CG (12 µmol/kg), whilst the absolute F was 8.2% for minispheres loaded with CA (32 µmol/kg). In terms of relative F, the best data were obtained for minispheres containing NaTDC (i.j.), a 4-fold increase over sCT solution, and also for either C10 or CG (i.c.), where there was a 3-fold increase over sCT solution. Histology of instilled intestinal loops indicated that neither the minispheres nor components thereof caused major perturbation. In conclusion, selected SmPill(R) minisphere formulations may have the potential to be used as oral peptide delivery systems when delivered to jejunum or colon.

Bhalekar, M. et al. (2015). "Formulation and evaluation of Adapalene-loaded nanoparticulates for epidermal localization." *Drug Deliv Transl Res* 5(6):585–595.

Adapalene (ADP), a topically administered antiacne drug, finds limitation due to poor penetration, limited localization, and associated incompatibility of photosensitization and skin irritation. To explicate an innovative and safe method for ADP administration and alleviating the associated limitations, solid lipid nanoparticles (SLN) of ADP have been fabricated and evaluated for efficacy in the present work. The SLN were prepared using preemulsion sonication method and incorporated into convenient topical dosage form, hydrogels. In vitro permeation studies of the hydrogels through HCS indicated gel containing ADP-SLN showed 2-fold more accumulation in skin layers as compared to conventional ADP gel. Rheological studies demonstrated ADP-SLN gel to possess pseudoplastic behavior, occlusion and hydration studies revealed permeation effectiveness of ADP-SLN gel over conventional ADP gel while primary skin irritation studies established safety of the ADP-SLN gel upon topical application. Hence, it was concluded that the studied ADP-SLN formulation with skin localizing ability may be a promising carrier for topical delivery of ADP.

Bijukumar, D. et al. (2016). "Design of an inflammation-sensitive polyelectrolyte-based topical drug delivery system for arthritis." *AAPS PharmSciTech* 17(5):1075–1085.

The most successful treatment strategy for arthritis is intra-articular injections that are costly and have reduced patient compliance. The purpose of the current study was to develop an inflammation-sensitive system for topical drug administration. Multimacromolecular alginate-hyaluronic acid-chitosan (A-H-C) polyelectrolyte complex nanoparticles, loaded with indomethacin were developed employing pregel and postgel techniques in the presence of dodecyl-L-pyroglutamate (DLP). In addition to in vitro studies, in silico simulations were performed to affirm and associate the molecular interactions inherent to the formulation of core all-natural multicomponent biopolymeric architectures composed of an anionic (alginate), a cationic (chitosan), and an amphi-ionic polyelectrolytic (hyaluronic acid) macromolecule. The results demonstrated that DLP significantly influenced the size of the synthesized nanoparticles. Drug-content analysis revealed higher encapsulation efficiency (77.3%) in the presence of DLP, irrespective of the techniques used. Moreover, in vitro drug release studies showed that indomethacin release from the nanosystem was significantly improved (98%) in Fenton's reagent. Drug permeation across a cellulose membrane using a Franz diffusion cell system showed an initial surge flux (0.125 mg/cm(-2)/h), followed by sustained release of indomethacin for the postgel nanoparticles revealing its effective skin permeation efficiency. In conclusion, the study presents novel nanoparticles which could effectively encapsulate and deliver hydrophobic drugs to the target site, particularly for arthritis.