

Novel nanoparticles to help cell imaging

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New fluorescent nanoparticles created from simple biomolecules can now help light up cancer cells for better imaging.

Scientists from Indian Association for the Cultivation of Sciences (IACS), Kolkata have created nanoparticles from folic acid, riboflavin and lactose and tuned the molecules to give a green fluorescence to help in cell imaging using bright-field microscopy.

“The cadmium selenium quantum dots currently used for imaging purposes are highly toxic to the human cells. But we have used simple molecules which are found within the human body as basic ingredients to do the same work,” says Dr. Nikhil R Jana, Professor and corresponding author of the paper published in *MRS Advances*.

Green fluorescence

The newly created nanoparticles are mixed with the cell culture medium, kept for 2-3 hours, washed and then viewed under the microscope. The nanoparticles label the cancer cells alone and are seen with a green fluorescence under the microscope.

The nanoparticles exhibit specific labelling properties. Since oral cancer cells have folate and riboflavin receptors, the nanoparticles prepared from folic acid and riboflavin bind to these receptors. Folic acid nanoparticles bind to ovary cancer cells, while nanoparticles made from lactose bind to galactose receptors found on liver cancer cells.

They found that the green fluorescence depended mainly on the temperature at which they were treated. “We used a wide range of temperature for cooking the molecules (90-340 degree C). The broadness of the fluorescence spectra increased with the lowering of the reaction temperature,” says Hayder Ali, PhD scholar and first author of the paper. “These new nanoparticles are less than 10 nanometre in size and can also be used for targeted drug delivery as they seem to have specific labelling abilities.”

Preliminary *in vivo* studies using a mouse model show no toxicity, and the researchers are currently working on getting a red emission so that bioimaging can be done with low background signal.

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