

Tiny gold probes give scientists a sense of how disease develops

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Tiny chemical sensors implanted into patients could help diagnose disease and track its progress, following a development by scientists.

Researchers have developed tiny probes comprising gold-coated particles. These can be inserted into cells, enabling diseases to be detected and monitored remotely using light from a laser.

Once the probe is inside a cell, [laser light](#) shone on to it is absorbed then re-emitted, causing nearby proteins in the cell to vibrate according to their shape.

Because molecules change shape as disease progresses, they give rise to different vibrational frequencies. Scientists can measure and interpret these vibrations, to understand how the cell is responding to disease.

Gold is used to coat the sensor because it is an unreactive metal, preventing the body from rejecting the implant. The laser technique is highly sensitive, fast and uses a low-power laser.

Scientists say the probes could be a useful tool to learn more about diseases at a very small scale, by observing how molecules interact. Further studies will look at diseases linked to the immune system in the first instance, but researchers say the technique has potential to help doctors diagnose and monitor a range of conditions.

Dr Colin Campbell, who led the research, said: "By creating a sensor that

can safely be implanted into tissue and combining this with a sensitive light-measurement technique, we have developed a useful device that will help diagnose and track disease in patients."

The research, funded by the Scottish Universities Physics Alliance, EaSTChem and the Engineering and Physical Sciences Research Council, was published in the journals [Chemical Communications](#), the *Journal of* [Biophotonics](#) and *ACSNano*.

Provided by University of Edinburgh

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