

Caffeine slows down the movement of water molecules

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Caffeine makes a water molecule (H_2O) fall asleep. Credit: I. Cerjak (AMOLF)

Contrary to the well-known stimulating effect on humans, caffeine slows down the movement of water molecules. Researchers from the NWO Institute AMOLF in Amsterdam and the ESPCI in Paris report this in a recent publication in the Journal of Physics Communications.

A cup of coffee is known for its boosting effect. That is because it contains caffeine: the most commonly used stimulant in the world. It enjoys enormous popularity in beverages like coffee, tea, [soft drinks](#), and [energy drinks](#). Caffeine stimulates the central nervous system and boosts human performance by speeding up reaction times and by increasing alertness.

Caffeine and Energy Drinks

The human body consists for about 60 percent of [water](#). These water molecules move very fast and continuously create new mutual bonds. Would they show the same behavior in the presence of caffeine? The Dutch researchers asked themselves this question and performed experiments in the laboratory to find out. They used modern laser techniques to study the movement of water molecules and discovered that the presence of caffeine slows down the movement of water molecules by a factor 5. They observed that one caffeine molecule slows down 10 surrounding water molecules. Hence, in a cup of coffee, one in a thousand water molecules is slowed down.

The researchers also studied the effect of taurine, another frequently-used constituent of energy drinks. They discovered that taurine also puts the brake on water molecules; a [single molecule](#) of taurine slows down four water molecules. Energy drinks often contain both caffeine and taurine. Their combined effect causes one in 2000 water molecules to slow down.

However, do not worry if you have just poured yourself a cup of coffee; to notice the effect of slow water, you need to drink so many cups of coffee that it becomes unrealistic. The consumption of one cup of coffee slows down only one in a million [water molecules](#) in the [human body](#).

More information: Wilbert J. Smit et al. Caffeine and taurine slow down water molecules, *Journal of Physics Communications* (2019). [DOI: 10.1088/2399-6528/ab07e4](#)

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