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TECHNOLOGY BRIEF

Surface layer coated biodegradable microcapsules for oral drug delivery

The Challenge: Targeted drug delivery is a challenging field of high importance within the pharmaceutical industry. The combination of an orally administered therapeutic agent contained in an encapsulated vehicle that can deliver its contents to a specific tissue type would provide a very effective means of fighting disease. This process would be of value through the non-invasive delivery of locally high doses to the afflicted area.

UMBI Solution: UMBI scientists have developed a targeted oral drug delivery system that specifically delivers therapeutic agents to epithelial surfaces. Microspheres consisting of biodegradable polymers are surface-functionalized with purified S-layer protein from *Lactobacilus brevis* and are directed to the epithelial surface by virtue of the affinity of the S-layer protein for components of the extracellular matrix, such as fibronectin and laminin-run on. The UMBI invention allows the targeted delivery of high local concentrations of therapeutic agents, which can include peptides, antibiotics, steroids, anti-inflammatory and/or immune modulators, to epithelial surfaces such as skin, lung and intestinal mucosa.

Commercial Applications:

- Microcapsules for oral drug delivery of any therapeutic agent to epithelial cells.
- Initial use is proposed with Human Defensin 5 as a therapeutic treatment of Crohn's disease. Recent studies have shown that patients suffering from this chronic intestinal inflammation show a specific decrease in HD-5.
- A second specific use may be the use of antimicrobial peptides as therapeutics in the treatment of cystic fibrosis.

Advantages:

- Biodegradable microspheres are widely used as carriers for therapeutics, but oral delivery currently lacks targeting ability. Targeted administration of biodegradable microspheres allows the delivery of relatively high doses of therapeutics to the locally afflicted area.

Stage of Development: *In vivo* testing and animal studies required

Patent Status: Pending PCT patent application

Licensing Potential: UMBI is seeking non-exclusive and exclusive licensees to all or part of this technology. The UMBI inventors would welcome the opportunity to work with any licensee to further refine or extend the capabilities of this invention.

Inventors & UMBI Reference: de Leeuw and Lu, 05-021

Relevant Publications:

1. de Leeuw E, Lu W. 2007. Human defensins: turning defense into offense? Infect Disord Drug Targets, 7(1):67-70.

2. de Leeuw E, Burks SR, Li X, Kao JP, Lu W. 2007. Structure-dependent functional properties of human defensin 5. FEBS Lett.; 581(3):515-20.

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