

## Dual Delivery of Therapeutics and Inflammatory Cytokines to Treat Pancreatic Cancer

### Description:

Cytokines play a vital role in immunity, which has led to their use as therapeutics for many diseases. However, cytokines have a short circulation half-life, and induce side-effects due to non-targeted delivery and activation of immune cells. To address this problem, this project involves a two-pronged approach of targeted activation of immune cells *via* the lymphatic system, accompanied by steady release of therapeutics into cancer tissues. The candidate will develop glycogen nanoparticles for delivering cytokines to lymph nodes, and cytotoxic drugs into cancer tissue. Poly(ethylene glycol)-heparin hydrogel matrices will be used for the release of nanoparticles and therapeutics. This is an interdisciplinary project spanning multiple groups including experts in bionanomedicine (AG Besford), matrix engineering (AG Freudenberg), and cancer biology (AG Lössner). The project involves nanomaterial synthesis and characterisation, polymer coupling with rheological characterisation, and xenograft studies to establish the therapeutic efficacy and pharmacokinetic properties of the nanomaterials.

### Specific key tasks:

- Establishing the *in vivo* Pharmacokinetics of glycogen nanoparticles.
- Coupling cytokines, chemotherapeutic drugs, and tumour-cell targeting motifs to glycogen nanoparticles.
- Engineering poly(ethylene glycol)(PEG) hydrogels for immune modulation and therapeutic release applicable to subcutaneous injections.
- *In vivo* testing of therapeutic materials.

**Your profile:** We are looking for a highly motivated candidate who is comfortable with both chemistry and biology. This ambitious research requires documented experience in chemistry and material sciences, and an understanding of cancer biology. There is opportunity to learn new aspects across these disciplines, and an enthusiasm for adapting is desired. Well-developed planning and organizational skills, the ability to setting and meeting deadlines, as well as good communication skills for scientific writing and discussions and proficiency in English are essential.

**We offer:** A position in a leading research institute, combined with a highly specialized working environment in the research groups of Dr. Quinn Besford, Dr. Uwe Freudenberg, and Dr. Daniela Lössner, where you can implement your own ideas and work with a diverse and inclusive team, with flexible working hours, and collaborative opportunities.