Revitalizing Wound Healing

Wound healing is a highly dynamic process which can be stimulated by the use of antibiotics, however the escalating threat of antibiotic-resistant strains due to persistent antibiotic use poses a significant challenge. In response, our research introduces a strategy using curcumin, a natural compound renowned for its remarkable healing properties. We are developing an approach that harnesses curcumin's power to stimulate reepithelization and augment collagen deposition at the wound site, creating a synergistic healing cascade.
To address the issue of delivering hydrophobic drugs effectively, we will create the Curcumin inclusion complexes. This complex not only demonstrates biocompatibility but also exhibits anti-bacterial and anti-infective properties, effectively promoting diabetic wound repair. Incorporating this complex in a bioactive natural polymeric hydrogel system ensures a controlled release. These hydrogels are enzymatically crosslinked and can be applied as a fast gelating wound dressing, sealing the wound with an hydrophilic layer.

The cyclodextrins and natural polymers will be modified to crosslink into the desired product. All components will be analyzed by characterization techniques such as H-NMR, FTIR, UV-Vis. Complexation will be confirmed by UV-Vis. And gelation will be analyzed by rheology.
Finally the biocompatibility will be tested through fibroblast viability assays using 3T3-fibroblast cells.

Project goal
Develop a skin regenerating hydrogel for wound healing.

During this project you carry out:
Synthesis of functionalized polymers, small molecules and inclusion complexes
Development of an drug releasing hydrogel
Preparation and analysis of hydrogels
Cell culture and biocompatibility tests