

## BIONAND 2018 CONFERENCE SERIES

### Medical applications of nano- and micro-technologies.

#### NANOGROUP S.A.

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Abstract:

The contemporary medicine is a field of many new scientific disciplines. Applications of modern physics, informatics and technical sciences allow to improve human's health in all its aspects, including treatment, diagnostics and quality of life.

This presentation describes only a very small part of the abovementioned processes by presenting some applications of chemical engineering and nanotechnology in the widely understood medical technology. Firstly, an application of micro technology and microfluidic devices in the electronically controlled drug delivery system embedded in the human molar tooth is presented. Secondly, multiple aspects of biocompatible, antibacterial and anti-thrombogenic coatings for various temporary and permanent implants will be presented. A modern microfluidic device able to detect various bacterial and viral infections in the single droplet of water or saliva is also an example of microfluidic and nano-coatings application in medical and military diagnostic tool. Then, the patented technology of self-assembly nanoparticles in cancer diagnostics and treatment will be discussed. The polysaccharide nanoparticles are an emerging new type of drug delivery vehicles for cancer treatment. They are able to break single cell resistance against cancer drugs and also increase treatment efficacy while decreasing devastating side effects of cancer treatment. Moreover, the nanoparticles loaded with organic fluorescent nanocrystals can serve as a tool for early cancer diagnostics. Equipped with radioactive isotopes they can be employed as modern PET scanning agent.

And last, not least, we present our nanoparticles in the engineering of immune cells to treat cancer by describing methods for enhancing antigen uptake and presentation for cancer immunotherapies and vaccines as well as usage of polymer nano-scaffolds as platform for stem cells embedment.

This presentation serves as a trigger for fruitful cooperation between our institutions.

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