

Injectable biodegradable gels with hydrophobic pockets/cavity for delivery of drugs

EXECUTIVE SUMMARY

Injectable, biodegradable, polymer hydrogel (that cross links in-situ) with one or more hydrophobic cavities which can be used to deliver drugs, with the desired release profile - having various biomedical applications

BACKGROUND

Hydrogels are 3-D polymer networks with an unique ability to hold water, maintaining semi-solid state giving them physical characteristics similar to soft tissues. They need to be easily administrable as preformed hydrogels and exist as flowable aqueous solutions before injection and immediately turn in to standing gels upon administration

TECHNOLOGY DESCRIPTION

The hydrogel developed by NCL scientists can be *in situ* crosslinked (which makes it suitable for injectable systems), with one or more hydrophobic pocket(s) which can be used to deliver desired drugs with desired release profile (gelation time- 1 to 30 minutes; degradation time- 1- 30 days; storage modulus from 5-110 Kpas). It comprises of a polymer backbone, a hydrophobic pocket (moiety being triclosan) and a water soluble cross linker (paclitaxel solubilized in alpha tocopherol)

MARKET POTENTIAL

- The US market for advanced drug delivery has been projected to exceed \$76 billion by 2014 - not many organizations exist which can fulfill the task of making such specialized delivery techniques on a large scale¹ Also significant market potential in wound care exists²

¹<http://www.pharmameddevice.com>, ²<http://www.tissuegenesis.com/TGI%20Market%20Opportunity%20Brochure.pdf>

VALUE/ADVANTAGES

- Overcome the barrier of surgical implantation
- Does not require solvents as other biodegradable polymers might require which are harmful to the human body/some drugs may become inactive on coming in contact with the solvent
- In drug delivery applications, drugs can be loaded in the hydrophobic pockets present in the gels
- Provides precise control over the chain length, sequence and 3D arrangement of the polymer networks in the gels - hence prevents side reactions caused which may influence their performance

APPLICATIONS

- In site specific drug delivery systems/depots (Many important drugs are hydrophobic in nature and need to be administered in a solubilized form for the expected therapeutic effect- using our gel system, which has hydrophobic pockets to hold these drugs, the drugs can be delivered directly)
- Biomedicine- cell growing depots for tissue regeneration & protective membranes for the treatment of wounds
- Tissue engineering- space filling agents, delivery vehicles for bioactive molecules & tissue formation directing scaffolds

TECHNOLOGY STATUS

- Demonstrated at the lab scale
- Ready to be licensed
- Patent application filed: PCT #- [IB2010/003190](http://www.patent.gov.in/tol/patent/IB2010/003190)