

Active emulgels for controlled zero-order drug release

Reference No: B79089

CHALLENGE

Releasing drugs with zero-order (constant release) is one of the ultimate goals of controlled drug-delivery vehicles. When drugs are released with zero-order, one can accurately control the drug plasma concentrations for a prolonged time. Particularly, hydrophobic drugs (e.g., BCS class II drugs) are difficult to deliver at constant therapeutic levels due to their low bio-availability. As a hybrid of emulsion and hydrogel, emulgels have shown to improve solubility of hydrophobic drugs. However, delivery via existing emulgels is hampered by non-linear drug-release (first-order kinetics), resulting in the risk of under- or overdose of medication.

INNOVATION

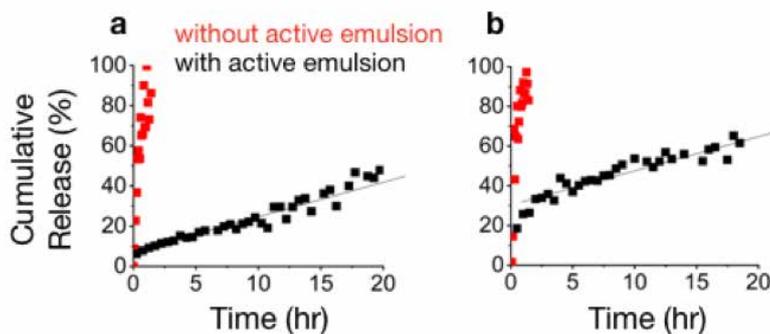
The innovation is a combination of a hydrogel and emulsion that release hydrophobic drugs at a constant rate. Component one is a standard polysaccharide based hydrogel that acts as a gelling agent ensuring the platform behaves like a solid. Critically, component two is the inventively 'active' emulsion that releases drugs at a constant, yet tunable, rate. The resulting 'active emulgel' has the potential to improve patient compliance by reducing the frequency of drug administration. Furthermore, next to BCS II class drugs, the platform allows incorporation of small peptides and modified DNA or RNA strands, thus expanding its scope as drug-delivery platform. With only three ingredients, the platform is economical, predictable, versatile and straightforward.

COMMERCIAL OPPORTUNITIES

For oral drug uptake via encapsulated emulgels, in dermal applications or as wound dressing.

DEVELOPMENT STATUS

Proof-of concept study show zero-order release kinetics for three BCS class II drugs (Nimesulide, Nitrendipine, Mebendazole) *in vitro*. Formulation for *in vivo* use is underway.



Representative traces of the cumulative drug release of 50 µM Nitrendipine (a) and Nimesulide (b) from agar gel without active emulsion (red traces) and with active emulsion (black traces).