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Significance of differential effects of glucose and fructose on brain food signaling is uncertain

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Letter to the Editor, *Biochemical and Biophysical Research Communications*

Title: Significance of differential effects of glucose and fructose on brain food signaling is uncertain

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Editor,

The Mini Review by Lane et al. [1] adequately describes the differential effects of glucose and fructose on the AMPK/malonyl-CoA signaling system and, thereby, feeding behavior. The review presents a misleading view of sugars effects, however, by displaying ignorance of contemporary sweetener composition and consumption, and failing to place the differential effects of fructose and glucose in proper scientific perspective.

Contemporary caloric (nutritive) sweeteners — comprising sucrose, high fructose corn syrup (HFCS), honey and fruit juice concentrates — are nearly equal mixtures of fructose and glucose, either free sugars or bonded together (sucrose). They are, for this reason, essentially interchangeable in sweetness and caloric value, their specific use dictated by individual sweetener functionality [2].

Author references to parallels between the rise in HFCS use and obesity are dated. In the past two years, a scientific consensus has developed that sucrose and HFCS are metabolically equivalent [3; 4; 5; 6]. Pure fructose, the test compound for many pathway elucidation studies, contains no glucose and is, therefore, not a good model for any caloric sweetener in common use.

The authors' own unpublished study, characterized by i.p. injection rather than oral intake and use of pure fructose or glucose rather than the blends found in caloric sweeteners, surely is a highly artificial dietary construct that cannot be said to model the typical human diet. We were not told the amounts administered, but it is common in current metabolic studies to feed exaggerated amounts of fructose to provoke metabolic upsets — 1.5-3 times the mean human intake level to test subjects and up to 6.5 times to experimental animals [7]. Such results are representative neither of HFCS or pure fructose, which is used in specialty food applications to good effect at modest levels.

Finally, the authors fail to provide scientific perspective, a singular deficiency in a review article. Their mechanism must surely be regarded as speculative when the highly artificial nature of the model systems is considered along with the authors' apparent uncertainty whether fructose does, in fact, cross the blood-brain barrier.

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