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doi:10.1038/nindia.2012.77; Published online 23 May 2012

Research highlight

Nanotherapy for jaundice

Using soft ultraviolet (UV) light, researchers have devised a novel way to degrade bilirubin (BR)[1]. This could be useful in removing excess bilirubin from the blood of jaundice-afflicted patients.

Phototherapy and blood transfusion are two existing therapeutic options for removing excess BR. However, studies have shown that free BR remains in the blood even after such therapies.

To establish a more effective treatment, the researchers studied if zinc oxide nanoparticles acted as photocatalysts in soft UV radiation from sunlight. Nanoparticles measuring 5 nm proved to be the most effective for degrading BR.

Next, the researchers investigated the potential of the 5 nm nanoparticles in a model-of-flow device, which consisted of two glass plates separated by a spacer. For this, they laid thin films of ZnO nanoparticles on one of the glass plates and passed BR solution through the channel at a very slow flow rate (4 ml/h).

BR degradation was 4% and 37% in the absence and presence of ZnO nanoparticles, respectively, under the same flow rate.

In blood, BR is mostly bound to serum albumin. The researchers therefore decided to pass a solution of BR and human serum albumin through the channel at a very slow flow rate (3 ml h−1), under soft-UV radiation. BR degradation in this case was 6% and 51% in the absence and presence of ZnO nanoparticles, respectively, under the same flow rate.

"Because ZnO is a good optical absorber, biocompatible and nontoxic, it could be used to protect blood against the harmful effects of UV light. ZnO nanoparticle-sensitized BR degradation is therefore a promising nanotherapy for jaundice," says lead researcher Samir K. Pal.

The authors of this work are from: *Unit for Nano Science & Technology, Department of Chemical, Biological and Macromolecular Sciences, S. N. Bose National Centre for Basic Sciences, Kolkata, India, Centre of Excellence in Nanotechnology, School of Engineering and Technology, Asian Institute of Technology, Klong Luang, Pathumthani, Thailand and Chair in Nanotechnology, Water Research Center, Sultan Qaboos University, Al-Khoudh, Sultanate of Oman.*

References

1. Sarkar, S. *et al*. Nanoparticle-sensitized photodegradation of bilirubin and potential therapeutic application. *J. Phys. Chem. C* **116**, 9608-9615 (2012) | Article | CAS |