Development of mucoadhesive systems for drug delivery in oral mucositis.

Approximately 60,000 patients in the United States are annually diagnosed with head and neck cancer. More than 60% of patients that undergo radiation and chemotherapy develop severe mucositis, a condition in which the oral mucosa presents constant inflammation and ulceration. This leads to early termination of radiation treatment and morbidity from pain, which requires opioid analgesia and prevents oral intake.

Delivering heparin-binding EGF-like growth factor (HB-EGF), a topical growth factor that enhances epithelial migration and proliferation during the 2-3 week period following radiation therapy, would increase patient compliance with radiation protocols and increase cancer survival. To increase the factor’s resident time and stability in the oral cavity we aim to encapsulate it in biocompatible dopamine-modified poly(ethylene glycol) microgels. These microgels have the ability to encapsulate both hydrophobic and hydrophilic active molecules in high amounts making them ideal for drug delivery. By introducing dopamine methacrylamide into the microgels we aim to improve the material mucoadhesive properties to be used in the oral mucosa for the treatment of oral mucositis and improve HB-EGF local delivery.