

Nanoparticle May Lead to Earlier Cancer Diagnosis



A new self-assembling nanoparticle has been designed to allow the ability to diagnose cancer earlier. Developed by a team of researchers at Imperial College London, this new nanoparticle seeks out receptors in cancerous cells, thus boosting the effectiveness of MRI scanning. It is coated with a special protein that detects signals given off by tumours. Once the nanoparticle finds a tumour, it starts to interact with the cancerous cells. During this interaction, the protein coating is stripped off and the nanoparticle self-assembles into a larger particle. This particle then becomes easily visible on the scan.

A recent study published in *Angewandte Chemie* examined the effects of the self-assembling nanoparticle in MRI scanning. It used cancer cells and mouse models to compare results from commonly used imaging agents and the nanoparticle. The nanoparticle was injected into a saline solution inside a petri dish. Its growth was then monitored for a period of four hours. It was observed that the nanoparticle grew from 100 to 800 nanometres. Thus, the nanoparticle did not become too big to cause damage. The study found that the nanoparticle had a stronger ability to produce a powerful signal and was able to create a clearer MRI image of the tumour.

The superior results are due to the fact that the nanoparticle increases the sensitivity of MRI scanning. This could be an important development since the self-assembling nanoparticle could greatly improve a doctor's ability to detect cancerous cells at the early stages of the disease. Professor Nicholas Long from the Department of Chemistry at Imperial College was particularly enthusiastic about the nanoparticle's ability to improve cancer diagnosis. "By improving the sensitivity of an MRI examination, our aim is to help doctors spot something that might be cancerous much more quickly. This would enable patients to receive effective treatment sooner, which would hopefully improve survival rates from cancer."

There is no doubt that MRI scanners are used by almost every hospital and that they are critical for medical diagnosis. However, some doctors are of the opinion that the MRI scanners are only effective for spotting large tumours and often fail to detect smaller tumours that may be present in the early stages of the disease. This newly designed nanoparticle may prove to be an effective tool for improving the sensitivity of MRI scanning.

The team of scientists at Imperial College are working on enhancing the effectiveness of the nanoparticle as well as improving its design. Professor Long states, "We're now trying to add an extra optical signal so that the nanoparticle would light up with a luminescent probe once it had found its target, so combined with the better MRI signal it will make it even easier to identify tumours."

Scientists will also continue to work on reducing the size of the nanoparticle and are aiming to optimise it for maximum performance. The objective is to create a design that is not so small that it secretes out of the body before imaging and not too big to cause any harm. It is also expected that a human trial will start within the next three to five years.

Source: [Science Daily](#)

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