More Evidence That Spicing Up Broccoli Boosts Its Cancer-Fighting Power

Teaming fresh broccoli with a spicy food that contains the enzyme myrosinase significantly enhances each food’s individual cancer-fighting power and ensures that absorption takes place in the upper part of the digestive system where you’ll get the maximum health benefit, suggests a new University of Illinois study (1).

"To get this effect, spice up your broccoli with broccoli sprouts, mustard, horseradish, or wasabi. The spicier, the better; that means it's being effective," said Elizabeth Jeffery, a U of I professor of nutrition.

In the study, when fresh broccoli sprouts were eaten with broccoli powder, the scientists were able to measure bioactive compounds in the blood 30 minutes later. When these peaked at three hours, they were much higher when the foods were eaten together than when either was eaten alone. Urine samples corroborated the blood results, said Jenna Cramer, lead author of the study.

"However, this study shows that even if broccoli is overcooked, you can still boost its benefits by pairing it with another food that contains myrosinase," she said.

Using mustard, horseradish, or wasabi to spice up your broccoli may result in increased intake of healthy phytochemicals like sulforaphane.

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Myrosinase is the enzyme necessary to form sulforaphane, the vegetable's cancer-preventive component, co-author Margarita Teran-Garcia explained.

Note what happened with the fresh broccoli sprouts and broccoli powder eaten in this experiment. The powder doesn’t contain myrosinase, but it does contain the precursor to the anti-cancer agent sulforaphane. Eaten together, the sprouts were able to lend their myrosinase to the powder. As predicted, both foods produced sulforaphane and provided greater anti-cancer benefit, Jeffery said.

Other foods that will boost broccoli’s benefits if they are paired together include radishes, cabbage, arugula, watercress, and Brussels sprouts.

"Here's another benefit of protecting and enhancing the myrosinase in your foods," Jeffery said. "If myrosinase is present, sulforaphane is released in the ilium. Absorption happens well and quickly there, which is why we saw bioactivity in 30 minutes."

An earlier Jeffery study showed that microbiota are capable of releasing sulforaphane in the lower gut, but absorption happens more slowly in the colon than in the upper intestine, she said.

Scientists say that as little as three to five servings of broccoli a week provide a cancer-protective benefit.

"But it pays to spice it up for added benefits and find ways to make it appealing so you don't mind eating it if you're not a broccoli fan. I add fresh broccoli sprouts to sandwiches and add them as one of my pizza toppings after the pie is out of the oven," Cramer said.

Increased Caffeinated Coffee Consumption Associated With Decreased Risk of Depression in Women

The risk of depression appears to decrease for women with increasing consumption of caffeinated coffee, according to a report in the Archives of Internal Medicine (1).

Caffeine is the most frequently used central nervous system stimulant in the world, and approximately 80 percent of consumption is in the form of coffee, according to background information in the article. Previous research, including one prospective study among men, has suggested an association between coffee consumption and depression risk. Because depression is a chronic and recurrent condition that affects twice as many women as men, including approximately one of every five U.S. women during their lifetime, "identification of risk factors for depression among women and the development of new preventive strategies are, therefore, a public health priority," write the authors. They sought to examine whether, in women, consumption of caffeine or certain caffeinated beverages is associated with the risk of depression.

Michel Lucas, Ph.D., R.D., from the Harvard School of Public Health, Boston, and colleagues studied 50,739 U.S. women who participated in the Nurses' Health Study. Participants, who had a mean (average) age of 63, had no depression at the start of the study in 1996 and were prospectively followed up with through June 2006. Researchers measured caffeine consumption through questionnaires completed from May 1980 through April 2004, including the frequency that caffeinated and non-caffeinated coffee, non-herbal tea, caffeinated soft drinks (sugared or low-calorie colas), caffeine-free soft drinks (sugared or low-calorie caffeine-free colas or other carbonated beverages) and chocolate were usually consumed in the previous 12 months. The authors defined depression as reporting a new diagnosis of clinical depression and beginning regular use of antidepressants in the previous two years.

Analysis of the cumulative mean consumption included a two-year latency period; for example, data on caffeine consumption from 1980 through 1994 were used to predict episodes of clinical depression from 1996 through 1998; consumption from 1980 through 1998 were used for the 1998 through 2000 follow-up period; and so on. During the 10-year follow-up period from 1996 to 2006, researchers identified 2,607 incident (new-onset) cases of depression. When compared with women who consumed one cup of caffeinated coffee or less per week, those who consumed two to three cups per day had a 15 percent decrease in relative risk for depression. Those who drank four cups or more per day had a 20 percent decrease in risk.

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Depression (Continued from page 3)
depression. No association was found between intake of decaffeinated coffee and depression risk.

"In this large prospective cohort of older women free of clinical depression or severe depressive symptoms at baseline, risk of depression decreased in a dose-dependent manner with increasing consumption of caffeinated coffee," write the authors. They note that this observational study "cannot prove that caffeine or caffeinated coffee reduces the risk of depression but only suggests the possibility of such a protective effect." The authors call for further investigations to confirm their results and to determine whether usual caffeinated coffee consumption could contribute to prevention or treatment of depression.


Zinc Regulates Communication Between Brain Cells

Zinc has been found to play a critical role in regulating communication between cells in the brain, possibly governing the formation of memories and controlling the occurrence of epileptic seizures (1).

A collaborative project between Duke University Medical Center researchers and chemists at the Massachusetts Institute of Technology has been able to watch zinc in action as it regulates communication between neurons in the hippocampus, where learning and memory processes occur -- and where disrupted communication may contribute to epilepsy.

"We discovered that zinc is essential to control the efficiency of communication between two critical populations of nerve cells in the hippocampus," said James McNamara, M.D., senior author and chair of the Department of Neurobiology at Duke. "This addresses a longstanding controversy in the field."

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The study appears online in the journal *Neuron*.

McNamara noted that zinc supplements are commonly sold over the counter to treat several different brain disorders, including depression. It isn’t clear whether these supplements modify zinc content in the brain, or modify the efficiency of communication between these nerve cells.

He emphasized that people taking zinc supplements should be cautious, pending needed information on the desired zinc concentrations and how oral supplements affect them.

More than 50 years ago, scientists discovered that high concentrations of zinc are contained in a specialized compartment of nerve cells, called vesicles, that package the transmitters which enable nerve cells to communicate. The highest concentrations of brain zinc were found among the neurons of the hippocampus, the center of learning and memory.

Zinc’s presence in these vesicles suggested that zinc played some role in communication between nerve cells, but whether it actually did so remained controversial.

To address this controversy, McNamara and his colleagues at Duke teamed up with Dr. Steve Lippard and colleagues in the Department of Chemistry at the Massachusetts Institute of Technology.

The Lippard team synthesized a novel chemical that bound zinc far more rapidly and selectively than previously available compounds. Use of this chemical let the Duke team rapidly bind the zinc released by nerve cells, taking it out of circulation and preventing enhanced communication.

The Duke team went on to confirm that eliminating zinc from the vesicles of mutant mice also prevented enhanced communication. They also found that increases in the transmitter glutamate seemed to increase zinc-mediated enhancement of communication.

Interestingly, the nerve cells in which the high concentrations of zinc reside are critical for a particular type of memory formation. Excessive enhancement of communication by the zinc-containing nerve cells occurs in epileptic animals and may worsen the severity of the epilepsy.

"Carefully controlling zinc’s regulation of communication between these nerve cells is critical to both formation of memories and perhaps to occurrence of epileptic seizures," McNamara said.

McNamara also noted that the scientific collaboration between the Duke and MIT scientists was critical to the success of this work. The availability of the novel chemical provided a critical tool that allowed the neuroscientists to unravel the puzzle.


Oral Steroids Linked To Severe Vitamin D Deficiency In Nationwide Study

People taking oral steroids are twice as likely as the general population to have severe vitamin D deficiency, according to a study of more than 31,000 children and adults by scientists at Albert Einstein College of Medicine of Yeshiva University. Their findings, published in the *Journal of Clinical Endocrinology and Metabolism*, suggest that physicians should more diligently monitor vitamin D levels in patients being treated with oral steroids.

"When doctors write that prescription for steroids and they’re sending the patients for lab tests, they should also get the vitamin D level measured," said study lead author Amy Skversky, M.D., M.S., assistant professor of pediatrics at Einstein and Montefiore Medical Center, the University Hospital for Einstein.

The severe vitamin D deficiency assessed in this study (defined as levels below 10 nanograms per milliliter of blood) is known to be associated with osteomalacia (softening of the bones), rickets (softening of bones in children) and clinical myopathy (muscle weakness). While there is much debate on the issue, vitamin D levels between 20 and 50 ng/ml are generally considered adequate for bone and overall health in healthy individuals. Steroids have been shown to cause vitamin D deficiency, possibly by increasing levels of an enzyme that inactivates the vitamin.

Smaller studies involving people often prescribed steroids (i.e., children with asthma and patients with Crohn’s disease and lupus) have found significantly reduced vitamin D levels in these patients. To further assess this association between steroid use and vitamin D levels, the Einstein researchers carried out the first-ever study of a large, nationally representative sample of people.

The researchers examined data collected from participants who had participated in the National Health and Nutrition Examination Survey 2001-2006. About one percent of the participants answered “yes” when asked if they had used oral steroids during the previous 30 days.

Eleven percent of the self-reported steroid users had severely low vitamin D levels compared with a severe vitamin D deficiency of 5 percent for people not taking steroids — a two-fold increased risk for severe vitamin D deficiency. The risk was particularly pronounced for steroid users under 18, who were 14 times more likely to have a severe vitamin D deficiency compared with young non-steroid users. (Participants who reported using inhaled steroids were not included in the steroid-user group.)


Pale People May Need Vitamin D Supplements

Fair-skinned people who burn quickly in the sun may need to take supplements to ensure they get the right amount of vitamin D, according to a new study (1).

Researchers at the University of Leeds suggest that people with very pale skin may be unable to spend enough time in the sun to make the amount of vitamin D the body needs - while also avoiding sunburn. This study defined fair-skinned as people with freckles, blue eyes or any tendency to get sunburnt.

The study, published in Cancer Causes and Control and funded by Cancer Research UK, suggested that melanoma patients may need vitamin D supplements as well.

But researchers also noted that sunlight and supplements are not the only factors that can determine the level of vitamin D in a person’s body. Some inherited differences in the way people’s bodies process vitamin D into the active form also have a strong effect on people’s vitamin D levels.

Researchers took the vitamin D levels of around 1,200 people and found that around 730 people had a sub-optimal level. Those with fair skin had significantly lower levels.

Professor Julia Newton-Bishop, lead author of the study based in the Cancer Research UK center at the University of Leeds, said: "Fair-skinned individuals who burn easily are not able to make enough vitamin D from sunlight and so should take vitamin D supplements.

"This should be considered for the majority of populations living in a mild climate like the UK and melanoma patients in particular."

The study defined the optimal amount of vitamin D required by the body as at least 60nmol/L. At present there is no universally agreed standard definition of an optimal level of vitamin D. Researchers chose 60nmol/L in part because there is evidence that levels lower than this are linked to greater risk of heart disease and poorer survival from breast cancer.

A consensus between health charities including Cancer Research UK says that levels below 25nmol/L are vitamin D deficient which means that these levels are associated with poor bone health. But some researchers consider that higher levels, around 60nmol/l, may be desirable for optimal health effects.

Sara Hiom, director of health information at Cancer Research UK, said: "We must be careful about raising the definition of deficiency or sufficiency to higher levels until we have more results from trials showing that maintaining such levels has clear health benefits and no health risks.

"We do know that some groups can have a higher risk of vitamin D deficiency. These include people with naturally brown or black skin who need much more sunlight to increase their vitamin D levels, pregnant women and people who don’t go outside much. If you are worried about your vitamin D levels, our advice is to go see your doctor."


Overall Quality Of Pregnant Woman's Diet Affects Risk For Two Types Of Birth Defects, Study Shows

The overall quality of a pregnant woman’s diet is linked with risk for two types of serious birth defects, a new study from the Stanford University School of Medicine has shown (1). In the study, women who ate better before and during pregnancy gave birth to fewer infants with malformations of the brain and spinal cord, or orofacial clefts, such as cleft lip and cleft palate.

Prior research on diet and birth defects has generally addressed one nutrient at a time. For instance, the B vitamin folic acid has been shown to protect against brain or spinal cord malformations known as neural tube defects, which include anencephaly (a fatal defect in which the brain is lacking) and spina bifida (an opening in the spinal column). However, after fortification of the U.S. food supply with folic acid was implemented in 1998, these types of birth defects did not completely disappear. And other defects, including cleft lip and palate, remained a concern in the population. So scientists began examining other single-nutrient players in the diet-defect connection.

The new study took a different approach.

“Our study showed for the first time that the overall quality of the diet, and not just a single nutrient, matters in terms of reducing the risk of birth defects,” said Suzan Carmichael, Ph.D., who is the first author of the study and an associate professor of pediatrics. The study was also the first to connect diet quality with reduced risk for cleft lip or cleft palate, she added.

“In the past, we’ve been trying to disentangle a particular nutrient from the composite diet. I think we’re wrong in that approach,” said Gary Shaw, D.Ph., professor of pediatrics and the study’s senior author. “It would have been really nice to have the magic bullet against birth defects. Folic acid was the hope for a magic bullet, and it clearly made a difference, but only made some of the difference.”

The study, published in Archives of Pediatrics & Adolescent Medicine, asked women from 10 U.S. states to answer detailed questions about their eating habits immediately before and during pregnancy. The subjects included 3,824 women whose fetuses or infants had a neural tube defect or a cleft lip or palate, and 6,807 women with healthy infants. The researchers analyzed the diet information using two well-validated methods for scoring overall diet quality. One score measures how well the diet matches a Mediterranean pattern, a diet rich in fruits, vegetables, whole grains, seafood and heart-healthy fat sources such as olive oil; the second score assesses similarity to the Dietary Guidelines for Americans issued by the U.S. Department of Health and Human Services and the U.S. Department of Agriculture, which emphasize low-fat, fiber-rich foods, including lots of fruits and vegetables and low intake of processed foods. The two scoring systems have much in common, with both awarding high

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scores for consumption of fruits and vegetables and low scores for foods that deliver unhealthy saturated fats, such as red meat or butter, for example.

To calculate the protection conferred by the healthiest diets, women were ranked by diet score and then divided into four comparison groups. The women with the highest scores (in the top 25 percent) were 36 to 51 percent less likely than those with the lowest scores (the lowest 25 percent) to have a pregnancy affected by anencephaly, depending on which dietary scoring system was used. Similarly, the women with the highest diet quality scores had approximately 24 to 34 percent protection against giving birth to a child with cleft lip. Higher diet quality was also protective against the other two birth defects that were studied — spina bifida and cleft palate — but results were not quite as strong.

“The take-home message from the current work is that diet matters,” Shaw said. “A better diet seems to make a difference in protecting against birth defects.”

The reason a generally healthy diet confers more protection against these birth defects than a single measure, such as folic acid supplementation, is still not known, the researchers said. However, there are several possibilities. For one thing, eating a variety of healthy foods doesn’t leave as much room in the diet for junk foods. Avoidance of unhealthy foods might explain some of the reduced risk.

Another possibility is that healthy foods are more than the sum of their nutrients.

“We may be capturing qualities of these foods that are beneficial to health but haven’t been measured in isolation,” Carmichael said. And the combinations of nutrients in such foods may also be important, she added. “In our bodies, nutrients interact. They don’t just act in isolation; they depend on each other.” So, for instance, eating fruits and vegetables that deliver several nutrients simultaneously may have greater benefits than consuming more of a single nutrient, she said.

“It’s also possible that healthy diet is a marker for some other component of a mother’s lifestyle that protects against birth defects.

The researchers plan to extend their findings with future studies that examine the relationship between diet quality and other pregnancy outcomes, including other types of birth defects. They also hope to gain a better understanding of how a healthy diet exerts its protective effect.

New research, led by psychologists at the University of Bristol, has found that children who are familiar with a snack food will expect it to be more filling (1). This finding, published in the American Journal of Clinical Nutrition, is important because it reveals one way in which children over-consume snack foods and increase their risk of becoming overweight.

Children are at risk of obesity due to consumption of energy-rich snack foods that are often high in calories and associated with weight gain. The study aimed to establish whether familiarity with snack foods (i.e. eating them more frequently) would change the children’s expectations about fullness.

Dr. Charlotte Hardman, one of the authors from the Nutrition and Behavior Unit in the University’s School of Experimental Psychology, said: “We know from previous work with adults that we have beliefs and expectations about how filling foods will be, and these expectations can change. Moreover, ‘fullness expectations’ are important determinants of meal-size selection, for example foods that are believed to be more filling are selected in smaller portions.”

Seventy 11- to 12-year-old children took part in the study. They used a specialized computer task in order to quantify the fullness that they expected from different snack food products. They also reported how frequently they ate the snack foods.

The researchers found that familiarity helps children to predict the fullness that is associated with snack foods, which, in turn, informs appropriate decisions about portion sizes. The team also discovered that children who were infrequent consumers tended to rely on the physical appearance of the food, for example volume, in their judgments about fullness. This strategy would be expected to promote selection of larger portion sizes.

Dr. Hardman added: “Presenting children with a wide variety of different snack food products may make it difficult to predict their fullness. Our study suggests that if parents choose to give snack foods to their children, they may wish to stick to the same products.”


Natural Compound Helps Reverse Diabetes In Mice

Researchers at Washington University School of Medicine in St. Louis have restored normal blood sugar metabolism in diabetic mice using a compound the body makes naturally (1). The finding suggests that it may one day be possible for people to take the compound much like a daily vitamin as a way to treat or even prevent type 2 diabetes.

This naturally occurring compound is called nicotinamide mononucleotide, or NMN, and it plays a vital role in how cells use energy.

“After giving NMN, glucose tolerance goes completely back to normal in female diabetic mice,” says Shin-ichiro Imai, M.D., Ph.D., associate professor of developmental biology. “In males, we see a milder effect compared to females, but we still see an effect. These are really remarkable results. NMN improves diabetic symptoms, at least in mice.”

The research appeared in Cell Metabolism.

Imai says this discovery holds promise for people because the mechanisms that NMN influences are largely the same in mice and humans.

“But whether this mechanism is equally compromised in human patients with type 2 diabetes is something we have to check,” Imai says. “We have plans to do this in the very near future.”

All cells in the body make NMN in a chain of reactions leading to production of NAD, a vital molecule that harvests energy from nutrients and puts it into a form cells can use. Among other things, NAD activates a protein called SIRT1 that has been shown to promote healthy metabolism throughout the body, from the pancreas to the liver to muscle and fat tissue.

According to the study, aging and eating a high-fat diet reduce production of NMN, slowing the body’s production of NAD and leading to abnormal metabolic conditions such as diabetes. NAD cannot be given to the mice directly because of toxic effects. But after administering NMN, levels of NAD rise and the diabetic mice show dramatically improved responses to glucose. In some cases, they return to normal.

“I’m very excited to see these results because the effect of NMN is much bigger than other known compounds or chemicals,” says first author Jun Yoshino, M.D., Ph.D., postdoctoral research associate. “Plus, the fact that the body naturally makes NMN is promising for translating these findings into humans.”

Imai and his colleagues found that young, healthy mice on a high-fat diet developed diabetes in six months or less. In these mice, they found that NAD levels were reduced. But after administering NMN, levels of NAD increased and the female mice had normal results in glucose tolerance tests -- a measure of how well the body moves glucose from the blood to the organs and tissues for use. Glucose tolerance was also improved after male diabetic mice received NMN but did not quite return to normal. The researchers are interested in learning more about these differences between male and female mice.
“We don’t have a clear answer, but we are speculating that sex hormones, such as estrogen, may be important downstream for NAD synthesis,” Yoshino says.

In older mice, they observed that about 15 percent of healthy males fed a normal diet developed diabetes.

“When we injected these older diabetic mice with NMN, they had improved glucose tolerance, even after one injection,” says Kathryn F. Mills, research lab supervisor and an equally contributing first author of the study. “We also injected older healthy mice and found that they weren’t adversely affected. It’s good to know that even if the mice are not diabetic, giving NMN is not going to hurt them.”

Imai says few studies have examined normal mice that naturally develop diabetes as a simple result of aging because the experiments take so long. In an interesting twist, few elderly female mice developed diabetes at all. But after switching to a high fat diet, older female mice quickly developed severe diabetes.

“Again, when we injected these females with NMN, we came up with a completely normal glucose tolerance curve,” Mills says. “We can also see that the NMN has completely reversed and normalized the levels of cholesterol, triglycerides and free fatty acids.”

Though the mice received NMN by injection in this study, Imai’s group is now conducting a long-term study of diabetic mice that get NMN dissolved in their drinking water. Imai calls this work a first step toward a possible “nutraceutical” that people could take almost like a vitamin to treat or even prevent type 2 diabetes.

“Once we can get a grade of NMN that humans can take, we would really like to launch a pilot human study,” Imai says.


To Ditch Dessert, Feed the Brain

If the brain goes hungry, Twinkies look a lot better, a study led by researchers at Yale University and the University of Southern California has found (1).

Brain imaging scans show that when glucose levels drop, an area of the brain known to regulate emotions and impulses loses the ability to dampen desire for high-calorie food, according to the study published in the Journal of Clinical Investigation.

"Our prefrontal cortex is a sucker for glucose," said Rajita Sinha, the Foundations Fund Professor of Psychiatry, and professor in the Department of Neurobiology and the Yale Child Study Center, one of the senior authors of the research.

The Yale team manipulated glucose levels intravenously and

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monitored changes in blood sugar levels while subjects were shown pictures of high-calorie food, low-calorie food and non-food as they underwent fMRI scans.

When glucose levels drop, an area of the brain called the hypothalamus senses the change. Other regions called the insula and striatum associated with reward are activated, inducing a desire to eat, the study found. The most pronounced reaction to reduced glucose levels was seen in the prefrontal cortex. When glucose is lowered, the prefrontal cortex seemed to lose its ability to put the brakes upon increasingly urgent signals to eat generated in the striatum. This weakened response was particularly striking in the obese when shown high-calorie foods.

"This response was quite specific and more dramatic in the presence of high-calorie foods," Sinha said.

"Our results suggest that obese individuals may have a limited ability to inhibit the impulsive drive to eat, especially when glucose levels drop below normal," commented Kathleen Page, assistant professor of medicine at the University of Southern California and one of the lead authors of the paper.

A similarly robust response to high-calorie food was also seen in the striatum, which became hyperactive when glucose was reduced. However, the levels of the stress hormone cortisol seemed to play a more significant role than glucose in activating the brain’s reward centers, note the researchers. Sinha suggests that the stress associated with glucose drops may play a key role in activating the striatum.

"The key seems to be eating healthy foods that maintain glucose levels," Sinha said. "The brain needs its food."


Study Links Drinking Pattern to Alcohol’s Effect on Heart Health

For the first time, new research shows that patterns of alcohol consumption – a drink or two every night, or several cocktails on Friday and Saturday nights only – may be more important in determining alcohol’s influence on heart health than the total amount consumed.

In the journal Atherosclerosis, scientists found that daily moderate drinking – the equivalent of two drinks per day, seven days a week – decreased atherosclerosis in mice, while binge drinking – the equivalent of seven drinks a day, two days a week – increased development of the disease. Atherosclerosis, or the hardening and narrowing of arteries, is a serious condition that can lead to a heart attack or stroke.

While population studies support an association between

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alcohol and cardiovascular disease, they’ve relied on self-reported data, which is not always accurate or reliable. According to study authors, this is the first study to provide concrete evidence linking drinking patterns to the development of vascular disease, and the nearly 15 percent of Americans who binge drink – as estimated by the Centers for Disease Control and Prevention – should take note.

“People need to consider not only how much alcohol they drink, but the way in which they are drinking it,” said lead study author John Cullen, Ph.D., research associate professor in the Department of Surgery at the University of Rochester Medical Center. “Research shows that people have yet to be convinced of the dangers of binge drinking to their health; we’re hoping our work changes that.”

Scientists don’t yet understand how moderate alcohol consumption benefits cardiovascular health or how heavy drinking episodes hurt it.

The National Institute on Alcohol Abuse and Alcoholism defines binge or “at-risk” drinking as consuming more than four drinks on any day for men, and more than three drinks on any day for women. Understanding how much alcohol is in a “standard” drink is also critical, something the institute is promoting through its new “Rethinking Drinking” campaign.

Health care professionals also need to be aware that drinking style matters and should address the issue when discussing alcohol consumption with patients, especially those who are at higher risk of atherosclerosis or who have suffered a heart attack in the past, added Cullen.

“This evidence is very interesting because it supports a pattern of drinking that is emerging in clinical studies as both safe and seemingly most protective against heart disease – frequent consumption of limited amounts of alcohol. This certainly backs up widespread clinical guidelines that limit drinking to one drink daily for non-pregnant women and two drinks daily for men,” said Kenneth Mukamal, M.D., M.P.H., Associate Professor of Medicine at Harvard Medical School who studies the role of dietary and lifestyle factors, particularly alcohol consumption, on the incidence of cardiovascular and neurovascular disease.

In the study, mice in the “daily-moderate” group were fed ethanol equivalent to two drinks every day of the week, mice in the “weekend-binge” group were fed approximately seven drinks on two days of the week and mice in the control group were fed a non-alcoholic cornstarch mix. All mice were put on an atherogenic diet, which Cullen
equates to a high-fat Western diet – think fried food every day – to encourage the development of atherosclerosis, which forms when fatty deposits or plaque collect on the inner walls of the arteries, causing them to narrow.

Levels of LDL or “bad” cholesterol plummeted 40 percent in the daily-moderate drinking mice, but rose 20 percent in the weekend-binge drinking mice, compared to the no-alcohol controls. High levels of bad cholesterol increase the risk of heart disease, and past studies show that every 10 percent increase in LDL results in a 20 percent increase in atherosclerosis risk.

Surprisingly, levels of HDL or “good” cholesterol went up in both the moderate and binge drinking groups, which Cullen speculates is an acute or short-term effect.

The volume of plaque, as well as the accumulation of immune cells that promote inflammation and consequently contribute to the narrowing of arteries, decreased in the moderate mice compared to no-alcohol mice. The opposite occurred in the binge-drinking mice: Plaque volume and the number of inflammatory immune cells grew.

Another unexpected yet noteworthy finding was that the binge-drinking mice gained significantly more weight than the moderate and control mice. Though all mice started at approximately the same weight and consumed similar amounts of food over the course of the study, the binge mice gained more than three times as much weight as the moderate mice and about twice as much weight as the control mice.

Building on this study, Cullen is investigating genes that are turned on or off following moderate and binge drinking episodes to determine if they influence outcomes.

The research was supported in part by the Founders Affiliate of the American Heart Association, which supports research exploring new ideas to combat cardiovascular disease. Founders Affiliate research committee chair Lucy Liaw, Ph.D., said these first-time findings could have far-reaching public health implications. “The discoveries of Dr. Cullen’s group show that binge drinkers may have increased risk of developing atherosclerosis and experiencing weight gain. Because obesity is also a risk factor for disease, binge drinking may have a strong negative impact on cardiovascular health,” said Liaw, who is also a member of the AHA national research committee.


Source: University of Rochester Medical Center News Room; Sep. 7, 2011; http://www.urmc.rochester.edu/news/story/index.cfm?id=3288
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