

23rd International Conference on

Nanomaterials and Nanotechnology

March 15-16, 2018 | London, UK

Fluorescent nanodiamonds-liposome behavior inside cells

A Morita, SR Hemelaar, MS Chipaux and R Schirhagl

Dept. Biomedical Engineering, University of Groningen, 9713 AV Groningen, The Netherlands

Fluorescent nanodiamonds (FNDs) have been developed for nanosensors, which can be used in living cells. Nitrogen vacancy (NV-) centers in FNDs possess outstanding optical and magnetic properties. The defects change their optical properties based on their magnetic surrounding. As a result the particles can be used as a magnetic resonance sensor. Since the signal is converted to an optical signal, read out can be done with a microscope. Since photons are high in energy they can be detected more sensitively. As a result, this techniques is so sensitive, that even the faint magnetic resonance signal of single electrons can be detected with nanometer resolution. To utilize these sensors for cell biology, FNDs have to be inside the cells. Introducing FNDs to intracellular environment has been investigated by a variety of methods and different kind of cells. Here we used liposomes to coat FNDs because they have good biocompatibility properties and offer a simple coating process.

70 nm FNDs (Adamas nanotechnologies Inc., USA) were incorporated with liposomes and used in two different cell types, colon cancer cells (HT29) and yeast both of these cells cannot ingest FNDs spontaneously. For both cell types, viability was unchanged by the presence of diamond particles. Since yeast has a thick cell wall, spheroplasting was done before internalization of FNDs-liposome. During this process the cell wall is removed resulting in a cell which is only covered by a cell membrane.

Result showed FNDs-liposome can be internalized in colon cancer cells and yeast. Comparing with FNDs, FNDs-liposome give higher number of particle and lower cytotoxic effect.

Biography

Aryan Morita is second years PhD student at Department of Biomedical Engineering, University of Groningen Netherlands. She is doing research in Bioanalysis group under supervision of Dr. Romana Schirhagl. Her project is using fluorescent nanodiamonds as a nanosensor to detect free radical in aging cells.

a.morita@umcg.nl

Notes: