Chubby? Blame Those Genes

Heredity plays the pivotal role in weight control

It has long been clear that people's weight is determined by a balance of heredity and life-style. But which exerts the heavier effect? Two reports in last week's *New England Journal of Medicine* tip the scales firmly toward genetic makeup.

In one investigation, researchers from the U.S. and Sweden analyzed weight and height records from the Swedish Adoption/Twin Study of Aging. Reviewing data on 247 identical and 426 fraternal pairs of twins, the team found that siblings end up with similar body weights whether or not they are raised in different families, and that they are much more likely to grow up looking like their natural parents than their adoptive ones. "If both biologic parents are fat, about 80% of their kids are going to be fat," says Dr. Albert Stunkard of the University of Pennsylvania.

In a separate study, Canadian researchers fed twelve pairs of identical twins 1,000 calories above their normal daily intake for 84 days out of a 100-day period. Weight gains ranged from 4 kg to 13 kg. But the difference in the amount gained was much less between twins than between subjects who were not siblings. Concludes Claude Bouchard, a professor of exercise physics at Quebec's Laval University: "It seems genes have something to do with the amount you gain when you are overfed."

"The results take obesity out of being a moral problem—that obese people have a lack of willpower—and put it more in the realm of metabolism," observes Dr. Theodore VanItallie of Columbia University's College of Physicians and Surgeons. If people are born to be fat, are attempts to slim down doomed? No, say weight specialists. Low-fat diets and exercise can help offset heredity. People may inherit a propensity to obesity, but it need not be their destiny. ■

The New England Journal of Medicine

and Biostatistics
McGill University

Volume 322 MAY 24, 1990 Number 21

THE RESPONSE TO LONG-TERM OVERFEEDING IN IDENTICAL TWINS

CLAUDE BOUCHARD, PH.D., ANGELO TREMBLAY, PH.D., JEAN-PIERRE DESPRÉS, PH.D., ANDRÉ NADEAU, M.D., PAUL J. LUPIEN, M.D., PH.D., GERMAIN THÉRIAULT, M.D., JEAN DUSSAULT, M.D., SITAL MOORJANI, PH.D., SYLVIE PINAULT, M.D., AND GUY FOURNIER, B.SC.

Abstract We undertook this study to determine whether there are differences in the responses of different persons to long-term overfeeding and to assess the possibility that genotypes are involved in such differences. After a two-week base-line period, 12 pairs of young adult male monozygotic twins were overfed by 4.2 MJ (1000 kcal) per day, 6 days a week, for a total of 84 days during a 100-day period. The total excess amount each man consumed was 353 MJ (84,000 kcal).

During overfeeding, individual changes in body composition and topography of fat deposition varied considerably. The mean weight gain was 8.1 kg, but the range was 4.3 to 13.3 kg. The similarity within each pair in the response to overfeeding was significant ($P<0.05$) with respect to body weight, percentage of fat, fat mass, and estimated subcutaneous fat, with about three times more variance among pairs than within pairs ($r \approx 0.5$). After adjustment for the gains in fat mass, the within-pair similarity was particularly evident with respect to the changes in regional fat distribution and amount of abdominal visceral fat ($P<0.01$), with about six times as much variance among pairs as within pairs ($r \approx 0.7$).

We conclude that the most likely explanation for the intrapair similarity in the adaptation to long-term overfeeding and for the variations in weight gain and fat distribution among the pairs of twins is that genetic factors are involved. These may govern the tendency to store energy as either fat or lean tissue and the various determinants of the resting expenditure of energy. (N Engl J Med 1990; 322:1477-82.)