

PREVIOUS PAGE

TABLE OF CONTENTS

NEXT PAGE



NIDDK research conducted on the Pima Indians for the past 30 years has helped scientists prove that obesity is a major risk factor in the development of diabetes. One-half of adult Pima Indians have diabetes and 95% of those with diabetes are overweight.

These studies, carried out with the help of the Pima Indians, have shown that before gaining weight, overweight people have a slower metabolic rate compared to people of the same weight. This slower metabolic rate, combined with a high fat diet and a genetic tendency to retain fat may cause the epidemic overweight seen in the Pima Indians, scientists believe.

Scientists use the "thrifty gene" theory proposed in 1962 by geneticist James Neel to help explain why many Pima Indians are overweight. Neel's theory is based on the fact that for thousands of years populations who relied on farming, hunting and fishing for food, such as the Pima Indians, experienced alternating periods of feast and famine. Neel said that to adapt to these extreme changes in caloric needs, these people developed a thrifty gene that allowed them to store fat during times of plenty so that they would not starve during times of famine.



Along with genetic make-up, diet is a key factor to healthy lifestyle. The influence of traditional desert crops on the metabolism of the Pima Indians is being studied to determine how to prevent the onset of diabetes and obesity.



This gene was helpful as long as there were periods of famine. But once these populations adopted the typical Western lifestyle, with less physical activity, a high fat diet, and access to a constant supply of calories, this gene began to work against them, continuing to store calories in preparation for famine. Scientists think that the thrifty gene that once protected people from starvation might also contribute to their retaining unhealthy amounts of fat.

Dr. Eric Ravussin, a visiting scientist at the Phoenix Epidemiology and Clinical Research Branch at NIDDK, has studied obesity in the Pima Indians since 1984. He believes the thrifty gene theory applies to the Pimas.

The Pima Indians maintained much of their traditional way of life and economy until the late 19th century, when their water supply was diverted by

American farmers settling upstream, according to Ravussin. At that time, their 2,000-year-old tradition of irrigation and agriculture was disrupted, causing poverty, malnutrition and even starvation. The Pima community had to fall back on the lard, sugar and white flour the U.S. government gave them to survive, says Ravussin.

However, World War II brought great social and economic change for American Indians. Those who entered military service joined Caucasian units. Many other American Indians migrated from reservations to cities for factory employment and their estimated cash income more than doubled from 1940 to 1944.

When the war and the economic boom ended, most Native Americans returned to the reservations, but contact with the larger society had profoundly affected the Pimas' way of life. Ravussin says it is no surprise that the increase in unhealthy weight among the Pima Indians occurred in those born post-World War II.

During this century people world-wide experienced more prosperity and leisure time, and less physical work. Since the 1920s, all Americans have consumed more fat and sugar and less starch and fiber. The greatest changes have occurred in consumption of fat. In the 1890s, the traditional Pima Indian diet consisted of only about 15 percent fat and was high in starch and fiber, but currently almost 40 percent of the calories in the Pima diet is derived from fat. As the typical American diet became more available on the reservation after the war, people became more overweight.

"The only way to correct obesity is to eat less fat and exercise regularly," Ravussin says.

Recently, Ravussin visited a Pima community living as their ancestors did in a remote area of the Sierra Madre mountains of Mexico. These Mexican Pimas are genetically the same as the Pima Indians of Arizona. Out of 35 Mexican Pimas studied, only three had diabetes and the population as a whole was not overweight, according to Ravussin.

"We've learned from this study of the Mexican Pimas that if the Pima Indians of Arizona could return to some of their traditions, including a high degree of physical activity and a diet with less fat and more starch, we might be able to reduce the rate, and surely the severity, of unhealthy weight in most of the population," Ravussin says.

"However, this is not as easy as it sounds because of factors such as genetic influences that are difficult to change. Our research focuses on determining the most effective way to bring about permanent weight loss in light of these factors," Ravussin adds.

-- *Lorraine H. Marchand*



Shaded areas show where the Pima Indians live.

