

## Is Diabetes a Leading Cause to Cancer?

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### DESCRIPTION

Diabetes is a disease that occurs when your blood glucose levels are too high and also called blood sugar. Blood glucose is the main source of energy which comes from the food. Insulin, a hormone made by the pancreas, helps glucose from food, which are to be used for energy. Obesity is a complex disease involving an excessive amount of body fat that increases the risk of health problems such as heart strokes, diabetes, hypertension and certain cancers. In moderate amounts, sugars contribute to our well-being. Sustained high blood glucose levels, as found in diabetes.

The International Agency for Research on Cancer (IARC) has identified 13 cancers associated with overweight and obesity which includes meningioma, multiple myeloma, adenocarcinoma of the oesophagus, and cancers of the thyroid, postmenopausal breast, gallbladder, stomach, liver, pancreas, kidney, ovaries, uterus, colon and rectum. People suffering with type 2 diabetes are twice as likely to develop liver or pancreatic cancer. They also have a higher than normal risk of developing colon, bladder and breast cancer. Diabetic women with breast cancer have a higher mortality rate than women with only breast cancer.

It is well known that obesity is the leading cause of diabetes. High blood glucose levels are characteristic in obesity and diabetes. It is less well known that diabetes and obesity are linked to an increase in cancer risk. That is, the diabetic people have double chances to suffer pancreatic or colon cancer among others, according to well sustained epidemiological studies. Obesity in British and Spanish children reached up to 16%, the highest in Europe, this epidemic has major health complications.

Scientists in Madrid have uncovered a key mechanism that links obesity and diabetes with cancer. That is, high blood glucose levels increases the activity of a gene, which is widely implicated in cancer progression. Scientists were investigating on how cells in the intestine respond to sugars and signal to the pancreas to release insulin, which is the key hormone that controls blood sugar levels. Sugars in the intestine trigger cells to release a

hormone called Gastric Inhibitory Polypeptide (GIP) that enhances insulin release by the pancreas. The team showed that the ability of the intestinal cells to secrete Gastric inhibitory polypeptide (GIP) is controlled by a protein called  $\beta$ -catenin, and the activity of  $\beta$ -catenin is strictly dependent on blood glucose levels. Increased activity of  $\beta$ -catenin is known to be a major factor in the development of many cancers and can make normal cells immortal which is a key step in early stages of cancer progression. The study demonstrates that high (but not normal) sugar levels induce nuclear accumulation of  $\beta$ -catenin and leads to cell proliferation. The changes induced on  $\beta$ -catenin, the molecules involved and the diversity of cancer cells susceptible to these changes are identified.

Scientists were surprised to realize that changes in the metabolism caused by dietary sugar impact on cancer risk. They are now investigating what other dietary components may influence the cancer risk. Changing diet is one of easiest prevention strategies that can potentially save a lot of suffering and money. Previously, scientists were unsure about how increased blood sugar found in diabetes and obesity could increase cancer risk. This identifies a key molecular mechanism through which high blood glucose would predispose to cancer. It opens the way for potential novel therapies aimed at reducing cancer risk in the obese and diabetic populations.

Estimations by the World Health Organization (WHO) are that obesity predisposes to diabetes and its prevalence is doubling every 20 years worldwide. More than 1 in 10 adults worldwide (12%) are obese (BMI>30). 1 in 6 children in UK and Spain suffer obesity. Diabetes caused 4.6 million deaths in 2011, more than 2 deaths per hour in Spain, more in USA. Worldwide, 1 in 10 adults (10%) suffered from diabetes in 2010 and more than one-third of individuals with diabetes are unaware that they suffer from the diabetic disease. The national cost of diabetes or cancer is in the order of billions of pounds or euros in Spain or England. More than half (63%) of premature deaths worldwide are due to Non-Communicable Diseases (NCD) of which cancer and diabetes are among the 4 causes more frequent. At least 1 in 3 of the main cancers (27%-39%) can be prevented by improving diet, physical activity and body composition.

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