

**SALA DE GRADOS  
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## **Breaking the Barrier: Efficient Topical Drug Delivery Using Responsive Polymers**

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Nanogel (NG) refers to nanometer-sized crosslinked polymeric materials having intrinsic properties ideal for biomedical applications, i.e. as drug carriers which shrink or swell significantly by expelling or absorbing large amounts of water, and selectively release their cargo in response to external stimuli. Among such stimuli, temperature is attractive because of its simple accessibility and easy applicability. Our group has developed several thermoresponsive NGs as drug delivery systems based on hyperbranched polyglycerol as a macro-crosslinker and different thermoresponsive polymers as ideal candidates for topical drug delivery, which permits targeted, sustained delivery of therapeutics to human skin. This delivery is limited to lipophilic molecules with molecular weight of typically < 500 Da, capable of crossing the stratum corneum. Nevertheless, there are indications that protein delivery may be possible in barrier deficient skin, a condition found in several inflammatory skin diseases such as psoriasis and atopic dermatitis, and in congenital diseases like autosomal recessive congenital ichthyosis. Here, the synthesis, characterization, and potential application in topical protein delivery of thermoresponsive NGs is presented. The delivery of proteins such as Transglutaminase, Etanercept, Ovalbumin, and the CRISPR-Cas 9 complex will be discussed as models for protein replacement therapy, antiinflammatory treatment, needle-free vaccination, and gene edition, respectively.

*For more info of the seminar and CV of Prof. M. Calderón, please click [here](#).*

