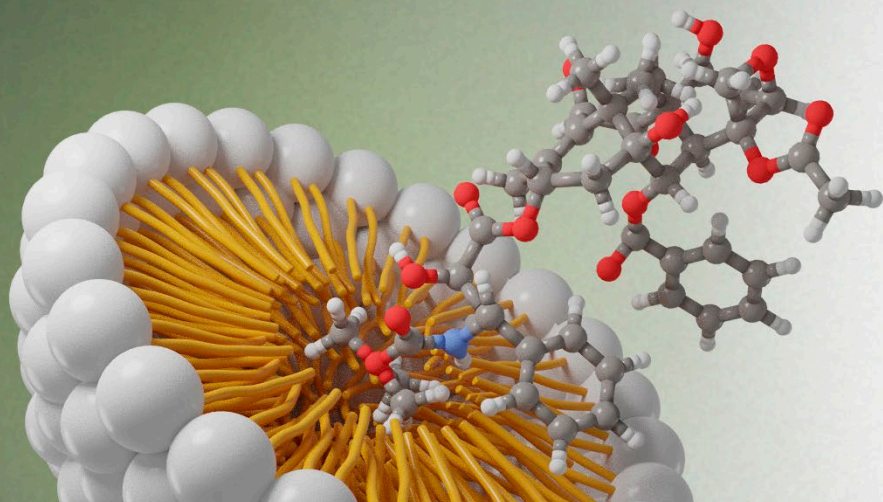


# Nanotechnology Characterization Laboratory



**November 2017**

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

### **EVOQ Therapeutics**

EVOQ Therapeutics is developing a new vaccine technology for cancer immunotherapy. EVOQ's proprietary nanodisc vaccine technology efficiently delivers tumor antigens and adjuvants to lymphoid tissues and elicits unprecedented levels of T-cell responses that exert strong therapeutic efficacy against established tumors in preclinical models. In this collaboration, EVOQ and NCL will perform rigorous testing and characterization of the nanodisc platform in order to expedite translation to the clinic.

<https://www.evoqtherapeutics.com>

### **John McDonald, Georgia Institute of Technology**

Prior in vitro studies indicate that siRNA-mediated knockdown of epidermal growth factor receptor (EGFR) mRNA levels may be more effective than EGFR protein inhibitors in inducing cancer cell death when combined with platinum based-therapies. Dr. John McDonald's laboratory has developed core/shell nanogels composed of poly N-isopropylmethacrylamide (pNIPMAm) to target delivery of EGFR siRNA to tumors with high specificity, to significantly reduce cellular levels of EGFR and dramatically enhance the efficacy of platinum-based drugs in mouse models of ovarian cancer. The technology has significant potential to enhance platinum-based standard-of-care therapies for ovarian and other epithelial cancers (e.g., lung and head & neck cancers).

<http://www.mcdonaldlab.biology.gatech.edu>

### **Oncolmmune, Inc.**

Oncolmmune is developing liposomal drug formulations for the treatment of cancer, autoimmune diseases and alloimmune diseases. These novel formulations are being used for safe and effective targeting of cancer stem cells and for selective ablation of autodestructive T cells.

<https://www.oncoimmune.com>

**Frederick National Laboratory  
for Cancer Research**

*sponsored by the National Cancer Institute*

## Congratulations to this Quarter's Awardees (continued)

### **Heike Daldrup-Link, Stanford University**

Patients with brain cancer (glioblastoma) have a dismal survival of less than a year. Novel curative therapies are urgently needed. Dr. Daldrup-Link and colleagues have developed novel combined diagnostic and therapeutic (= theranostic) nanoparticles, which release the potent therapeutic drug azademethylcolchicine after cleavage by specific enzymes in the tumor tissue (matrix metalloproteinases, MMP-14). This leads to selective toxic effects in MMP-14 expressing brain cancers, but not normal brain. In addition, the theranostic nanoparticles can be detected with magnetic resonance imaging, which enables real-time monitoring of tumor drug accumulation. Treatment with the theranostic nanoparticles significantly improved the survival of glioblastoma bearing mice (Mol Cancer Therapeutics 2017, PMID: 28659432).

<http://daldrup-link-lab.stanford.edu>

### **Synergene Therapeutics, Inc.**

Temozolomide (TMZ) is the most commonly used chemotherapy for brain tumors, but it does not efficiently cross the blood-brain barrier (BBB). SynerGene Therapeutics, Inc. is developing a nano-encapsulated formulation of TMZ that is actively ferried across the BBB via endothelial cell transcytosis mediated by the transferrin receptor. This formulation, termed scL-TMZ, has been shown in cell cultures and preclinical animal models to be considerably more effective than free TMZ. In addition to improved efficacy, scL-TMZ appears to be less toxic and to have potential applicability to cancers beyond brain tumors. Related nanomedicines with distinct payloads have completed Phase I trials and are advancing in clinical development attesting to the safety of the nanodelivery system.

### **Jindrich Kopeček, University of Utah**

Dr. Kopeček and his team developed a new strategy that endorses inert HPMA polymer with biodegradability, which permitted the preparation of high molecular weight HPMA-drug conjugates with simple linear architecture while maintaining good biocompatibility. Extended long-circulating pharmacokinetics and enhanced antitumor activities have been achieved in several preclinical investigations. This innovative approach has created amazing flexibility and greater synthetic diversity than previously possible. As such, this platform technology may initiate a new wave of HPMA-based polymer-drug conjugate development.

<http://pharmacy.utah.edu/pharmaceutics/groups/kopecek>

### **ZY Therapeutics, Inc.**

ZY Therapeutics Inc. is a fast-growing drug delivery company based in RTP, North Carolina. The company's mission is to create innovative formulations to address unmet medical needs and improve patient quality of life. ZY has developed multiple proprietary nanotechnology platforms for drug delivery purposes. The first product using a biodegradable polymeric platform, ZY-010-PNP, is a third-generation non-foaming paclitaxel injectable supplied as a lyophilized powder. Preclinical data for ZY-010-PNP demonstrated improved efficacy and toxicity. ZY-010-PNP will continue preclinical characterization through collaboration with the NCL, and ZY Therapeutics plans to initiate regulatory review in 2018.

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](mailto:ncl@mail.nih.gov). **The next application deadline is December 1, 2017.**