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Scientists use nanoparticles to detect deep-tissue cancers

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Australian and Chinese scientists have developed a method using coded nanoparticles to detect and help diagnose disease.

The research team from Macquarie University and Fudan University hopes that their study will lead to less invasive disease detection.

"Currently for many more disease diagnosis such as for cancer, they rely on medical imaging but ultimately need to take tissue out for testing, we would like to move that to a different approach using optical imaging." said research author Dr. Yiqing Lu from the Centre of Excellence for Nanoscale BioPhotonics (CNBP) at Macquarie University.

In its current level of laboratory testing, the method has been successful in detecting multiple forms of breast cancer in mice.

"This technique has the potential to provide a low-invasive method of determining if breast cancer is present, as well as the form of breast cancer, without the need to take tissue samples via biopsy," joint-lead author Prof. Fan Zhang from China's Fudan University said.

Up until now it has been very difficult for the method to detect multiple biomarkers, or different forms of disease.

Light absorbing and scattering elements such as blood, muscle and cartilage produce too much interference making it difficult to determine if a range of disease biomarkers are present.

The team's solution was to engineer special nanoparticles which emit light for set periods of time.

It is the duration of the light-emission and the biomarker reaction to this timed amount of light that produces a clearly identifiable molecular signature.

"This enables high-contrast optical biomedical imaging that can detect multiple disease biomarkers all at the one time."Prof. Jim Piper, CNBP node leader at Macquarie University described the research as a major breakthrough.

"Next steps in our research collaboration are to further refine the nanoparticles, to examine issues related to a clinical roll-out of the technology and to explore further applications and disease areas where this technique could be best utilised," Piper said.