



MUSHROOMS AND HEALTH GLOBAL INITIATIVE BULLETIN

An ISMS Global Initiative to increase the worldwide consumption of mushrooms through the collection, evaluation and dissemination of scientifically validated information.

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► Table of Contents

News from the Initiative - <i>Mary Jo Feeney</i>	1
Mushroom Research.....	1
News from Australia - <i>Glenn Cardwell and Chris Rowley</i>	3
News from the United States - <i>Heidi Gengler</i>	6

News from the Initiative - Mary Jo Feeney

► Mushrooms and Health 2010 now available

Mushrooms and Health 2010, a thorough review and evaluation of the state of the science linking mushrooms and health, is now posted on the [Mushrooms and Health](#) website. The 2010 report replaces the initial 2008 report and was prepared by the Food and Nutritional Sciences division of the Commonwealth Scientific and Industrial Research Organisation (CSIRO, www.csiro.au), Australia's largest and most diversified food research organization. This updated report includes a very useful table summarizing the effects of [mushroom consumption on human health](#), and a new section on mushroom consumption and [neurodegenerative disease](#). Although very preliminary, new data showing protective effects of mushrooms on beta-amyloid peptide toxicity in the brain and mild cognitive impairment (both precursors to dementia) warrant further research on the ability of mushroom consumption to delay the onset of dementia/Alzheimer's.

For those of you new to the Mushrooms and Health website or the report, download the [Executive Summary and Methodology](#) for a snapshot of the nutritional and health benefits of mushrooms and how the review was conducted. Use the Executive Summary for a quick reference when you receive inquiries from the media or others in the industry.

Mushroom Research

► Breast cancer cell culture study

Martin KR and Brophy SK. [Commonly consumed and specialty dietary mushrooms reduce cellular proliferation in MCF-7 human breast cancer cells](#). *Experimental Biology and Medicine* 2010; 00: 1–9. DOI: 10.1258/ebm.2010.010113.

This study tested and compared the ability of five commonly consumed or specialty mushrooms to modulate cell number balance in the cancer process using MCF-7 human breast cancer cells. Overall, all test mushrooms significantly suppressed cellular proliferation with maitake further significantly inducing apoptosis and cytotoxicity in human breast cancer cells.

Hot water extracts (80°C for 2 h) of maitake (MT, *Grifola frondosa*), crimini

Both common and specialty mushrooms may be chemoprotective against breast cancer.

(CRIM, *Agaricus bisporus*), portabella (PORT, *Agaricus bisporus*), oyster (OYS, *Pleurotus ostreatus*) and white button (WB, *Agaricus bisporus*) mushrooms or water alone (5% v/v) were incubated 24 h with MCF-7 cells. Cellular proliferation determined by bromodeoxyuridine incorporation was significantly ($P < 0.05$) reduced up to 33% by all mushrooms with MT and OYS being the most effective. (3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide) reduction, an often used mitochondrion-dependent marker of proliferation, was unchanged although decreased ($P > 0.05$) by 15% with OYS extract. Lactate dehydrogenase release, as a marker of necrosis, was significantly increased after incubation with MT but not with other test mushrooms. In addition, MT extract significantly increased apoptosis, or programmed cell death, as determined by terminal deoxynucleotidyl end labeling method, whereas other test mushrooms displayed trends of approximately 15%. The total numbers of cells per flask, determined by hemacytometry, were not different from control cultures. Overall, all test mushrooms significantly suppressed cellular proliferation with MT further significantly inducing apoptosis and cytotoxicity in human breast cancer cells. This suggests that both common and specialty mushrooms may be chemoprotective against breast cancer.

► Colitis-related colon carcinogenesis in mice

Jedinak A, Dudhgaonkar S, Jiang J, Sandusky G, and Sliva D. [Pleurotus ostreatus inhibits colitis-related colon carcinogenesis in mice](#). *International Journal of Molecular Medicine* 26: 643-650, 2010.

Pleurotus ostreatus significantly reduced the number of ACF and multiplicity of colon neoplasms.

This study investigated whether *Pleurotus ostreatus* (PO) has chemopreventive effect on inflammation-associated colon carcinogenesis induced by 2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (PhIP) and promoted by dextran sodium sulfate (DSS). Treatment with PO at both doses (100 and 500 mg/kg), significantly reduced by 50 and 78% the number of aberrant crypt foci (ACF) and the multiplicity of colon neoplasms by 43 and 89%, respectively. Incidence of colon tumors and high grade dysplasia was reduced by 50 and 63% only in the dose 500 mg/kg of PO, respectively. Colon shortening and dysplastic index was significantly reduced by PO treatment in dose-dependent manner. Immunohistochemistry of colons revealed that treatment with PO suppressed expression of cyclin D1, Ki-67, COX-2 and F4/80. According to the researchers, data suggest that PO may prevent inflammation-associated colon carcinogenesis with exposure to PhIP through combined modulatory mechanisms of inflammation and tumor growth via suppression of COX-2, F4/80, Ki-67 and cyclin D1 expression in mice.

► Updated vitamin D, ergosterol, sterol and folate values

The US Mushroom Council funded research to update the vitamin D, ergosterol, sterol and folate values for commonly consumed mushrooms. These updated values can be found at <http://www.nal.usda.gov/fnic/foodcomp/search/>. Enter "mushrooms" in the keyword box and then "submit."



News from Australia - Glenn Cardwell and Chris Rowley

► From Glenn Cardwell

► Tasmania leads the way

Tasmania is not in Africa. It is an island state of Australia and became the launch pad of a campaign to promote mushrooms and tell everyone about the science behind the health benefits of the mushroom. Local dietitian Maree Taylor spoke on getting children to eat more vegetables, while Glenn Cardwell, the dietitian with the Australian Mushroom Growers (AMGA), gave some background information on what the published research has shown for the vitamin B12 and vitamin D content of mushrooms and the influence of mushrooms on cancer risk.

The launch was supported by Tasmanian Mushroom Growers. Mushroom farmer Douglas Schirippa revealed that his company is to produce a high vitamin D mushroom for the market in early 2011. Great news for a southern island that has a high number of people with insufficient vitamin D.

Glenn Cardwell and super-cook Pam Tobin demonstrated simple mushroom recipes to the locals at shopping centres in the capital Hobart. It was a great lead in to the *Mushrooms go Pink in October* campaign (<http://www.mushroomsgopink.com.au>).



Roseanne Cavallaro & Pam Tobin promoting mushrooms going pink in October.



Pam Tobin, super-cook, prepares a mushroom dish while being filmed for the news.

► Mushrooms hit Adelaide

Glenn Cardwell and Pam Tobin partnered up again to promote the science and health benefits of mushrooms to doctors and practice nurses during a three day program in Adelaide, South Australia. Cook Roseanne Cavallaro provided delicious mushroom dishes during the breaks, while Glenn gave two presentations and answered specific questions on mushrooms. It was great to note that the previous presentation Glenn gave in Brisbane, Queensland was voted the most practical and useful session in the conference, reminding us that doctors and nurses want simple and practical information they can give their patients.

"Thank you very much for your talk as well as having a great stall with delicious mushrooms!" (Text message from a Practice Nurse, Adelaide)



Nurses line up for a mushroom taste, Adelaide.

► Mushrooms Japanese style

All around the country, media, celebrities and guests gathered to see chef Fast Ed from the popular TV program *Better Homes and Gardens* demonstrate simple Japanese recipes featuring the mushroom. The recipes are available from http://www.bbqmushrooms.com/styles_japanese.html.

The good news from all our efforts is that journalists, health professionals and academics are now contacting us direct for information on mushroom research and using it for their stories and background information. Many dietitians, in particular, write articles for magazines and newsletters and prefer to hear the story from the horse's mouth.

Our message is getting across.



Fast Ed does mushrooms Japanese style, Perth.

► **From Chris Rowley**

► **Mushrooms and motorbikes**

If you have to ride a bike 4,000 kilometers across Australia for charity, then the best option is a motorbike. So, that is what some 25 “mushroom” riders did in late September, completing the trip from Sydney to Perth in one week and in the process raising over AUD\$68,000 for breast cancer research.

The Mushroom for Life Charity Ride drew together riders from Australia, the United States, Ireland, Italy and the Netherlands. The three common things shared by riders were: they were all involved in the mushroom industry; they all enjoyed riding motorbikes and they all supported on-going research efforts to fight breast cancer.



A sample logo with sponsors.



Riders wore pink safety vests indicating industry support for breast cancer research.

The trip served as a strong focal point in spreading the mushroom message, attracting media attention across the country and allowing industry to highlight its longer term research investment into the ways in which mushrooms can potentially help fight a range of serious diseases.

Over the course of the trip the riders wore special pink safety vests to show their support for breast cancer research and to draw awareness of the involvement of the mushroom industry. The pink vests also signified that the ride was part of the wider Mushrooms go pink in October celebration, marking a decade of support for global research on the link between mushrooms and good health.

The bike trip attracted media attention to the industry's longer term research investment.

The 2010 Mushrooms for Life Charity Ride has been a positive way of contributing to local breast cancer research, while at the same time highlighting the longer term commitment of the global mushroom industry to improve the health of consumers throughout the world. Good healthy fun and a great effort by all the mushroom riders. The question now is where and when for the next great mushrooms and motorbikes event.

► **Four weeks of fungi foodie fun**

Over four weeks in September, three teams of food bloggers – representing Australia, the United States and Canada – battled it out for recipe supremacy in the inaugural Mushroom Masters. Each week one blogger from each country entered a recipe featuring a different mushroom as the hero of the meal. The recipes were hosted on the Tastespottting website with direct votes determining the winner for each week.



MUSHROOM MASTERS

— A TOURNAMENT OF TASTE —

So who won this “Tournament of Taste”?

Week 1 – Portabella Playoff – [Angela from Oh She Glows](#) – Canada

Week 2 – Button Battle – [Ellie Won from Kitchen Wench](#) – Australia

Week 3 – Shiitake Showdown – [Christie Connelly from Fig & Cherry](#)
– Australia

Week 4 – Wildcard Playoff – [Peter Georgakopoulos from Souvlaki for the Soul](#)
– Australia

And so the bragging rights for the Mushroom Masters 2010 go to Australia by a score of 3-1 with some fantastically creative mushroom meals.

So, apart from some friendly competition what did mushroom lovers get out of the competition. Well for a start there are now 12 great new mushroom recipes, packaged and ready for public consumption.

In addition there are 12 bloggers who relished the opportunity to represent their country and who collectively have helped (and will continue) to spread the mushroom message to an even wider blogging community of many thousands of food enthusiasts. (Anyone doubting the enthusiasm should read the blog entry from Ellie Won [urging her readers to get behind her entry and vote.](#))

Importantly the Mushroom Masters also helped to drive traffic to the three mushroom industry blogsites, with many thousands of page views recorded over the period of the competition.

From an Australian viewpoint we entered the competition to have some fun; give our international mates a hard time and show them that no-one knows mushrooms as well as our ever modest Australian bloggers. Our Fungi Foursome can now take a bow and enjoy the applause as mushroom lovers everywhere sit down to enjoy some Mushroom Masters inspired meals.

A final word of warning for our competitors - now we have the trophy we are not giving it back – bring on Mushroom Masters 2011!

Log on to the winners’ blogs for award winning mushroom recipes!

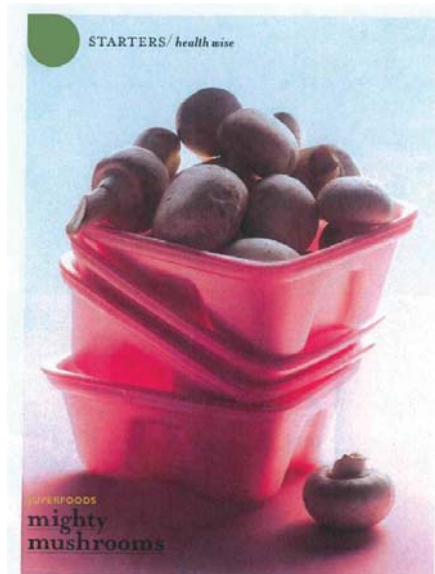


News from the United States - Heidi Gengler

► **Mushrooms and cancer research hit national U.S. magazines**

Reaching national magazines has been an ongoing strategy for increasing mushrooms’ position as a “superfood” for nutrition, as well as taste, versatility and value. Because of the volume of Mushroom Council-funded research over the past several years, mushrooms have made many appearances in “Foods you Should Eat” articles, which are prevalent in consumer magazines. Since 2008, more than 1,700 stories have included mushrooms as a *must* eat food. Recently, the Council has seen editorial coverage of City of Hope’s research on breast cancer and mushrooms. These placements resulted from a series

of meetings in New York City in May between top editors, City of Hope and Council representatives. *Bon Appétit* featured a review of City of Hope's breast cancer research on mushrooms. *Self, Shape and Martha Stewart's Everyday Food* praised the mushroom as a "powerfood" for its aromatase-blocking and immunity-boosting properties, antioxidants and vitamin D content. In the September issue of *Cooking Light*, mushrooms showed movement from "superfood" status to "pantry staple" in a list of top foods to have on hand for easy, healthy meals. Mushrooms' presence in these magazines reinforces the Council's "every day, every way philosophy," positioning mushrooms as an essential dietary and culinary staple.



This month, you'll find the humble mushroom all dressed up in pink containers at your local supermarket, in recognition of National Breast Cancer Awareness Month. The reason? Recent research shows that a diet that includes plenty of mushrooms can help slow down the development of certain cancers, such as breast cancer. Mushrooms are one of the very few non-meat sources of conjugated linoleic acid (CLA), which has been shown to block aromatase, a protein necessary for producing estrogen in women. Since about 70 percent of breast cancers are hormone-dependent, the ability to block aromatase is a powerful tool in controlling or even stopping cancer. CLA is also found in dairy products, beef, and lamb.

So how many mushrooms do you need to eat to reap the benefits? Dr. Shuan Chen, director of tumor cell biology at City of Hope, a biomedical research hospital in Los Angeles, is currently conducting human clinical trials designed to answer that very question. Early results indicate that you may need to eat about half a pound a day to get the most effective levels of CLA, but researchers won't know for sure until the trials are complete at the end of this year. In the meantime, you can't go wrong by adding more mushrooms to your diet. Try the wild mushroom dishes featured on page 73, or go to mygo2go.com/mushrooms for a collection of some of our favorite mushroom recipes of the past few years. —VICTORIA VON BIEL

48 | bonappetit.com | OCTOBER 2010

Bon Appétit



Martha Stewart's Everyday Food

► Foodservice sales training seminars arm industry for success

The Mushroom Council hosted two foodservice sales training events at the Culinary Institute of America campuses in Hyde Park, NY and St. Helena, CA. The goal of the two-day sales training was to help growers take advantage of the changing foodservice terrain by showcasing key foodservice trends, what operators are looking for and how to use Mushroom Council tools more effectively.

Sales training attendees are considered mushroom ambassadors equipped with information to sell more mushrooms.

The trainings also addressed the changing food and nutrition landscape and the resulting challenges foodservice operators face; specifically, the implications of new U.S. Food and Drug Administration (FDA) rulings and recommendations on the importance of menu transparency and sodium reduction. In terms of transparency for consumers, foodservice operators are under immense pressure to be more clear about the nutritional value of their menu items, especially the fat (saturated and *trans*), calorie and sodium content. Adding more mushrooms to the menu, particularly as meat-substitutes, is a way to manage

and reduce fat and calorie content. Mushrooms' umami content may offer a satisfying solution for the sodium challenge as well. The FDA wants to limit sodium, but consumers still seek the "craveability factor" they're accustomed to with salty foods. **"Tasting Success with Cutting Salt,"** a collaborative report from the department of nutrition at Harvard School of Public Health and the Culinary Institute of



Sales training attendees participating in a live culinary demonstration.

America, suggests cooking with umami-rich ingredients, like mushrooms, instead of salt to reduce the overall sodium in a dish. Mushrooms are already low in sodium, plus their umami counterbalances saltiness and allows up to a 50 percent salt reduction without compromising flavor.

Sales training attendees discussed these challenges and others facing the industry. Each participant who graduated from the training is now considered a mushroom ambassador, armed with the resources needed to provide distributor sales representatives and operator customers with the fact-based selling information they need to sell more mushrooms. This was the first time the Council or any commodity board has taken a category management approach to foodservice.

Be sure to visit the Mushrooms and Health website <http://www.mushroomsandhealth.com/>

► **Initiative project team**

- Greg Seymour, President, ISMS General Manager AMGA, Australia; Manager, Mushrooms and Health Global Initiative
- Bart Minor, President, Mushroom Council, United States
- John Collier, Group Research and Development Manager, Monaghan Mushrooms Ltd, Republic of Ireland
- Mary Jo Feeney, Mushrooms and Health Global Initiative Operations Manager, Bulletin Editor, United States
- Glenn Cardwell, Accredited Practising Dietitian, Nutrition Impact P/L, Australia
- Chris Rowley, Communications Consultant, Australia
- Heidi Gengler, Vice President, Edelman Public Relations, United States

► **Strategic communications group**

Members of the Strategic Communications Group strengthen the Initiative's communication capability and develop a local public relations presence in each country whose industry is contributing financially to the project. Members of this group help facilitate stories about mushrooms and health appearing in their local media, monitor mushroom nutrition and health research, liaison with scientists, media and other influencers, and provide feedback to the Initiative. They include

- United Kingdom
- Franz Schmaus - Germany
- Francois Marche - France
- Ignace Deroo, Evy Detroch - Belgium
- Jose Antonio Jimenez Hernandez - Spain
- Kent Stenvang - Denmark
- Raymond van Buuren - Netherlands
- Elizabeth O'Neil - Canada