

# Laser beam makes cells 'breathe in' water and potentially anti-cancer drugs

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Shining a laser light on cells and then clicking off the light makes the cells "breathe in" surrounding water, providing a potentially powerful delivery system for chemotherapy drugs, as well as a non-invasive way to target anti-Alzheimer's medicines to the brain. That's the conclusion of a report in ACS's *The Journal of Physical Chemistry Letters*.

Andrei Sommer's group, with Emad Aziz and colleagues note using this technique before to force [cancer cells](#) to sip up anti-cancer drugs and fluorescent dyes. Pulses of [laser light](#) can also change the volume of water inside cells in a way that plumps up wrinkles and makes skin look younger, the researchers found in an earlier study.

"The potential applications of the technique range from anticancer strategies to the design principles of nano-steam engines," the report states. Using the so-called Liquidrom ambient approach, developed by Aziz's group, the researchers combined for the first time laser irradiation with soft X-rays obtained from a cyclotron radiation source to explore the [molecular structure](#) of interfacial water layers under ambient conditions.

The researchers now showed that laser light aimed at a cell causes the water inside the cell to expand. When the light goes off, the volume of water collapses again, creating a strong pull that also sucks in the water surrounding the cell. This "breathing in and out" of the [water molecules](#) can pull [chemotherapy drugs](#) into a cell faster than they would normally penetrate, the researchers found. "In other words, we discovered a

powerful method to kill cancer cells by pumping anti-cancer drugs into them via laser light," said Sommer.

**More information:** "Breathing Volume into Interfacial Water with Laser Light", *The Journal of Physical Chemistry Letters*.

Provided by American Chemical Society

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