

Technology Licensing Opportunity

Non-Confidential Summary



Industry
Liaison
Office

FUNCTIONALISED NANODIAMONDS AS GENE DELIVERY AGENTS

ROI# 13-005

Opportunity:

Researchers at the University of Saskatchewan have developed and tested a lysine functionalized nanodiamond-based gene delivery system that can deliver genetic materials to mammalian cells and hence can be exploited for use in gene therapy.

Background:

Nanodiamond (NDs) based gene delivery systems offer unique structural, chemical and biological properties that are safer compared to currently available viral and non-viral gene delivery systems. NDs have been used successfully to deliver chemotherapeutic agents to cancer cells, plasmid DNA and siRNA into cell lines. Despite the use of NDs as vectors for delivering therapeutic agents and genetic material, it is a challenge to obtain nanosized particles in laboratory and industry scale as NDs tend to aggregate into micron-sized aggregates that are toxic to biological systems. Our technology overcomes this limitation as the lysine functionalized nanodiamonds are stable in aqueous medium and have smaller hydrodynamic radii compared to the currently available polymer based functionalized nanodiamonds.

Invention benefits:

Advantages over the existing gene delivery agents include:

- Biocompatible, high loading capacity compared to non-functionalised nanodiamonds, with the ability to cross cellular membranes
- Biologically safer than current delivery systems such as viral vectors
- Superior physical and chemical stability

Industry Liaison Office
250 – 15 Innovation Blvd.
Saskatoon, SK, S7N 2X8
Tel: (306) 966-1465

Technology Licensing Opportunity

Non-Confidential Summary



Industry
Liaison
Office

FUNCTIONALISED NANODIAMONDS AS GENE DELIVERY AGENTS

ROI# 13-005

Researcher profile:



Dr. Ildiko Badea is an associate professor in the College of Pharmacy and Nutrition. She is a member of the Drug Discovery and Development Research Group at the University of Saskatchewan with expertise in drug delivery systems.

Patent Status:

US patent application # 14/255001 was filed on April 17, 2014 and Canadian patent application # 2849447 was filed on April 17, 2014

Publications:

1. Kaur R., Badea I. (2013). Nanodiamonds as novel nanomaterials for biomedical applications: drug delivery and imaging systems. *Int J Nanomed* 8.
2. Kaur R, Chitandra JM, Michel D, Maley J, Borondics F, Yang P, Verrall RE, Badea I. (2012). Lysine-functionalized nanodiamonds: synthesis, physiochemical characterization, and nucleic acid binding studies. *Int J Nanomed* -7.

Development Stage:

Pre-clinical *in vitro* data is available

For more information, please contact:

Oksana Akhova, PhD, MBA

Tel. (306) 966 5496

oksana.akhova@usask.ca

Industry Liaison Office
250 – 15 Innovation Blvd.
Saskatoon, SK, S7N 2X8
Tel: (306) 966-1465