First Lady, Agriculture Secretary Vilsack and Surgeon General Benjamin Launch MyPlate Icon

First Lady, Agriculture Secretary Tom Vilsack and Surgeon General Regina Benjamin unveiled the federal government's new food icon, MyPlate, to serve as a reminder to help consumers make healthier food choices. MyPlate is a new generation icon with the intent to prompt consumers to think about building a healthy plate at meal times and to seek more information to help them do that by going to www.ChooseMyPlate.gov. The new MyPlate icon emphasizes the fruit, vegetable, grains, protein and dairy food groups.

"This is a quick, simple reminder for all of us to be more mindful of the foods that we're eating and as a mom, I can already tell how much this is going to help parents across the country," said First Lady Michelle Obama. "When mom or dad comes home from a long day of work, we're already asked to be a chef, a referee, a cleaning crew. So it's tough to be a nutritionist, too. But we do have time to take a look at our kids' plates. As long as they're half full of fruits and vegetables, and paired with lean proteins, whole grains and low-fat dairy, we're golden. That's how easy it is."

"With so many food options available to consumers, it is often difficult to determine the best foods to put on our plates when building a healthy meal," said Secretary Vilsack. "MyPlate is an uncomplicated symbol to help remind people to think about their food choices in order to lead healthier lifestyles. This effort is about more than just giving information, it is a matter of helping people understand there are options and practical ways to apply them to their daily lives."

"The new icon is simple and easy to understand, with more emphasis placed on fruits and vegetables," said U.S. Surgeon General Regina M. Benjamin. "This new tool can be a fun way to help individuals and families make healthier food choices."

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healthier meal choices. I encourage all Americans to follow the new dietary guidelines and become familiar with the new icon because it will serve as a compass to a healthy and fit nation."

Originally identified in the Child Obesity Task Force report which noted that simple, actionable advice for consumers is needed, MyPlate will replace the MyPyramid image as the government’s primary food group symbol as an easy-to-understand visual cue to help consumers adopt healthy eating habits consistent with the 2010 Dietary Guidelines for Americans. MyPyramid will remain available to interested health professionals and nutrition educators in a special section of the new website.

ChooseMyPlate.gov provides practical information to individuals, health professionals, nutrition educators, and the food industry to help consumers build healthier diets with resources and tools for dietary assessment, nutrition education, and other user-friendly nutrition information. As Americans are experiencing epidemic rates of overweight and obesity, the online resources and tools can empower people to make healthier food choices for themselves, their families, and their children. Later this year, USDA will unveil an exciting "go-to" online tool that consumers can use to personalize and manage their dietary and physical activity choices.

Over the next several years, USDA will work with First Lady Michelle Obama’s Let’s Move! initiative and public and private partners to promote MyPlate and ChooseMyPlate.gov as well as the supporting nutrition messages and "how-to" resources.

The 2010 Dietary Guidelines for Americans, launched in January of this year, form the basis of the federal government’s nutrition education programs, federal nutrition assistance programs, and dietary advice provided by health and nutrition professionals. The Guidelines messages include:

- **Balance Calories**
  - Enjoy your food, but eat less.
  - Avoid oversized portions.

- **Foods to Increase**
  - Make half your plate fruits and vegetables.
  - Switch to fat-free or low-fat (1%) milk.
  - Make at least half your grains whole grains

- **Foods to Reduce**
  - Compare sodium (salt) in foods like soup, bread, and frozen meals, and choose foods with lower numbers.
  - Drink water instead of sugary drinks.

ChooseMyPlate.gov has a variety of new educational materials for the public, including the new Dietary Guidelines for Americans consumer brochure, as well as tips, recipes, and sample menus.

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Coupled with these tested, actionable messages will be the "how-tos" for consumer behavior change. A multi-year campaign calendar will focus on one action-prompting message at a time starting with "Make Half Your Plate Fruits and Vegetables."

"What we have learned over the years is that consumers are bombarded by so many nutrition messages that it makes it difficult to focus on changes that are necessary to improve their diet," said Secretary Vilsack. "This new campaign calendar will help unify the public and private sectors to coordinate efforts and highlight one desired change for consumers at a time."

For more information, visit www.choosemyplate.gov. Additional resources include: www.dietaryguidelines.gov and www.letsmove.gov.


Why Childhood Obesity? It's So Much More Than What Kids Eat

Scientists from a variety of disciplines have teamed up to examine the factors that contribute to childhood obesity. Why? Because individual researchers have found that the problem is too complicated for any of them to tackle alone.

"Our Strong Kids team members are looking at such diverse factors as genetic predisposition, the effect of breastfeeding, how much TV a child watches, and the neighborhood he lives in, among many others," said Kristen Harrison of the University of Illinois' Division of Nutritional Sciences. "It seems like the answer should be simple, just eat less and exercise more, but when you look at the reasons that kids overeat and burn fewer calories, it turns out there are a lot of them."

Harrison and other Strong Kids team members received funding for a three-year longitudinal study and are applying for support to keep the research going. The scientists have collected and analyzed two generations of data on approximately 400 families, and they are beginning a third wave of data collection. Individual studies, including communication professor Harrison’s own examination of preschoolers’ television viewing and eating habits, are ongoing.

But the first step was developing a model for studying the

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problem. The team’s Six Cs model will examine the problem of childhood obesity from the following angles: cell, child, clan (or family), community, country and culture. A paper detailing their approach appeared in a recent issue of *Child Development Perspectives* (1).

"From 30 to 40 percent of the population has a variety of genetic markers that puts them at greater risk for obesity," said professor of nutrition Margarita Teran-Garcia, who is approaching the problem at the cellular level. As a starting point, she is taking saliva samples from preschoolers in the study group to map their genetic susceptibility to obesity.

Child development professor Kelly Bost is looking at the quality of parent-child attachment. "There’s evidence that insecure attachment predicts more TV exposure, more consumption of unhealthful foods, and other factors leading to greater obesity," she said.

Another kinesiology and community health professor, Diana Grigsby-Toussaint, is geomapping retail environments in the neighborhoods where the participating families live, looking in detail at what foods are available there. "She’s also mapping how much green space is available and how that relates to outdoor play and activity," Harrison said.

Later work will add more puzzle pieces relating to the community and culture components. For example, what’s the community BMI and do participants in the study believe that BMI is normal? What’s the usual portion size in this culture? Are children urged to take second and third helpings at mealtime?

"Southern U.S. culture, Latin American culture, and the Sam’s Club bulk-buying phenomenon are all elements of what we’re trying to capture when we talk about culture," Harrison said.

And professor of applied family studies Angela Wiley is collecting data relating to childhood obesity prevention among Mexican immigrant families in the Abriendos-Caminos program so the researchers can compare parallel populations across countries.

Later work will add more puzzle pieces relating to the community and culture components. For example, what’s the community BMI and do participants in the study believe that BMI is normal? What’s the usual portion size in this culture? Are children urged to take second and third helpings at mealtime?

"Childhood obesity is a puzzle, and at different stages, certain variables drop in or out of the picture. Breastfeeding versus formula feeding is a predictor, but it drops out of the model entirely when you get past babyhood. Vending machines in schools are important later in a child’s life, but they weren’t important before," she added.

There has been very little transdisciplinary effort to map out how all these factors work together, although research shows that no single factor is the most important, Harrison noted.

"We’re each looking at different spheres in the model, but we’re also looking at potential interactions. That’s one of the exciting things we’ll get to do as we move forward," she said.


Dad’s choice of where to eat could literally tip the scales on his children’s health.

A father’s use of restaurants and his perceptions of family meals carry more weight, so to speak, than mothers’, according to a Texas AgriLife Research study, published recently in the Journal of Nutrition Education and Behavior (1).

“Dads who think that dinner time is a special family time certainly do not see a fast-food restaurant as an appropriate place for that special family time, so this means that his kids are spending less time in those places. Dads who have no trouble eating food in a fast-food restaurant are going to be more likely to have kids who do so,” said Dr. Alex McIntosh, AgriLife Research sociologist.

The study began as a 15-month look at parents’ use of time and how that impacted meal choices. It aimed at the difference between fast-food and full-service restaurants because numerous studies have shown a correlation between fast-food consumption and weight gain.

Of particular interest for the research, funded by the U.S. Department of Agriculture, was parental choice of restaurants as a connection to childhood obesity, McIntosh said.

Almost as an afterthought, the researchers decided to ask children in these families also to record what they ate and whether it was at home or out. If a meal was eaten out, the name of the restaurant was not required.

“It never occurred to me that we would have data on them eating out and where they were eating out. But the kids — if they said they ate out, they always wrote down where they ate by the name of the restaurant,” McIntosh said. “So it was just a matter of tracking down information about the restaurant to find out if they were full-service or more like a fast-food place.”

That’s where the real meat of the study was revealed, according to McIntosh.

“We had been analyzing the data for a long time when it occurred to us that because the kids had done such a great job in their time diaries that we would actually be able to distinguish between a meal at a fast-food restaurant versus a meal at a full-service restaurant,” McIntosh noted. “And somewhat to our surprise, it was father’s time spent at fast-food restaurants — not mother’s time spent there — that was associated with kids’ time spent in a fast-food place.”

“For a long time fathers have been told that they need to spend more time with their children. But often when this message is being transmitted, the message is ‘you should be having fun with your children,’” McIntosh said. “Mothers are not unimportant when it comes to eating out choices,” he said, “but in terms of statistical findings, the father findings are stronger.”

McIntosh said the message to fathers should be that they have some responsibility just like mothers to raise healthy, well-adjusted children. Also, fathers need to know more about nutritional content of fast food.

The only instances of mothers being more lax on the use of fast-food restaurants are those who are neglectful and those who are highly committed to their work, McIntosh said.

“So mothers are not unimportant when it comes to eating out choices,” he said, “but in terms of statistical findings, the father findings are stronger.”

“Traditionally academics have blamed mothers for everything that goes wrong with children, especially when it comes to food,” he added. “But I think it’s... Dads continued on page 6
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pretty clear that fathers have a substantial influence over what children are eating. And if that’s the case, then they need to be the target of education just like mothers.”

Such education might help a father change some of his own selections when at a fast-food restaurant with his family or at least have an effect on what restaurants they choose to go to, he noted.

“When I mention these findings in class, my students say they can fully understand, because when they’re with dad, he gives them choices,” said McIntosh, who also is a professor in the recreation, parks and tourism sciences department at Texas A&M University. “They are the ones who get to choose where to eat or, if they are in a grocery store, what to buy as a snack.

“So basically all you really need is a dad who says, ‘no, I think we ought to eat someplace else and this is why,’” he said. “It’s about a father taking more of a responsible role when he’s parenting.”


Researchers Find a Sensitive Period in Human Flavor Learning

Researchers found that infants were less accepting of the unpalatable protein hydrolysate formula depending on the age at which it was introduced.

In an article published in February 2011 researchers examined how infants respond to flavors and the implication this has on programming our eating behaviors (1).

In the study mother-infant pairs (n=69) were recruited, and two infant formulas that had naturally occurring variations in flavor were used. The first formula was a cow-milk-based formula (CMF) and the other was a protein hydrolysate formula (PHF), which is considered unpalatable to adults because of odors and bitter taste components. They wanted to determine if duration and timing of the formula had an effect on flavor learning.

The mother-infant pairs were randomly assigned to one of six groups. The six groups were given CMF and then were introduced to PHF at different intervals in the study. This excluded the PHF control group that only received PHF, and the CMF control group that only received CMF for the entire study.

At the conclusion of the study period, the infants in each group were given both formulas to determine their taste preferences.

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Overall, researchers observed that there were sensitive periods for flavor programming that occurred before four months of age, where an infant could be conditioned to accept a particular formula. This was dependent upon whether or not the infant received the formula and the time the formula was introduced.

When the infants received PHF later in the study, such as at 3.5 months, they were less accepting of PHF than infants who received PHF at 1.5 months.

However, the group that received PHF at 3.5 months was more accepting of the PHF than the CMF control group. In addition, it was noted that infants as young as 1.5 months can taste the PHF for the first time and reject the formula. This indicated that infants can taste the differences between PHF and CMF. CMF is considered more palatable because it resembles tastes found in the mother’s breast milk. It should not be assumed that there is only one sensitive flavor programming period, however; flavor programming is likely retained as the infant ages. In addition, more research is needed to relate these findings to other senses, such as vision, in order to further elucidate flavor learning.

This research is important, not only for what nutrients the infants will be programmed to consume later in life, but indicates the importance of making the infant familiar with flavors that their mother’s will transfer through their breast milk. This research has more clearly identified a component of our sensory system that can be used in future nutrition interventions.


By: Jenny Lee. Nutrition 129, Department of Nutrition, University of California, Davis.

Maternal Caffeine Intake and Risk of Adverse Birth Outcomes

Caffeine is one of the most pervasive substances in foods and beverages throughout Western countries, with significant intake coming from coffee and tea. In pregnant women, caffeine passes through the placenta to the baby without restriction, thus maternal caffeine intake may directly affect the fetus. In a cohort study measuring the caffeine intake of 7346 pregnant women, fetal growth characteristics and the risks of adverse birth outcomes were evaluated (1).

The caffeine consumption of the soon-to-be mothers was estimated by mail surveys, one in each trimester of pregnancy. Women reported their caffeine intake by categorizing their average number of cups of coffee or tea in a day, along with the type. In order to standardize the measurement of caffeine intake, researchers weighted the type of coffee or tea, where one cup (125 ml) of regular coffee = 1, mixed regular and decaf = 0.5, decaf coffee = 0, caffeinated tea = 0.5, mixed regular and decaf tea = 0.25, decaf tea = 0, and herbal tea = 0. Therefore, each unit of caffeine intake is weighted based upon one cup of regular, caffeinated coffee.

Fetal ultrasounds were performed in each trimester of pregnancy, in order to determine fetal growth characteristics in utero. Crown-rump length, head circumference, 

Caffeine continued on page 8
abdominal circumference, femur length, and estimated fetal weight were determined at each ultrasound.

Caffeine intake in the mothers did not have a consistent relationship with fetal head circumference or fetal weight in the second and third trimesters. While there was a slight trend (p = 0.14) toward lower birth weight in babies born to mothers consuming six or more caffeine units per day, the overall tests yielded results that were not significant. No associations were found between caffeine units and fetal head circumference growth. However, in comparison to mothers who did not consume any caffeinated beverages during pregnancy, babies born to mothers that consumed six or more units per day were significantly more likely to be small-for-gestational-age. No relationship was found between level of caffeine intake and risk of premature delivery.

The researchers showed that caffeine intake of six or more units per day was associated with risk of small-for-gestational-age birth. The results suggest that pregnant women should be advised not to consume six or more units of caffeine per day for the duration of their pregnancy.


By: Pearl Thai. Nutrition 129, Department of Nutrition, University of California, Davis.

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Extensive Television Watching Linked With Increased Risk of Type 2 Diabetes, Cardiovascular Disease and All-Cause Death

In an analysis of data from several studies, watching television for 2-3 hours per day or more was associated with a higher risk of type 2 diabetes, fatal and nonfatal cardiovascular disease and all-cause death, according to a study in the *Journal of the American Medical Association* (1).

Television (TV) viewing is the most commonly reported daily activity apart from working and sleeping in many populations around the world. In the United States, the average number of daily hours of TV viewing has recently been reported to be 5 hours. “Beyond altering energy expenditure by displacing time spent on physical activities, TV viewing is associated with unhealthy eating (e.g., higher intake of fried foods, processed meat, and sugar-sweetened beverages and lower intake of fruits, vegetables, and whole grains) in..."
both children and adults," according to background information in the article. "Physical inactivity, various dietary factors, and smoking are well-established independent risk factors of type 2 diabetes, cardiovascular disease, and all-cause mortality. Because TV viewing is the most prevalent and pervasive sedentary behavior, there is a great deal of interest in quantifying its independent association with health outcomes. However, a systematic and quantitative assessment of published studies is not available."

Anders Grøntved, M.P.H., M.Sc., of the University of Southern Denmark, Odense, and Frank B. Hu, M.D., Ph.D., of the Harvard School of Public Health, Boston, conducted a meta-analysis to summarize data from published prospective cohort studies on the association between TV viewing and the incidence of type 2 diabetes, nonfatal or fatal cardiovascular disease and all-cause mortality. The researchers performed a search of the medical literature for relevant studies from 1970 to March 2011 and identified 8 studies that met criteria for inclusion in the analysis.

For type 2 diabetes (4 studies), the total number of individuals was 175,938 with 6,428 incident cases during an average follow-up of 8.5 years. For fatal or nonfatal cardiovascular disease (4 studies), the total number of individuals was 34,253 with 1,052 incident cases during an average follow-up of 10.4 years; and for all-cause mortality (3 studies), the total number of individuals was 26,509 with 1,879 deaths during an average follow-up duration of 6.8 years.

An analysis of data indicated that per 2 hours of TV viewing time per day was associated with a 20 percent higher risk for type 2 diabetes; a 15 percent increased risk for fatal or nonfatal cardiovascular disease; and a 13 percent higher risk for all-cause mortality. "While the associations between time spent viewing TV and risk of type 2 diabetes and cardiovascular disease were linear, the risk of all-cause mortality appeared to increase with TV viewing duration of greater than 3 hours per day," the authors write.

Based on incidence rates in the United States, the researchers estimated that the absolute risk difference (cases per 100,000 individuals per year) per 2 hours of TV viewing per day was 176 for type 2 diabetes, 38 for fatal cardiovascular disease, and 104 for all-cause mortality.

"It is biologically plausible that prolonged TV viewing is associated with type 2 diabetes, cardiovascular disease, and all-cause mortality. Numerous prospective studies have reported associations of TV viewing with biological risk factors for these outcomes including obesity, adverse lipid levels, and clustered cardiovascular risk; however, some studies did not report these associations. Furthermore, associations of sedentary behaviors analogous to TV viewing (e.g., sitting during work or while driving) with type 2 diabetes, fatal or nonfatal cardiovascular disease, and all-cause mortality have been reported in cohort studies," the authors write.

"Additional research quantifying the mediating influence of diet and physical inactivity is warranted. Future research also should assess the association of prolonged daily use of new media devices on energy balance and chronic disease risk."

Reference: 1. Grøntved A, and Hu FB. Television Viewing and Risk of Type 2 Diabetes, Cardiovascular Disease, and All-Cause Mortality. J Am Med Assoc; June 2011; 305(23): 2448-2455

Overweight or obese women with less-than-optimal levels of vitamin D who lose more than 15 percent of their body weight experience significant increases in circulating levels of this fat-soluble nutrient, according to a new study by researchers at Fred Hutchinson Cancer Research Center (1).

“Since vitamin D is generally lower in persons with obesity, it is possible that low vitamin D could account, in part, for the link between obesity and diseases such as cancer, heart disease and diabetes,” said Caitlin Mason, Ph.D., lead author of the paper, published online in the American Journal of Clinical Nutrition. “Determining whether weight loss helps change vitamin D status is important for understanding potential avenues for disease prevention,” said Mason, a postdoctoral research fellow in the Hutchinson Center’s Public Health Sciences Division.

According to the National Institutes of Health, vitamin D plays many important roles in the body. It promotes calcium absorption and is needed for bone growth and bone healing. Along with calcium, vitamin D helps protect older adults from osteoporosis. The nutrient also influences cell growth, neuromuscular and immune function, and reduces inflammation. Many gene-encoding proteins that regulate cell proliferation, differentiation, and apoptosis (programmed cell death) are modulated in part by the vitamin.

The year-long study – one of the largest ever conducted to assess the effect of weight loss on vitamin D – involved 439 overweight-to-obese, sedentary, postmenopausal Seattle-area women, ages 50 to 75, who were randomly assigned to one of four groups: exercise only, diet only, exercise plus diet and no intervention.

Those who lost 5 percent to 10 percent of their body weight – equivalent to approximately 10 to 20 pounds for most of the women in the study – through diet and/or exercise saw a relatively small increase in blood levels of vitamin D (about 2.7 nanograms per milliliter, or ng/mL), whereas women who lost more than 15 percent of their weight experienced a nearly threefold increase in vitamin D (about 7.7 ng/mL), independent of dietary intake of the nutrient.

“We were surprised at the effect of weight loss greater than 15 percent on blood vitamin D levels,” said senior author Anne McTiernan, M.D., Ph.D., director of the Hutchinson Center’s Prevention Center and principal investigator of the study. “It appears that the relationship between weight loss and blood vitamin D is not linear but goes up dramatically with more weight loss. While weight loss of 5 percent to 10 percent is generally recommended to improve risk factors such as blood pressure, cholesterol and blood sugars, our findings suggest that more weight loss might be necessary to meaningfully raise blood vitamin D levels.”

About 70 percent of the participants had less-than-optimal levels of vitamin D when the study began; at baseline, the mean blood level of vitamin D among the study participants was 22.5 ng/mL. In addition, 12 percent of the women were at risk of vitamin D deficiency (blood levels of less than 12 ng/mL).

The optimal circulating range of vitamin D is thought to be between 20 and 50 ng/mL, according to a recent data review conducted by the Institute of Medicine, which found that blood levels under 20 ng/mL are inadequate for bone health and levels over 50 ng/mL are associated with potential adverse effects, such as an increased risk of developing kidney stones (2).

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Vitamin D is naturally found in some foods, such as fatty fish, and is produced within the body when skin is exposed to sunlight. According to the Institute of Medicine, just 10 minutes of sun a day is enough to trigger adequate vitamin D production. The estimated average requirement via diet or supplementation is 400 international units per day for most adults.

“It is always best to discuss supplementation with your doctor, because circulating levels can vary a lot depending on factors such as age, weight, where you live, and how much time you spend outdoors,” Mason said. Vitamin D levels tend to decrease as people age and are generally lower among those with dark skin.

It is thought that obese and overweight people have lower levels of vitamin D because the nutrient is stored in fat deposits. During weight loss, it is suspected that the vitamin D that is trapped in the fat tissue is released into the blood and available for use throughout the body.

“Vitamin D is found in several different forms in the body and its pathways of action are very complex, so the degree to which vitamin D becomes available to the body as a result of weight loss is not well understood,” Mason cautioned.

A possible link between vitamin D deficiency and chronic diseases, including cancer and heart disease, is also not well established. “More targeted research ongoing at the Hutchinson Center and elsewhere aims to better understand whether vitamin D plays a specific role in the prevention of these chronic diseases,” McTiernan said. To that end, McTiernan is recruiting Seattle-area obese and overweight postmenopausal women for a separate new study to assess the impact of vitamin D on weight loss and breast cancer risk factors.


Blueberry's Effects on Cholesterol Examined in Lab Animal Study

Laboratory hamsters that were fed rations spiked with blueberry peels and other blueberry-juice-processing leftovers had better cholesterol health than hamsters whose rations weren’t enhanced with blueberries. That’s according to a study led by U.S. Department of Agriculture (USDA) chemist Wallace H. Yokoyama (I).

Yokoyama pointed out that further research is needed to confirm whether the effects observed in hamsters hold true for humans. He works at the Western Regional Research Center operated in Albany Calif., by the Agricultural Research Service (ARS), the principal scientific research agency of USDA.

In the investigation, hamsters were fed high-fat rations. For some animals, those rations were supplemented with one of three different kinds of juice byproducts: blueberry skins—that is, peels leftover when berries are pressed to make juice; fiber extracted from the peels; or natural compounds known as polyphenols, also extracted from the peels. Blueberry polyphenols give the fruit its purple, blue, and red coloration.

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Blueberry (Continued from page 11)

In an article published in the Journal of Agricultural and Food Chemistry in 2010, Yokoyama and his coinvestigators reported that all the hamsters that were fed blueberry-enhanced rations had from 22 to 27 percent lower total plasma cholesterol than hamsters fed rations that didn’t contain blueberry juice byproducts.

Levels of VLDL (very low density lipoprotein—a form of "bad" cholesterol) were about 44 percent lower in the blueberry-fed hamsters.

Yokoyama and his coinvestigators used a procedure known as real-time reverse transcription polymerase chain reaction, or RT-PCR, to learn about the genes responsible for these effects. This approach allowed the scientists to pinpoint differences in the level of activity of certain liver genes.


Parsley, Celery Carry Crucial Component for Fight Against Breast Cancer

Parsley is usually used as a decorative accent to a scrumptious meal, but don’t set it aside just yet. In a new study, a University of Missouri researcher has found that a compound in parsley and other plant products, including fruits and nuts, can stop certain breast cancer tumor cells from multiplying and growing (1). The study was published recently in Cancer Prevention Research.

In his study, Salman Hyder, the Zalk Endowed Professor in Tumor Angiogenesis and professor of biomedical sciences in the College of Veterinary Medicine and the Dalton Cardiovascular Research Center, exposed rats with a certain type of breast cancer to apigenin, a common compound found in parsley and other plant products. The rats that were exposed to the apigenin developed fewer tumors and...
Parsley (Continued from page 12)

experienced significant delays in tumor formation compared to those rats that were not exposed to apigenin. Hyder believes this finding could impact women who are taking certain hormone replacement therapies.

“Six to 10 million women in the United States receive hormone replacement therapy (HRT),” Hyder said. “We know that certain synthetic hormones used in HRT accelerate breast tumor development. In our study, we exposed the rats to one of the chemicals used in the most common HRTs received in the United States – a progestin called medroxyprogesterone acetate (MPA) – which also happens to be the same synthetic hormone that accelerates breast tumor development.”

When tumor cells develop in the breast in response to MPA, they encourage new blood vessels to form within tumors. The blood vessels then supply needed nutrients for the tumors to grow and multiply. Hyder found that apigenin blocked new blood vessel formation, thereby delaying, and sometimes stopping, the development of the tumors. Hyder also found that the compound reduced the overall number of tumors. However, while apigenin did delay tumor growth, it did not stop the initial formation of cancer cells within the breast.

Apigenin is most prevalent in parsley and celery, but can also be found in apples, oranges, nuts and other plant products. However, apigenin is not absorbed efficiently into the bloodstream, so scientists are unsure of how much can or should be ingested.

“We don’t have specific dosage for humans yet,” Hyder said. “However, it appears that keeping a minimal level of apigenin in the bloodstream is important to delay the onset of breast cancer that progresses in response to progestins such as MPA. It’s probably a good idea to eat a little parsley and some fruit every day to ensure the minimal amount. However, you can also find this compound in pill supplements in the health food section of many stores. Of course, you should always check with your doctor before making any major changes to your diet or lifestyle.”

The next phase of studies should include human clinical trials to determine the appropriate dosage amount, Hyder said. He believes further study on humans is necessary to address any health and safety issues that might exist.


Mechanism Discovered for Health Benefit of Green Tea

One of the beneficial compounds found in green tea has a powerful ability to increase the number of “regulatory T cells” that play a key role in immune function and suppression of autoimmune disease, according to new research in the Linus Pauling Institute at Oregon State University (OSU).

This may be one of the underlying mechanisms for the health benefits of green tea, which has attracted wide interest for its ability to

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help control inflammation, improve immune function and prevent cancer.

Pharmaceutical drugs are available that perform similar roles and have been the subject of much research, scientists say, but they have problems with toxicity. A natural food product might provide a long-term, sustainable way to accomplish this same goal without toxicity, researchers said.

“This appears to be a natural, plant-derived compound that can affect the number of regulatory T cells, and in the process improve immune function,” said Emily Ho, an LPI principal investigator and associate professor in the OSU Department of Nutrition and Exercise Sciences.

“When fully understood, this could provide an easy and safe way to help control autoimmune problems and address various diseases,” Ho said.

The findings have been published in Immunology Letters, a professional journal.

There are many types of cells that have different roles in the immune system, which is a delicate balancing act of attacking unwanted invaders without damaging normal cells. In autoimmune diseases, which can range from simple allergies to juvenile diabetes or even terminal conditions such as Lou Gehrig’s disease, this process goes awry and the body mistakenly attacks itself.

Some cells exist primarily to help control that problem and dampen or “turn off” the immune system, including regulatory T cells. The number and proper function of those regulatory T cells, in turn, is regulated by other biological processes such as transcription factors and DNA methylation.

In this study, OSU scientists did experiments with a compound in green tea, a polyphenol called EGCG, which is believed to be responsible for much of its health benefits and has both anti-inflammatory and anti-cancer characteristics. They found it could cause a higher production of regulatory T cells. Its effects were not as potent as some of those produced by prescription drugs, but it also had few concerns about long-term use or toxicity.

“EGCG may have health benefits through an epigenetic mechanism, meaning we aren’t changing the underlying DNA codes, but just influencing what gets expressed, what cells get turned on,” Ho said. “And we may be able to do this with a simple, whole-food approach.”

Laboratory studies done with mice, Ho said, showed that treatment with EGCG significantly increased the numbers and frequencies of regulatory T cells found in spleen and lymph nodes, and in the process helped to control the immune response.

“Epigenetic regulation can be potentially exploited in generating suppressive regulatory T cells for therapeutic purposes, and is of significant clinical importance for the suppression of autoimmune diseases,” the researchers said in their study.


Study Confirms Cancer-Targeting Ability of Nutrient in Broccoli

Sulforaphane, one of the primary phytochemicals in broccoli and other cruciferous vegetables that helps them prevent cancer, has been shown for the first time to selectively target and kill cancer cells while leaving normal prostate cells healthy and unaffected (1).

The findings, made by scientists in the Linus Pauling Institute at Oregon State University, are another important step forward for the potential use of sulforaphane in cancer prevention and treatment. Clinical prevention trials are already under way for its use in these areas, particularly prostate and breast cancer.

It appears that sulforaphane, which is found at fairly high levels in broccoli, cauliflower and other cruciferous vegetables, is an inhibitor of histone deacetylase, or HDAC enzymes. HDAC inhibition is one of the more promising fields of cancer treatment and is being targeted from both a pharmaceutical and dietary approach, scientists say.

“It’s important to demonstrate that sulforaphane is safe if we propose to use it in cancer prevention or therapies,” said Emily Ho, a principal investigator in the Linus Pauling Institute, lead author on the study and associate professor in the OSU Department of Nutrition and Exercise Sciences.

“Just because a phytochemical or nutrient is found in food doesn’t always mean its safe, and a lot can also depend on the form or levels consumed,” Ho said. “But this does appear to be a phytochemical that can selectively kill cancer cells, and that’s always what you look for in cancer therapies.”

The findings were published in *Molecular Nutrition and Food Research*. Research was supported by the National Cancer Institute, National Institute of Environmental Health Sciences and the OSU Agricultural Experiment Station.

The Linus Pauling Institute has conducted some of the leading studies on sulforaphane’s role as an HDAC inhibitor – one, but not all, of the mechanisms by which it may help prevent cancer. HDACs are a family of enzymes that, among other things, affect access to DNA and play a role in whether certain genes are expressed or not, such as tumor suppressor genes.

Some of the mechanisms that help prevent inappropriate cell growth – the hallmark of cancer – are circumvented in cancer cells. HDAC inhibitors can help “turn on” these silenced genes and restore normal cellular function.

Previous studies done with mouse models showed that prostate tumor growth was slowed by a diet containing sulforaphane.

“It is well documented that sulforaphane can target cancer cells through multiple chemopreventive mechanisms,” the researchers wrote in their study. “Here we show for the first time that sulforaphane selectively targets benign hyperplasia cells and cancerous prostate cells while leaving the normal prostate cells unaffected.”

“These findings regarding the relative safety of sulforaphane to normal tissues have significant clinical relevance as the use of sulforaphane moves towards use in human clinical trials,” they said.

The results also suggest that consumption of sulforaphane-rich foods should be non-toxic, safe, simple and affordable.


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