Skin cancer treatments could be used to treat other forms of the disease

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The creation of a silica nanocapsule could allow treatments that use light to destroy cancerous or precancerous cells in the skin to also be used to treat other types of cancer. Such are the findings of a study by INRS

(Institut national de la recherche scientifique) professors Fiorenzo Vetrone and Federico Rosei, in collaboration with an international research team. Their results have been published in an article featured on the cover of the 26th edition of the Royal Society of Chemistry journal *Chemical Science*.

Photodynamic therapies, referred to as PDT, are treatments that use visible light to destroy cancerous or precancerous cells. Abnormal tissue is brought into contact with a light-activated and light-sensitive medication before it is exposed to light, triggering a chemical reaction that releases reactive oxygen species (ROS) to attack the diseased cells. In current treatments, the medication is injected into unhealthy tissue. But injection only works if tumors are on or under the skin, such as skin cancers.

The research team found a way around the limitation, so phototherapies can be used to treat other types of cancers as well. Thanks to silica nanoparticles doctors can use near-infrared (NIR) light, which penetrates further down into the tissue. The nanoparticles convert NIR light into visible light, triggering a chemical reaction and releasing ROS. "It's like we've reinforced the capsule that transports the treatment for diseased cells and increased the versatility of PDT. This nano superhero is stronger and more effective, even inside the body," explained Professor Vetrone, referring to the cover illustration depicting the team's discovery.

Developed by a team of chemists, magnetic resonance imaging (MRI) experts, and an oncologist, the new way of selectively enveloping light -sensitive medication in a nanocapsule could be beneficial for diagnosis and treatment. "Eventually, nanocapsules will help us expand the scope of application," added the professor.

Next, the team plans to test the nanoparticles in an in-vivo setting.

More information: Miao Wang et al, One-pot synthesis of theranostic nanocapsules with lanthanide doped nanoparticles, *Chemical Science* (2020). DOI: 10.1039/D0SC01033B