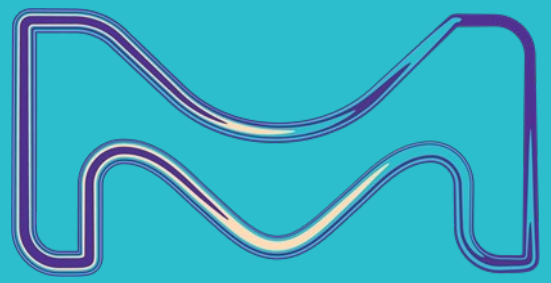
WARF 2026

Project Proposals CSS

April 11, 2026



Chemistry Proposal 1

Validation of Novel Polymers for Engineered Tissue

Proposal:
Utilize precision natural and synthetic polymers developed by CSS R&D in cutting edge tissue engineering applications such as the vascularized tissue developed by the Ngo lab in the Department of Chemical and Biological Engineering

Deliverables:
- Joint publication and protocol for use of TissueFab materials in creating vascularized tissue
- Product ideation of specific MW, Rheology, or surface modifications necessary to enhance cell growth and differentiation
- Data highlighting the suitability of our patented Polysapertamide materials for tissue engineering applications
- Validation of additional cell lines for cytocompatibility with our natural polymers

Why UW
The department of Chemical and Biological Engineering has extensive expertise in tissue engineering including in the Ngo and Palecek laboratories and can showcase our materials in cutting edge applications

Benefit for MilliporeSigma

Provide specific data on compatibility and performance of our materials in tissue engineering accelerating adoption and revenue. Increase awareness of fully novel materials such as our Polysapertamides with limited publications in cell supportive hydrogels

Embodiments

Methods and materials for neural model development and API delivery testing

Advanced models to duplicate tissue interfaces and interactions between cell lines

Methods for templated or emergent vascularization formation in hydrogels

Synthetic Matrigel® replacements

Development of synthetic polymer based formulations for cell differentiation and growth through functionalization or additives

Chemistry Proposal 2

Head to Head comparison of PEG and PEG alternative formulations for drug delivery

Proposal:
Validate our biocompatible and biodegradeable PEG alternatives as replacements for immunegenic PEGs in drug delivery formulations

Deliverables:
- Formulation design incorporating our PEG alternative polymers including Polysarcosines, Polyphospoesters, Polyaminoesters and Polysapertamides
- Joint publication and workflow instructions on the use and efficacy of these materials in drug delivery formulations
- Testing information allowing development of alternatives with superior performance

Why UW
UW's School of Pharmacy Drug Delivery Core has extensive experience in the formulation and testing of advanced micro and nano drug delivery formulations across multiple research group allowing a degree of testing beyond our internal capabilities

Benefit for MilliporeSigma

Pharmaceutical formulation scientists are extremely hesitant to move away from PEG materials due to their long history and use in FDA approved formulations despite their many drawbacks. Proven third party data on the performance of our PEG alternatives will be very influential with customers considering switching systems and drive revenue and uptake

Embodiments

Comparison of PEG and non-PEG polymeric nanoparticles for efficacy in nano drug delivery systems with model compounds

Polymeric delivery solutions for Peptide therapeutics

Design and testing of lipid polyplexes for advanced modalities (Nucleic acids, peptides, antibodies, etc)

We have a Confined Impinging Jet mixer device and are interested in its suitability for particle formation across a range of APIs particularly as a replacement/compliment to microfluidic methods

Polymer functionalization or new polymer classes for better controlled release of APIs based on pH, temperature or other biological or chemical cues