Cancer

Faculty Research Interests

Dr. Abraham Joy
Dr. Joy's lab is developing functionalized biomaterials with tunable properties for the regulation of cell functions. These smart delivery systems can offer great therapeutic advantages over traditional systems in which release of active/diagnostic agents can be controlled according to disease-specific (proximal) or nondisease-specific (external) stimuli.

Dr. Judit Puskas
Dr. Puskas' Lab has conceived a way to use a proprietary “Biorubber” as a novel, soft gel-filled breast implant that would significantly reduce or eliminate the risk of leakage and ruptures in implants, and may reduce the incidence of capsular contracture — promising a safer alternative for women choosing breast implants. The new Biorubber for the breast implant is a proprietary polyisobutylene rubber with superior barrier and mechanical properties. It belongs to a family of polyisobutylene-based thermoplastic elastomers whose biocompatibility has been demonstrated in vitro and in vivo. One version of the material is currently FDA approved for a different use. Other potential applications of this material include vascular grafts and other medical devices.

Dr. Wiley Youngs
At present, the standard treatment of ovarian cancer is cytoreductive surgery followed by intravenous chemotherapy involving platinum-based drugs. Though treatment of this disease is possible, the majority of the patients relapse leading to death. Therefore, successful treatment of ovarian cancer vitally depends on the discovery of more effective chemotherapeutic agents than the currently available platinum-based compounds. The Youngs’ lab has reported thiaether metal complexes that are nonplatinum-based and possess anticancer activity. The lead complex, a Rh(III) thiaether complex, possesses very impressive anticancer activity when compared to that of cisplatin.
Dr. Yang Yun
Dr. Yun’s lab investigates methods of increasing the efficacy of common and experimental drugs by applying the principals of drug delivery to create smarter drugs and carriers. An ideal platform for targeting cancer cells is the group’s L-tyrosine polyphosphate (LTP) nanoparticles, which is a rapidly degrading polymer. The surface of the nanoparticles are easily decorated with various targeting moieties, such as peptides, antibodies, and other molecular ligands, that increase the specificity for certain types of cells. The combination of LTP, targeting moieties, and drugs are essential for localizing the activities of potent chemotherapy drugs even when systemically injected. In addition, the Yun lab has drug pendant systems that not only provide water solubility to hydrophobic drugs but also have a built-in targeting mechanism that can recognize many types of carcinomas through two receptors that are over-expressed by these tissues.

HeLa cancer cells that have been stained for nucleus, actin, and folate receptors.