

Calorie restricted diet prevents pancreatic inflammation and cancer

April 15 2008

Prevention of weight gain with a restricted calorie diet sharply reduced the development of pancreatic lesions that lead to cancer in preclinical research reported today by researchers from The University of Texas at Austin and The University of Texas M. D. Anderson Cancer Center at the American Association for Cancer Research annual meeting.

The research sheds light on the connection between obesity, calorie intake and pancreatic cancer by comparing a calorie restricted diet, an overweight diet and an obesity-inducing diet in a strain of mice that spontaneously develops pancreatic lesions that lead to cancer.

"Obesity is a known risk factor for pancreatic cancer, but the mechanism underlying that relationship is unknown," said senior author Stephen D. Hursting, Ph.D., professor in M. D. Anderson's Department of Carcinogenesis and Chair of the Division of Nutritional Sciences at the University of Texas. "Our findings indicate that calorie restriction hinders development of pancreatic cancer, which could have implications for prevention and treatment of pancreatic tumors caused by chronic inflammation and obesity."

The group's analysis points to a connection between calorie intake and a protein called Insulin-like Growth Factor (IGF) -1, with obesity increasing and calorie restriction decreasing levels of IGF-1. IGF-1 is an important growth factor known to stimulate the growth of many types of cancer cells. Inflammatory signaling proteins also were found to be reduced in the blood of the calorie-restricted mice.

"Mice on the heavier diets had significantly more lesions and larger lesions than those on the restricted calorie diet," said first author Laura Lashinger, Ph.D., a post-doctoral fellow in Hursting's laboratory. The strain of mice, developed by Susan Fischer, professor in M. D. Anderson's Department of Carcinogenesis, spontaneously develops lesions associated with pancreatitis - inflammation of the pancreas. These lesions develop into pancreatic cancer and virtually all of these mice die within six to eight months.

The researchers fed the calorie restricted group a diet that was 30 percent lower in calories than that consumed by the overweight group and 50 percent lower than the obese group. Only 7.5 percent of mice on the calorie-restricted diet developed pancreatic lesions at the end of the experiment, and these lesions were so small that none exhibited symptoms of illness. For mice on the overweight diet, 45 percent developed lesions, as did 57.5 percent of those on the obesity-inducing diet. Lesions were also much larger in the overweight and obese mice than the calorie restricted mice.

While calorie restriction has been shown to have an anti-cancer effect in multiple species and for a variety of tumor types, its impact had not been well-studied in a model of pancreatic cancer. Pancreatic cancer is the fourth leading cause of cancer death and remains mostly intractable to existing treatments.

The decline in blood levels of inflammatory proteins in the calorie restricted mice makes sense, Lashinger notes, because fat tissue is a major source of inflammatory factors such as cytokines.

Source: University of Texas M. D. Anderson Cancer Center

Citation: Calorie restricted diet prevents pancreatic inflammation and cancer (2008, April 15)
retrieved 2 May 2024 from

<https://medicalxpress.com/news/2008-04-calorie-restricted-diet-pancreatic-inflammation.html>

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