Researchers feed white blood cells micro-lasers causing them to produce light

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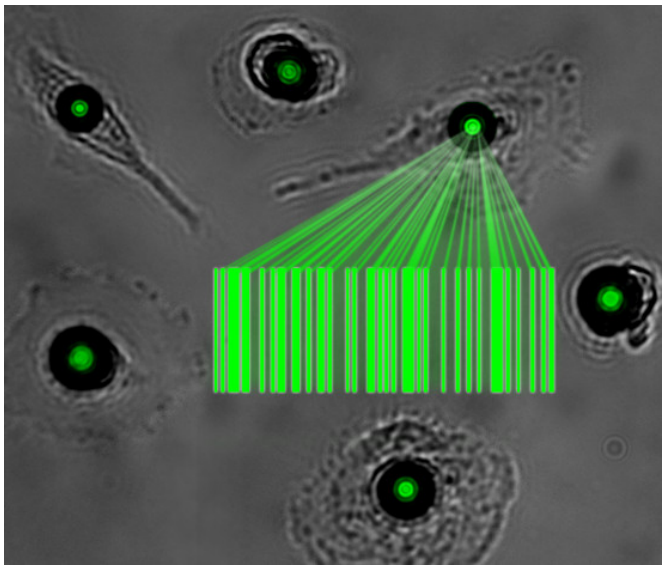

A team of researchers working at the University of St Andrews in Scotland has found a way to place a laser inside a living human cell. In their paper published in the journal *Nano Letters*, the team describes their technique and the ways in which the new procedure may be used for future medical applications.

Scientists have been working with lasers based on single cells for a number of years, but until now, all of them required optical resonators that were actually larger than the cell—in this new effort the researchers used a resonator so small that it was able to fit inside the cell. The point of such research is to create fluorescing cells in living organisms, which would allow researchers to track them as they go about their business, and that would offer insight into such things as how cancer cells get their start.

In this new effort, the researchers have expanded on prior research where green fluorescent proteins (normally found in jellyfish) were introduced into human cells and then light was amplified using a resonant cavity. In this new work, cells were coaxed into "swallowing" a whispering gallery mode micro-resonator, which forms a tiny bubble inside the cell—a fluorescent dye inside the resonator grows excited when hit with a laser beam causing the light to bounce around inside the bubble which causes it to be amplified. The result is light emitted at a different wavelength, i.e. a tiny implanted laser. The color that is emitted depends on the size of the bubble and refractive index.

Because the procedure allows for modifying large numbers of cells, and because the light is emitted for a protracted period of time (days or weeks), the researchers believe that it might be used for distinguishing and tracking cells over a prolonged period of time inside of a living organism, potentially giving researchers a means for performing intracellular sensing, adaptive imaging and perhaps actually watching the process by which tumor cells grow.

Thus far, the technique has only been used on cells living in a Petri dish, but the team is hopeful that further research will lead to a cell tracking system for test animals, and then perhaps eventually, for humans.

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