

The use of magnetic nanoparticles for cancer therapy

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Prof. Dr. Georgeta Salvan and Prof. Dr. Dietrich R.T. Zahn worked on the paper. Credit: Chemnitz University of Technology

A joint research paper from Chemnitz University of Technology and Shivaji University (India) titled "APTES monolayer coverage on self-assembled magnetic nanospheres for controlled release of anticancer drug Nintedanib" was downloaded 4,458 times last year. This puts the paper among the top most accessed papers in the peer-reviewed journal

Scientific Reports.

The authors of the paper include apl. Prof. Dr. Georgeta Salvan and Dr. Apoorva Sharma from the Professorship Semiconductor Physics (Head: Prof. Dr. Dietrich R.T. Zahn), Prof. Dr. Dietrich R.T. Zahn and Prof. Dr. Prashant Patil and Dr. Ashok Chougale from Shivaji University.

The article deals with the synthesis of magnetic drug carriers for [cancer therapy](#). The team investigated whether self-assembled [magnetic nanoparticles](#) can improve the effect of the anticancer drug Nintedanib. In doing so, the researchers showed during in vitro cytotoxicity studies—i.e. studies on [cancer cells](#) in the laboratory—that there is a dose-dependent activity of the functionalized nanoparticles for human lung cancer cells. At a concentration of 100 µg/ml (micrograms/milliliter) of the nanoparticle solution, a reduction in the cellular viability of the cancer cells by about 75 percent was observed.

"This work demonstrates the successful loading of an ensemble of magnetic nanoparticles with an anticancer drug that is poorly soluble in water and thus difficult to administer," says Prof. Salvan. Prof. Zahn adds "What is special about these magnetic nanoparticles is that the self-assembled magnetic nanoparticles retain high stability under normal physiological conditions and this inhibits the drug release. In an environment with a pH similar to a cancer cell, a controlled release of the drug then takes place."

As a result, the authors believe that the higher magnetization of the studied [nanoparticles](#) can be useful for many other applications in nanobiotechnology, for example, in the fabrication of devices for magnetoresistive biosensors or in nano-biocatalysis.



Prof. Prashant Patil. Credit: Prof. Prashant Patil

More information: V. C. Karade et al, APTES monolayer coverage on self-assembled magnetic nanospheres for controlled release of anticancer

drug Nintedanib, *Scientific Reports* (2021). [DOI: 10.1038/s41598-021-84770-0](https://doi.org/10.1038/s41598-021-84770-0)

Provided by Chemnitz University of Technology

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