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IISc discovers hybrid nanoparticles that shine new light on targeting cancer cells

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The hybrid nanoparticles have photothermal, oxidative stress, and photoacoustic properties

Scientists at the Indian Institute of Science (IISc), Bengaluru have developed a new approach to potentially detect and kill cancer cells, especially those which form a solid tumour mass. The scientists have created hybrid nanoparticles made of gold and copper sulphide, which can kill cancer cells using heat, and enable their detection using sound waves.

Early detection and treatment are key in the battle against cancer. Copper sulphide nanoparticles have previously received attention for their application in cancer diagnosis, while gold nanoparticles, which can be chemically modified to target cancer cells, have shown anticancer effects. In the current study, the IISc team decided to combine these two into hybrid nanoparticles.

The researchers say that the nanoparticles can also help diagnose certain cancers. Existing methods such as standalone CT and MRI scans require trained radiology professionals to decipher the images. The photoacoustic property of the nanoparticles allows them to absorb light and generate ultrasound waves, which can be used to detect cancer cells with high contrast once the particles reach them.

When light is shined on these hybrid nanoparticles, they absorb the light and generate heat, which can kill cancer cells. These nanoparticles also produce singlet oxygen atoms that are toxic for the cells.

The researchers have tested their nanoparticles on lung cancer and cervical cancer cell lines in the lab. They now plan to take the results forward for clinical development.