

### Oral anesthesia reveals individual differences in food-related sensory interactions

D.J. SNYDER\*, F.A. CATALANOTTO, P.J. ANTONELLI, L.M. BARTOSHUK *University of Florida, Gainesville, FL, USA*

Flavor sensation incorporates taste, oral touch, and retronasal olfaction (RO), which merge into a unitary percept localized to the mouth. The mechanisms governing this process are not fully understood, but our data reveal important interactions among food-related cues. Mounting evidence shows that regional oral sensory loss produces compensatory disinhibition at remaining oral loci: Chorda tympani (CT) anesthesia leads to elevated glossopharyngeal sensation; among supertasters of 6-n-propylthiouracil, it also enhances trigeminal (V) sensation. Moreover, oral sensation supports RO: individual differences in it extend to RO, and CT block compromises RO function without affecting orthonasal sensation. Our most recent study suggests that the effects of oral sensory change occur in proportion to genetic taste status, and that affected sensations are differentially susceptible to these effects. In healthy subjects with low taste function, unilateral block of either CT or the lingual nerve (i.e., CT + V) asymmetrically suppressed posterior taste sensation; this may reflect mild disinhibition. Contralateral anterior oral burn remained intact with both nerve blocks, while posterior oral burn was blunted bilaterally; these data confirm that disinhibition at V is linked to high taster status. Finally, both nerve blocks produced similar RO losses, suggesting that taste input surpasses trigeminal input in supporting RO. In sum, the modulation of flavor components by oral sensation varies by modality, taster status, and pathology, leading to broad individual differences in the balance of food-related sensory input.

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### Low carbohydrate intake only shows a larger decrease in body weight and fat percentage in the presence of high protein intake

S. SOENEN\*, M.S. WESTERTERP-PLANTENGA *Human Biology, TIFN, NUTRIM, Maastricht University, Maastricht, Netherlands*

**Introduction:** Our objective was to examine if combination of high-protein and low-carb intake (HPLC) compared to high-protein (HPNC) or low-carb (NPLC) or normal-protein normal-carb intake (NPNC) results into a difference in body composition. **Methods:** Body-weight and body composition (deuterium-dilution) of 143 subjects (BM  $106.6 \pm 20.1$  kg FM%  $43.9 \pm 5.8\%$ ) and blood- and urine-parameters were assessed before and after 3 months energy intake reduction of 67%. HPLC consisted of 60/5/35E% protein/carb/fat and resulted in  $120 \pm 41$  g of protein intake (24 h nitrogen), HPNC of 60/35/5E% and  $105 \pm 30$  g, NPLC of 30/5/65E% and  $73 \pm 21$  g, and NPNC of 30/35/35E% and  $67 \pm 16$  g. **Results:** HPLC reduced BM and FM% most. The synergistic effect of HP and LC and the effect of HP in the LC condition was already significant on BM-reduction after 1 month (HPLC vs. NPNC  $-6.7 \pm 2.1$  vs.  $-5.1 \pm 1.8$ ,  $p < 0.005$ ; and vs. NPLC  $-5.8 \pm 1.7$ ,  $p < 0.05$ ). The effect of HP was significant after 3 months in the normal- (HPNC vs. NPNC; BM  $-12.6 \pm 4.1$  vs.  $-10.6 \pm 4.0$ ,  $p < 0.01$  and FM%  $-5.7 \pm 3.3$  vs.  $-3.9 \pm 2.5$ ,  $p < 0.05$ ) and low-carb condition (HPLC vs. NPLC; BM  $-15.3 \pm 4.5$  vs.  $-12.2 \pm 4.4$ ,  $p < 0.01$  and FM%  $-6.6 \pm 2.6$  vs.  $-4.8 \pm 3.7$ ,  $p < 0.05$ ). There was no effect of LC in the normal- (NPLC vs. NPNC) or the high-protein (HPLC vs. HPNC) condition. Changes in waist, MDRD, albumin-creatinin-ratio, glucose, insulin, and cholesterol were not different between diets. **Conclusion:** High-protein shows a larger decrease in BM and FM% irrespective of the presence of low-carb, while low-carb only shows a larger decrease in BM and FM% in the presence of high-protein.

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### Eating behavior and lifestyle characteristics within a sample of vegetarian and non-vegetarian university students

A.M. SPAETH\*, C.A. FORESTELL *The College of William and Mary, Williamsburg, VA, USA*

Since the 1980s, interest in new-wave vegetarianism has become increasingly popular. The limited research conducted in this area has produced conflicting results, with only some studies showing a clear positive relationship between vegetarianism and eating disordered behavior. These discrepant findings may be due to inconsistent definitions of vegetarianism, small sample sizes, and disparate age-ranges between groups. The current study aimed to address some of these issues in order to better understand the relationship between vegetarianism and eating disordered behavior. Fifty vegetarians (88% female) and 50 non-vegetarians (68% female), matched for age, ethnicity, race, family income and other lifestyle characteristics such as alcohol and cigarette use, completed a battery of questionnaires about their eating behavior. Results suggest that vegetarians were less food neophobic and similar in their restrained eating when compared to non-vegetarians. There were no significant differences between groups on the Eating Attitudes Test, suggesting that vegetarians did not differ from non-vegetarians in their current disordered eating behavior. However, of the seven participants who indicated that they had previously been treated for an eating disorder, five became vegetarians by the age of 14 years. Thus, consistent with prior research, becoming a vegetarian at a young age may serve as a risk factor for later disordered eating. These results add to the existing literature and provide further insight into the complicated connection between vegetarianism and eating behavior.

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### Dopamine-related genotypes moderate relation between reward circuitry activation and weight gain. A prospective fMRI study

E. STICE<sup>1,2,\*</sup>, S. SPOOR<sup>1,2</sup>, C. BOHON<sup>1,3</sup>, C.N. MARTI<sup>2</sup> <sup>1</sup> *Oregon Research Institute, Eugene, OR, USA* <sup>2</sup> *University of Texas at Austin, Austin, TX, USA* <sup>3</sup> *University of Oregon, Eugene, OR, USA*

The present study tested whether elevated anticipatory food reward is related to elevated weight and future weight gain, and whether genotypes associated with reduced dopamine signaling (DRD2, DRD4) moderated these relations. We used fMRI to measure responses in meso-limbic reward system and associated regions in response to imagined intake of appetizing food, unappetizing foods, or glasses of water in 39 girls (14–18 years; BMI range = 17.3–38.9). Cross-sectional analyses indicated that BMI was positively correlated with activation in the superior frontal gyrus, medial orbitofrontal cortex, putamen, and frontal operculum in response to imagined intake of appetizing food and that these relations were moderated by DRD2 and DRD4 genotype status. Yet prospective analyses indicated that participants who showed a blunted response in the putamen, medial frontal cortex, and frontal operculum in combination with these genotypes showed the greatest weight gain over the 1-year follow-up. These latter results converge with evidence that women who showed reduced dorsal striatum activation in response to food and possessed the DRD2 genotype showed the greatest future weight gain. Results suggest that blunted response of food reward circuitry increases risk for weight gain if coupled with genetic risk for compromised dopamine signaling. Findings also illustrate the importance of prospective fMRI studies, rather than cross-sectional studies.

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