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New NIH grant supports UCSB taste and hydration research

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Postdoctoral fellow Anindya Ganguly has earned an Early Career Research Award from the National Institute on Deafness and Other Communication Disorders (NIDCD), a part of the National Institutes of Health. The grant will support research on how animals sense and respond to the osmotic properties of food — an underexplored but important dimension of taste.

“I’m honored that my idea — probing how osmotic stress is sensed by the taste system — resonated with the reviewers,” said Ganguly, an assistant project scientist in UC Santa Barbara’s Department of Molecular, Cellular and Developmental Biology and Neuroscience Research Institute. “It is relatively rare for people in my career stage to get NIH grants as a solo principal investigator.”

“Anindya is a very creative and brilliant young scientist. I am thrilled that he received this award,” said Duggan Professor and Distinguished Professor Craig Montell, who leads the lab where Ganguly works.

Ganguly’s research lies at the intersection of chemosensation and homeostasis. His work centers on how animals sense and respond to the osmolality of food, which is the concentration of dissolved particles in a solution. “Suppose you are preparing a soup,” Ganguly said. “You start with water, which has very few dissolved substances, hence low osmolality. As you pack in all the flavors — such as salt, bouillon and soy sauce — the soup now has many dissolved components, or higher osmolality.”

Most organisms maintain a stable osmolality within their body fluids. Consuming food that is high in osmolality can upset this balance. For instance, increasing the osmolality around cells can force water from them, like brining a cucumber, he explained.

High levels of dissolved particles appear to inhibit fruit fly feeding, and Ganguly hopes to discover which receptors, neurons and pathways detect and respond to these osmotic properties. He believes chloride channels play a key role. “The goal is to establish osmolality as a key sensory cue that regulates feeding and to characterize the mechanisms behind this regulation,” he said.

Understanding this process in fruit flies could illuminate how animals regulate fluid and electrolyte balance through taste. The research could also inform how changes in environmental conditions, such as humidity or dryness, and physiological conditions, such as thirst and hydration, alter feeding and foraging strategies. It may even help us control pests and disease vectors by exploiting their sensitivities to osmotic stress.

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