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## Synthesis, functionalization and antimicrobial activity of a near-IR photoactive gold multibranched tags

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Surface-modified gold multibranched nanoparticles were prepared by chemical reduction of gold chloride aqueous solution followed by *in vivo* modification using water soluble arenediazonium tosylates. Results of NPs synthesis and their functionalization were checked using the TEM, SEM-EDX, SERS and UV-Vis spectroscopy techniques. The antibacterial effect of the surface-modified AuMs was evaluated using *Escherichia coli* and *Staphylococcus epidermidis* bacteria under the IR light illumination and without the external triggering. Prepared NPs exhibited low antibacterial activity, which was significantly increased by the grafting of carboxyl and amino functional groups on their surface. Moreover, light triggering of these functional NPs further increase their efficiency in the killing of bacteria. This significant increase of NPs bioactivity was achieved under the illumination with “tissue-favorable” IR wavelength and very mild illumination conditions. It is proposed, that strong plasmon resonance, occurred on the AuMs cups allows to significantly reducing the light power and achieves apparent bacteria killing under mild conditions of continuous illumination. This type of NPs with a wide range of attached functional groups has huge potential for application in antibacterial treatment and cancer therapy.

### Biography

Lyutakov Oleksiy is a researcher at the University of Chemistry and Technology Prague from 2009 – present. He has done his PhD from Institute of Chemical Technology, Chemical Engineering, Prague, Czech Republic during the year 2005 – 2009.

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