

# Nanoscopic probes can track down and attack cancer cells

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Purdue professor Joseph Irudayaraj uses a magnet to attract tiny magnetic particles in a solution. Irudayaraj designed nanoprobes with gold and magnetic particles that could be used to deliver drugs directly to cancer cells. Credit: Purdue Agricultural Communication photo/Tom Campbell

A researcher has developed probes that can help pinpoint the location of tumors and might one day be able to directly attack cancer cells.

Joseph Irudayaraj, a Purdue University associate professor of agricultural and biological engineering, developed the nanoscale, multifunctional probes, which have [antibodies](#) on board, to search out and attach to [cancer cells](#).

A paper detailing the technology was released last week in the online version of [Angewandte Chemie](#), an international chemistry journal.

"If we have a tumor, these probes should have the ability to latch on to it," Irudayaraj said. "The probe could carry drugs to target, treat as well as reveal cancer cells."

Scientists have developed probes that use gold nanorods or [magnetic particles](#), but Irudayaraj's [nanoprobes](#) use both, making them easier to track with different imaging devices as they move toward cancer cells.

The magnetic particles can be traced through the use of an MRI machine, while the gold nanorods are luminescent and can be traced through microscopy, a more sensitive and precise process. Irudayaraj said an MRI is less precise than optical [luminescence](#) in tracking the probes, but has the advantage of being able to track them deeper in tissue, expanding the probes' possible applications.

The probes, which are about 1,000 times smaller than the diameter of a [human hair](#), contain the antibody [Herceptin](#), used in treatment of metastatic breast cancer. The probes would be injected into the body through a saline buffering fluid, and the Herceptin would find and attach to [protein markers](#) on the surface of cancer cells.

"When the cancer cell expresses a protein marker that is complementary to Herceptin, then it binds to that marker," Irudayaraj said. "We are advancing the technology to add other drugs that can be delivered by the probes."

Irudayaraj said better tracking of the nanoprobes could allow doctors to pinpoint the location of known tumors and better treat the cancer.

The novel probes were tested in cultured cancer cells. Irudayaraj said the next step would be to run a series of tests in mice models to determine the dose and stability of the probes.

Source: Purdue University ([news](#) : [web](#))

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