UNIVERSITEIT GENT

CHEMTECH LIFE SCIENCE

TECHNOLOGY OFFER

BIOGELATOR: PEPTIDE-BASED HYDROGELS FOR CONTROLLED DRUG-DELIVERY

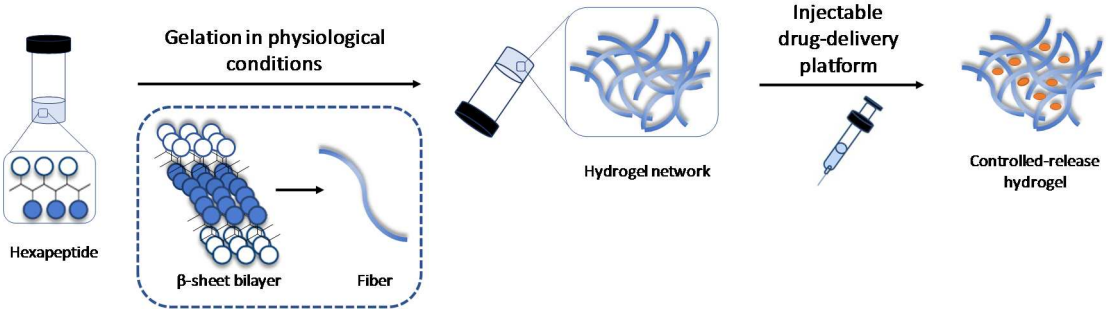
We are seeking partners interested in peptide-based soft materials for the development of new controlled delivery formulations for biomedical applications.

INTRODUCTION

Hydrogels are swollen cross-linked networks that contain large amounts of water. They can be made from synthetic or natural polymers via chemical or physical crosslinking. Because they present unique properties, biodegradable hydrogels are used in many biomedical applications such as tissue engineering, contact lenses, hygiene products and drug delivery, presenting different designs and shapes depending on the envisaged purpose.
Due to their biocompatibility, their low toxicity and their physically crosslinked properties, peptide-based hydrogels represent an important class of injectable hydrogels suitable to be used as matrices for controlled and sustained drug release.

TECHNOLOGY

Researchers from VUB (Prof. Ballet) and Ghent University (Prof. Madder & Prof. Hoogenboom) have developed an appealing delivery platform based on injectable peptide hydrogels. These materials are based on short, tunable amphipathic hexapeptide sequences that form hydrogels upon addition of aqueous media. These physical hydrogels were demonstrated to be biocompatible and were found to present thixotropic properties, hence providing ideal materials for subcutaneous administration.



Injectable hydrogels are recognized to be a powerful tool for minimally invasive therapies.

APPLICATIONS

The technology could be used as a generic controlled drug delivery formulation for the treatment of various chronic diseases, suited for the extended release of small molecule drugs and biologicals of medium- to high molecular weight drugs. Additionally, it could also be used in other areas like tissue engineering, where soft matters are highly valuable.

ADVANTAGES

The BioGelator technology:

- is easy to produce
- is based on biocompatible and biodegradable materials
- is highly tunable
- is compatible with a wide range of therapeutics (from small molecules to biologics)
- presents thixotropic properties, providing ideal materials for subcutaneous administration
- is a powerful tool for minimally invasive therapies

STATUS OF DEVELOPMENT

The BioGelator technology was first developed for pain therapy, and other biomedical and therapeutic applications are currently under investigation.

The *in vivo* efficacy of BioGelator formulations was demonstrated via monitoring of opioid-induced antinociceptive effects in mice using the tail-flick test. Systemic subcutaneous (sc) injection of morphine, co-formulated with different hydrogelators, produced a prolonged and significant antinociceptive effect (see Figure below).

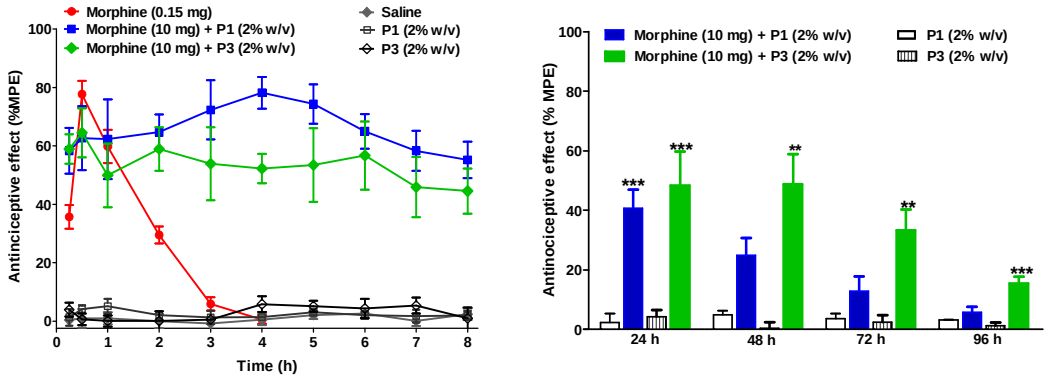


Figure: Comparison of morphine-induced antinociception in the mouse tail-flick test after s.c. administration, applied in solution or co-formulated with two hydrogels. Dose/mouse of morphine are indicated.

To demonstrate the broader applicability of the technology, other opioids such as 14-methoxymetopon and opioid peptides were tested showing a significant pain relief up to 96 h. During the treatment, no alterations in the general behavior of mice were observed, indicating the absence of potential side effects and the stability of the formulation over extended periods of time.

PARTNERSHIP

We are seeking partners/collaborators that are interested to further develop our technology in the current application towards clinical trials. We are also interested in partnerships willing to investigate the potential of the BioGelator in your application. We could provide materials, and/or develop new systems specifically for your purpose that may lead to new proprietary applications.

INTELLECTUAL PROPERTY

PCT/EP2016/066583: Hydrogel-forming peptides (priority date 13/07/2015 and publication number WO 2017/009358)
PCT/EP2017/053518: Hydrogel-forming composition for controlled release (priority date 16/02/2016).

KEYWORDS

Peptide hydrogels, Controlled-drug delivery, Biomedical applications

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