

This Week's Citation Classic

Teitelbaum P & Epstein A N. The lateral hypothalamic syndrome: recovery of feeding and drinking after lateral hypothalamic lesions. *Psychol. Rev.* **69**:74-90, 1962.

After bilateral lateral hypothalamic damage in rats, eating and drinking are abolished. Recovery occurs gradually, in behavioral stages that reveal: (a) eating recovers before drinking; (b) peripheral stimuli (taste of food, dry mouth) can motivate ingestion, but central regulation may still be absent; (c) later, central control systems appear to recover separately. [The Science Citation Index® (SCI®) and the Social Sciences Citation Index™ (SSCI™) indicate that this paper has been cited over 345 times since 1963.]

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"As a psychology graduate student at Johns Hopkins under Eliot Stellar's direction, I was trying to produce hypothalamic obesity. We failed at first, so we varied our lesion placements. Several animals refused to eat and drink until they died. I dismissed it as surgical trauma. Later, Anand and Brobeck localized a hypothalamic area controlling feeding.¹ Our aphagic animals' lesions were always at the coordinates they specified. We felt like kicking ourselves for missing an obviously important finding.

"But our failure had a silver lining. Believing the animals merely debilitated, I tried coaxing them to eat. Earlier, while cleaning the department's rat colony (my assistantship), I used to stop, munch chocolate bars, and offer the rats some. I soon discovered that shortly before my break, many rats were lined up at the front of each cage, all waiting for their treat. Later, I remembered this when trying to tempt aphagics to eat. Nevertheless, it was a thrill to see a rat, being kept alive by tube-feeding,

refusing ordinary food and water for two months postoperatively, suddenly gobble up bits of chocolate.

"Strangely, such rats ate Hershey's milk chocolate, but refused Nestle's. Naively, I wrote to Hershey's describing our findings, asking for their formula, so that I could isolate the essential ingredient that induced our rats to eat. No answer. Years later, through the intervention of Charles King, father of Fred King, a fellow graduate student, I eventually got a letter from someone at Hershey's, gently informing me that the formula for their milk chocolate was their most closely guarded secret.

"A few years later, at the University of Pennsylvania, Alan Epstein and I (both of us had been students of Eliot Stellar's and we were old friends from Hopkins) joined our common interests in hunger and thirst. By then, there was controversy about the effects of lateral hypothalamic damage. We realized that such damage produced a syndrome that changed rapidly with recovery. Both hunger and thirst were affected but they recovered at different rates.

"Stages of recovery are now a standard method for operationally defining both the degree of disorganization and the progress of recovery after such damage. This is one reason for our paper's wide citation. Others are: (1) In late recovery, when such animals eat relatively normally, we found separable deficits in subcomponents of hunger and thirst. In part, Epstein's later work on angiotensin and thirst grew from this. (2) The dopaminergic nigrostriatal bundle, implicated in Parkinsonism, is also involved in the lateral hypothalamic syndrome.² This has linked two huge areas of research.

"The syndrome still fascinates me. It is gratifying that it interests others as well."

References

1. **Anand B K & Brobeck J R.** Hypothalamic control of food intake in rats and cats. *Yale J. Biol. Med.* **24**:123-40, 1951.
2. **Ungerstedt U.** Aphagia and adipsia after 6-hydroxydopamine induced degeneration of the negro-striatal dopamine system. *Acta Physiol. Scand. Suppl.* **367**:95-122, 1971.