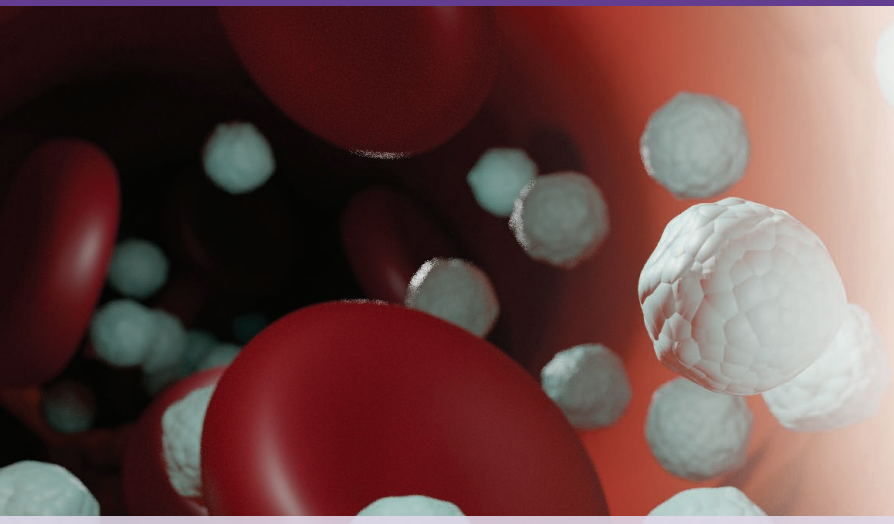
Nanotechnology Characterization Laboratory



NCL
Nanotechnology
Characterization
Laboratory

August 2018

Each quarter the NCL accepts the most promising cancer nanomedicine candidates into its Assay Cascade characterization and testing program. Nanomedicines accepted into the program will undergo a rigorous evaluation that may include sterility and endotoxin testing, physicochemical characterization, in vitro hemato- and immunotoxicity, and in vivo studies to evaluate safety, efficacy and pharmacokinetics. The studies are tailored to each individual nanomedicine and are designed to promote the clinical translation of these novel therapies. **All studies are conducted free of charge for Awardees**.

Congratulations to this Quarter's Awardees

BioSynectics, Inc.
Bio-Synectics specializes in a nanoparticulation process that formulates poorly water-soluble organic compounds into nanoparticles which are easily dispersed in water. The platform technology, NUFS™ (Nanoparticulation Using Fat and Supercritical Fluid), provides a powder nanoformulation, convenient for a variety of applications such as capsules, tablets, injection suspensions, and inhalable formulations. Development of these well-dispersible nano-crystal forms of APIs provides a very efficient and effective means to handle problems related to poor solubility and intra/inter-batch variation. Unlike other nanotechnologies, NUFS™ can formulate stable nanoparticles of drugs that have typically been unsuccessful for making nanoparticles in aqueous conditions, including those in a salt form. Using this NUFS™ nanotechnology, Bio-Synectics develops nanoparticle formulations for internal research and development, as well as optimizes nanoparticle formulations for partnering companies.

http://www.bio-synectics.com/new/eng/

Prof. Zheng-Rong Lu, Case Western Reserve University
MRI is a clinical imaging modality commonly used in cancer imaging. Currently, no targeted MRI contrast agent is available for accurate detection and risk-stratification of aggressive cancer. Dr. Lu and his colleagues have developed a peptide targeted hydroxylated Gd3N@C80 to target an oncoprotein associated with tumor aggressiveness for sensitive detection and risk-stratification of aggressive tumors. The new contrast agent possesses an r1 relaxivity approximately 20 times that of conventional Gd-based contrast agents and produces sensitive contrast enhancement of tumor tissues at substantially reduced doses, which will minimize potential dose-dependent toxic side effects. The goal of the NCL collaboration will be to perform structural characterization, pharmacokinetic studies and safety studies to inform an Investigational New Drug (IND) application to the Food and Drug Administration (FDA). Successful development of this high performance

The Nanotechnology Characterization Laboratory is operated by Leidos Biomedical Research, Inc. in support of the Frederick National Laboratory for Cancer Research under Contract HHSN261200800001E.

Frederick National Laboratory
for Cancer Research
sponsored by the National Cancer Institute

Congratulations to this Quarter's Awardees (continued)

MRI contrast agent has the potential to accurately detect, localize, and diagnose aggressive cancers, replace invasive breast biopsies, and improve decision-making in the clinical management of cancer. It also has the potential for non-invasive active surveillance of low-risk cancer and timely monitoring of disease progression, as well as image-guided therapy.

http://engineering.case.edu/groups/cbm/

Prof. Jordan J. Green, Johns Hopkins University
New biotechnology is needed to safely and effectively deliver promising nucleic acid medicines, such as miRNA, to target cells of interest in the brain. In particular, glioblastoma is a devastating disease requiring new treatment modalities. Tumor-propagating brain cancer stem cells (BCSCs) are especially of concern as they can be resistant to conventional chemotherapy and radiation treatments. A promising new nanomedicine has been developed with the potential to target these BCSCs and reprogram them by delivering miRNA. Through this approach, investigators have the potential to destroy the source of resistance and regrowth of glioblastoma. To form the nanomedicine, biodegradable, positively-charged polymers are used to bind and encapsulate negatively-charged miRNA into nanoparticles that are effective for intracellular delivery to brain cancer cells. This genetic nanomedicine platform will be further evaluated to accelerate its translation to the clinic.

http://greengroup.johnshopkins.edu/

If you are interested in learning more about the NCL's services, please visit our website, https://ncl.cancer.gov, or contact us for more information, ncl@mail.nih.gov. **The next application deadline is December 1, 2017**.