10.1371/journal.pgen.1000369>

Multiple Sclerosis (MS) is an inflammatory disease of the central nervous system. Although its etiology is unknown, genetic and environmental factors play a role. Studies of disease geography suggest that sunlight, through generating active vitamin D, may be an environmental factor. Circumstantial evidence supporting this include studies indicating that MS patients are deficient in vitamin D. Direct links to how vitamin D may affect MS risk have not yet been identified.

This study sought to discover any relationship between vitamin D and the *HLA-DRB1* main gene region. Research discovered that vitamin D interacts with *HLA-DRB1\*1501* to influence its expression and thus provides more direct support to the epidemiological evidence implicating sunlight and vitamin D in determining MS risk. The authors comment that vitamin D supplementation at critical time periods may be key to disease prevention.

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