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Cell-type mapping used to identify cellular substrates that underlie two types of thirst

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A team of researchers from the California Institute of Technology, Nankai University and the University of California, Berkeley, has found that the cellular substrates that underlie two types of thirst could be

identified using a certain kind of cell-type mapping. In their paper published in the journal *Nature*, the group outlines their study of thirst and the way it is processed by the brain.

Prior research has shown that our brains process at least two main kinds of thirst: Osmotic and hypovolaemic. Osmotic thirst is what we feel when we need more water. Hypovolaemic thirst is what we feel when we need minerals and water to replenish blood supplies. The researchers note that this can be easily observed—when people are just thirsty, they will be satisfied with a glass of water. But when they have been working out, they need water with added minerals. This is because we lose minerals through sweat. In this new effort, the researchers wanted to learn more about how the brain processes both types of thirst.

Prior research has shown that circumventricular organs located in the lamina terminalis are the parts of the brain that process the two kinds of thirst, but how they do so has not been clear. To find out, the researchers used stimulus-to-cell type mapping which involved the use of single-cell RNA sequencing. The goal was to figure out which of the cellular components were involved with processing thirst types. They then forced test mice to experience either of the two types of thirst. That allowed them to see which cells were responding to which type of thirst. They also used optogenetics, in which the cells were engineered to respond to a light source. Shining a light on the cells then produced one kind of thirst or the other depending on how they had been engineered as evidenced by the water source the mice chose to use—one that was just water, or one that contained minerals, salt and sugar.

The researchers plan to continue their study of thirst cells in the brain, seeking to answer other questions they have, such as whether they also contribute to changing blood pressure or body temperature.

More information: Allan-Hermann Pool et al. The cellular basis of

distinct thirst modalities, *Nature* (2020). DOI: 10.1038/s41586-020-2821-8