

# Genotype May Help Predict Best Diet Response

## VITALS

**Major Finding:** Women randomized to a low-fat or a low-carbohydrate diet considered appropriate (based on a pattern of three single nucleotide polymorphisms) lost about 6 kg, compared with about 1-1.5 kg among women randomized to diets judged as inappropriate.

**Data Source:** Data from 133 participants in the A TO Z Weight Loss Study.

**Disclosures:** Research support was provided by Interleukin Genetics. Dr. Nelson had no financial conflicts.

BY ROBERT FINN

SAN FRANCISCO — Genotypes may identify women likely to lose weight on a low-carbohydrate diet and those likely to do better on a low-fat diet, based on data from 133 participants in the A TO Z Weight Loss Study.

Women with one pattern of single nucleotide polymorphisms (SNPs) lost five times as much weight on the Atkins diet, compared with those who did not have that pattern. Similarly, women with a different SNP genotype lost five times as much weight on the Ornish diet, Mindy Dopler Nelson, Ph.D., of Stanford (Calif.) University, said at a conference sponsored by the American Heart Association.

In the original A TO Z study, 311 women were randomized to one of four popular diets. Ranging on a continuum from low carbohydrate to low fat, they were the Atkins diet, the Zone diet, the LEARN diet, and the Ornish diet. On average, the women lost weight on all four diets; the only significant difference was that they tended to lose somewhat more weight on the Atkins diet than on the Ornish diet (JAMA 2007;297:969-77).

“Within each of the diet groups, there are women who had lost over 15 kg ... as well as people who gained 5 kg,” Dr. Nelson said in an interview. “When you look at the averages you don’t see the differences, but when you look at each in-

dividual participant you see some variability.”

Some time after the conclusion of that trial, a company called Interleukin Genetics approached Stanford researchers and suggested they use the company’s proprietary SNP test to assess responders and nonresponders to particular diets. In previous studies, the company had found polymorphisms in three genes—fatty acid binding protein, PPAR-gamma, and the beta<sub>2</sub> adrenergic receptor—that appeared to predict a person’s response to diets.

Among the 133 women from the original study who agreed to provide DNA samples from swabs of the inner cheek, 31 had been in the Atkins group, 32 in the Zone group, 34 in the LEARN group,

and 36 in the Ornish group. There were no statistically significant baseline differences among the groups in measures such as body mass index, blood pressure, or levels of cholesterol, insulin, and glucose.

The company’s test showed that 79 of the women had genotypes designated as low-carb appropriate, and 54 had genotypes designated as low-fat appropriate.

The interaction between genotype and diet was statistically significant, with striking differences among the women in the lowest-carb and lowest-fat diets. Among the women on the Atkins diet, those designated as low-carb appropriate lost an average of just under 6 kg during 12 months, while those designated as low-carb inappropriate lost about 1 kg.

Among the women on the Ornish diet, those designated as low-fat appropriate lost an average of more than 6 kg

during 12 months, while those designated as low-fat inappropriate lost an average of about 1.5 kg.

Thus, in each of those groups, women who had been randomized to what was designated as the appropriate diet lost about five times as much weight as those randomized to the apparently inappropriate diet.

Among women on the Zone or LEARN diets, which involve intermediate levels of carbohydrates and fat, women with low-carb and low-fat genotypes did not have statistically significant differences in weight loss.

Dr. Nelson acknowledged that the trial was relatively small, and that the findings need to be confirmed in a larger trial in a more heterogeneous population. Nevertheless, the results do provide some guidance to people who are trying to lose weight, she said. ■

## Taxing Pizza, Soda Proposed to Fight Obesity Epidemic

Taxing soda and restaurant pizza could discourage U.S. adults from consuming those foods, helping them reduce long-term weight gain and insulin resistance, according to a 20-year longitudinal study.

The results bolster the argument that taxes on fast food and sweetened beverages could reduce obesity and improve overall health in the United States, the authors said (Arch. Intern. Med. 2010;170:420-6).

The team pulled data from the Coronary Artery Risk Development in Young Adults (CARDIA) study, which has tracked various factors reported by adults since 1985, including their diets and the prices they paid for foods. The new analysis focused on relationships between dietary changes and the prices reported by 5,115 participants at 0, 7, and 20 years.

The study found that a 10% increase in the price of soda (roughly 20 cents/1-L bottle) resulted in a 3% decline in the probability of consuming soda and a decrease in the amount of soda consumed. Pizza followed a similar trend. A \$1 increase in the price of both soda and pizza was associated with even greater changes in total energy intake, body weight, and individuals’ homeostasis model assessment of insulin resistance scores, the study found.

As a result, the authors estimated, an 18% tax on soda and fast food could cut energy intake among young to middle-aged adults by about 56 kcal per day. At the population level, this reduction could lead to about 5 fewer pounds in weight gain per person per year “and significant reductions” in the chronic disease risks.

In an editorial, Dr. Mitchell Katz, director of San Francisco department of public health, and Dr. Rajiv Bhatia, medical director of San Francisco’s division of occupational and environmental health, advocated that “agricultural subsidies be used to make healthful foods such as locally grown vegetables, fruits, and whole grains less expensive.”

The study was conducted by researchers at the University of North Carolina at Chapel Hill, the University of Alabama at Birmingham, the University of Minnesota, Minneapolis, and the University of Oslo, none of whom reported any conflicts. Dr. Bhatia reported no conflicts, and Dr. Katz received consulting payments from the hospital management company Health Management Associates Inc.

—Jane Anderson

# Depression May Lead to Obesity in Women, and Vice Versa

BY ROBERT FINN

SAN FRANCISCO — Depression might lead to overweight and obesity, and overweight and obesity might also lead to depression, but only in women, according to a longitudinal study of 5,031 participants in the Multi-Ethnic Study of Atherosclerosis presented at a conference sponsored by the American Heart Association.

Numerous studies have demonstrated associations between depression and the development of type 2 diabetes and cardiovascular disease.

According to lead investigator Rosemay A. Remigio-Baker, a doctoral candidate at Johns Hopkins Bloomberg School of Public Health, Baltimore, overweight and obesity might provide the link connecting

depression with diabetes and cardiovascular disease.

Participants entered the study between 2000 and 2002, when they were 45-84 years of age. Investigators followed them for 5 years. None of the participants had diabetes at baseline.

## VITALS

**Major Finding:** Women with depression were 54% more likely to develop overweight/obesity within 5 years than were those who were not depressed, and women who were overweight or obese were 27% more likely to develop depression within 5 years than were those who were not.

**Data Source:** A study of 5,031 men and women aged 45-84 years at baseline.

**Disclosures:** The investigator stated that she had no disclosures.

The investigators defined overweight as a body mass index of 25 kg/m<sup>2</sup> or greater, and they defined depression as a score of 16 or above on the Center for Epidemiologic Studies Depression Scale (CES-D).

To see whether depression was associated with the later development of overweight, the investigators restricted their analysis to the 1,496 individuals whose baseline BMI was less than 25 kg/m<sup>2</sup>. At baseline, 19% of those women and 12% of those men were depressed.

After controlling for age, ethnicity, education, in-

come, smoking status, daily caloric intake, exercise, and levels of interleukin-6 and C-reactive protein, the investigators found that women with depression were 54% more likely to develop overweight or obesity within 5 years than were those without depression. The hazard ratio was statistically significant. The investigators found no statistically significant association between depression and incident overweight among men.

To see whether overweight/obesity was associated with the development of depression, the investigators restricted their analysis to the 3,801 participants without depression at baseline. At baseline, 65% of those women and 70% of those men were overweight or obese.

After controlling for the same set of covariates listed above, the investigators found that women who were overweight or obese were 27% more likely to develop depression within 5 years than were those who were not. The hazard ratio was statistically significant. Once again, the investigators found no statistically significant association between overweight/obesity and incident depression among men.

She stated that she had no disclosures. ■