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Red meat linked to increased risk of type 2 diabetes

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A new study by Harvard School of Public Health (HSPH) researchers finds a strong association between the consumption of red meat—particularly when the meat is processed—and an increased risk of type 2 diabetes. The study also shows that replacing red meat with healthier proteins, such as low-fat dairy, nuts, or whole grains, can significantly lower the risk.

The study, led by An Pan, research fellow in the HSPH Department of Nutrition, will be published online in the *American Journal of Clinical Nutrition* on August 10, 2011 and will appear in the October print edition.

Pan, senior author Frank Hu, professor of nutrition and epidemiology at HSPH, and colleagues analyzed questionnaire responses from 37,083 men followed for 20 years in the Health Professionals Follow-Up Study; 79,570 women followed for 28 years in the Nurses' Health Study I; and 87,504 women followed for 14 years in the Nurses' Health Study II. They also conducted an updated meta-analysis, combining data from their new study with data from existing studies that included a total of 442,101 participants, 28,228 of whom developed type 2 diabetes during the study. After adjusting for age, body mass index (BMI), and other lifestyle and dietary risk factors, the researchers found that a daily 100-gram serving of unprocessed red meat (about the size of a deck of cards) was associated with a 19% increased risk of type 2 diabetes. They also found that one daily serving of half that quantity of processed meat—50 grams (for example, one hot dog or sausage or two slices of

bacon)—was associated with a 51% increased risk.

"Clearly, the results from this study have huge public health implications given the rising type 2 diabetes epidemic and increasing consumption of red meats worldwide," said Hu. "The good news is that such troubling risk factors can be offset by swapping red meat for a healthier protein."

The researchers found that, for an individual who eats one daily serving of red meat, substituting one serving of nuts per day was associated with a 21% lower risk of type 2 diabetes; substituting low-fat dairy, a 17% lower risk; and substituting whole grains, a 23% lower risk.

Based on these results, the researchers advise that consumption of processed red meat—like hot dogs, bacon, sausage, and deli meats, which generally have high levels of sodium and nitrites—should be minimized and unprocessed red meat should be reduced. If possible, they add, red meat should be replaced with healthier choices, such as nuts, whole grains, low-fat dairy products, fish, or beans.

Worldwide, diabetes has reached epidemic levels, affecting nearly 350 million adults. In the U.S. alone, more than 11% of adults over age 20—25.6 million people—have the disease, according to the Centers for Disease Control and Prevention. Most have type 2 diabetes, which is primarily linked to obesity, physical inactivity, and an unhealthy diet.

Previous studies have indicated that eating processed red meats increases the risk of developing type 2 diabetes. Risks from unprocessed meats have been less clear. For instance, in 2010, HSPH researchers found no clear evidence of an association between eating unprocessed meats and increased risk for either coronary heart disease or type 2 diabetes, but that study was based on smaller samples than the current study, and the researchers recommended further study of unprocessed meats. Another HSPH study in 2010 linked eating red meat with an increased risk of

heart disease—which is strongly linked to diabetes—but did not distinguish between processed and unprocessed red meats.

This new study—the largest of its kind in terms of sample size and follow-up years—finds that both unprocessed and processed meats pose a type 2 diabetes risk, thus helping to clarify the issue. In addition, this study is among the first to estimate the risk reduction associated with substituting healthier protein choices for red meat.

"Our study clearly shows that eating both unprocessed and processed red meat—particularly processed—is associated with an increased risk of type 2 diabetes," said Pan. He noted that the 2010 U.S. dietary guidelines continue to lump red meat together with fish, poultry, eggs, nuts, seeds, beans, and soy products in the "protein foods" group. But since red meat appears to have significant negative health effects—increased risk of diabetes, cardiovascular disease, and even total mortality, as suggested by several recent studies—Pan suggested the guidelines should distinguish red meat from healthier protein sources and promote the latter instead.

More information: "Red Meat Consumption and Risk of Type 2 Diabetes: 3 Cohorts of U.S. Adults and an Updated Meta-Analysis," An Pan, Qi Sun, Adam M. Bernstein, Matthias B. Schulze, JoAnn E. Manson, Walter C. Willett, and Frank B. Hu, *American Journal of Clinical Nutrition*, online August 10, 2011.

Provided by Harvard School of Public Health