

Rain or Shine? Computer Models How Brain Cells Reach a Decision

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In a study published online December 13 in the journal <u>Nature</u> <u>Neuroscience</u>, Xiao-Jing Wang, professor of neurobiology at Yale School of Medicine and at the Kavli Institute of Neuroscience, proposes that synapses—the connections between neurons—are capable of computing probabilities from observed cues in order to make a statistical inference.

"We often need to make probabilistic inference—like deducing which of the numerous foods we ate made us sick, reaching a medical diagnosis based on symptoms and test results, or deciding whether it will rain or shine given a few pieces of information about the atmosphere," Wang said. "Such decisions are based on the calculus of chance or the statistical theory of prediction."

With his former postdoctoral associate Alireza Soltani, now at the California Institute of Technology, Wang built computer models of



neural circuits to investigate how such probabilistic decisions are carried out in the brain. The model explains a phenomenon called "base rate neglect" observed in humans. Base rate neglect roughly means that a piece of information (for example, a test result that shows a spot on the lung) that is equally predictive of two possible outcomes (I have cancer or I do not have cancer) is perceived by people to be more predictive for the one that is less probable (I have cancer).

"What's interesting is that such complicated probabilistic computations and psychological phenomena can now be studied, perhaps explained, in terms of the neural computation in the brain," Wang said.

Provided by Yale University (<u>news</u> : <u>web</u>)

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