

The dynamic relationship between brain response to food and body weight: Teasing apart cause and consequence

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There is now strong evidence that body weight influences brain response to the sensation of food. However, the extent to which these differential responses reflect cause or consequence of obesity is unknown. For example, a brain region that responds differently in obese compared to healthy weight individuals may represent a biomarker for weight gain susceptibility or it may reflect a neural adaptation that occurs as a consequence of the metabolic and physiological alterations that are known to accompany obesity. In this lecture I will present data to support the working hypothesis that the relationship between brain response to food and body weight is dynamic and accompanied by cognitive correlates. It will be argued that overeating leads to down regulation of dorsal striatal response to a palatable and energy dense food and that this down regulation is associated with increased impulsivity that may confer further risk for overeating. Genetic influences on this neural adaptation will also be discussed. Finally, preliminary evidence will be presented suggesting that amygdala-dependent learning and memory mechanisms may promote eating in the absence of hunger and that these mechanisms may also undergo adaptation in the face of increased body weight.