Taste Deviation in Juvenile Obesity and its Effect on Food Choice

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THE NEED: Obesity is the number one public health concern in the United States, responsible for over 300,000 deaths per year. In New York, 60% of adults are now considered either overweight or obese, and New York ranks second in adult obesity-related medical expenditures. Taste sensitivity changes when we become obese, guiding us toward less healthy food. In addition, the taste buds of children differ from those of adults: adults have a “bliss point” for sweetness (a level of sweetness beyond which foods becomes distasteful) but in childhood, we have almost no limit on how sweet we like foods to be. This project studies how diet affects the developing sense of taste from pre-natal through juvenile stages in mice (a model for human taste and obesity). We aim to understand the impacts of an unhealthy diet during gestation and during childhood on an individual’s health through adulthood, so we can develop approaches to prevent obesity before it becomes an adult health problem.

THE APPROACH: We raised groups of mice on an unhealthy diet compared to a standard diet, and also studied groups of mice whose mothers had consumed an unhealthy diet compared to a standard diet. The food choices, eating behaviors, taste bud gene expression, and taste bud structure were compared for each group of mice. These studies aimed to understand how taste sensitivity and taste bud development are affected by the mouse’s own diet and by the diet of its mother during pregnancy.

IMPACTS: Unlike mice that were fed a healthy diet, mice that grew up eating a high fat diet did not move toward a “bliss point” for sweetness in adulthood. Instead, these adult mice continued to prefer sweet tastes at a much higher rate (see graph at right). This suggests that diet in childhood may have life-long effects on food choices and preferences. In contrast, our study of pre-natal exposure to sweeteners did not appear to affect the “sweet tooth” of the offspring. These results need to be confirmed in larger-scale mouse studies and also with humans. However, they point to the importance of a healthy, low-fat diet during childhood for establishing positive food preferences that can reduce the risk of obesity through adulthood.

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