

Mayo researchers look for explanation behind high incidence of diabetes among Asian Indians

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The incidence of type 2 diabetes is rising, especially in urbanized parts of the world where sedentary lifestyles and obesity abound. In addition to weight and inactivity, race puts some people at increased risk for developing type 2 diabetes. The incidence of diabetes is rapidly increasing globally, and Asian Indians have the highest prevalence.

An estimated 32 million Asian Indians have been diagnosed with this condition, and some experts expect this number to double over the next 30 years. In a study published in the March issue of *Diabetes*, Mayo researchers examined whether Asian Indians have observable differences in the way their cells convert nutrient fuel to available energy and whether these differences may increase the risk for diabetes.

“We know that Asian Indians are highly susceptible to this condition, and they often acquire the disease at an earlier age and at lower body mass index than people of European origin,” explains Mayo endocrinologist K. Sreekumaran Nair, M.D., Ph.D., the study’s lead researcher. “The question we asked is whether any metabolic differences between Asian Indians and Americans of Northern European origin can explain the higher incidence of diabetes in Indians.”

Once known as adult-onset or non-insulin-dependent diabetes, type 2 diabetes is a chronic condition that affects the way the body utilizes sugar (glucose). People with type 2 diabetes don’t produce enough

insulin -- a hormone that regulates the absorption of sugar into cells -- and their cells resist the effects of insulin (insulin-resistant). While death rates due to heart attack, stroke and even cancer are decreasing, deaths related to diabetes are increasing. Type 2 diabetes is the leading cause of cardiovascular deaths, kidney failure, blindness, sexual dysfunction and many other chronic complications.

Mayo researchers studied 13 diabetic Indians, 13 nondiabetic Indians, and 13 nondiabetic northeast Americans of European descent who were matched for gender, age and body mass to Indian study participants. Study participants were fed the same diet and underwent tests for insulin resistance and muscle biopsy to see whether differences occurred at the cellular level among the different study subject groups.

The study yielded a number of interesting findings. Researchers observed that the Indian subjects, irrespective of their diabetic status, had a greater degree of insulin resistance than the American subjects of Northern European origin, even though the study subjects were not obese, a condition commonly associated with insulin resistance. Earlier research has established that people with insulin resistance typically have poorly functioning muscle mitochondria. Mitochondria are the part of cells responsible for converting energy from nutrients to ATP (adenosine triphosphate), the chemical form of cellular energy that the body uses for almost all functions.

“Our study showed that the Indian diabetic and nondiabetic subjects with insulin resistance actually had mitochondrial function that was higher than those observed in the Northern European American subjects,” says Dr. Nair.

Dr. Nair hypothesizes that key to understanding this difference may lie in an examination of how populations adapt as they become more urbanized. Urban societies typically move away from lifestyles that

involve a higher level of physical activity and diets dominated by low-calorie foods.

“The higher capacity to produce ATP that the Indian subjects displayed may have been an adaptive advantage for the generations that preceded them, when energy content of their diet was lower. But today, this trait may be a disadvantage given the higher energy content of their current diets,” explains Dr. Nair.

Dr. Nair and his team are hopeful that the information gained from this study will have a substantial impact on understanding the cause of the global epidemic in diabetes.

“Our findings have potential to help determine the energy requirements of different populations and what role this plays in the onset of diabetes” says Dr. Nair.

Source: Mayo Clinic

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