A New Perspective for Ionic Liquids not Related with CO2 Capture. Can we Design them as Drugs?

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Abstract:

Transdermal Drug Delivery global market reached up to USD 4,200.3 Million in 2016 and it is expected thrive at a Compound Annual Growth Rate of 7.5% in 2017-2024, according to Global Transdermal Drug Delivery Market Analysis Opportunity, making this research area not only relevant but also an economical and profitable health care solution. In recent years, combination of pharmaceutical therapeutics with natural polymers has received widespread interest in comparison with synthetic materials due to their biocompatibility, biodegradability and similarity to macromolecules recognized by the human body. Bacterial-derived biopolymers have also been regarded as good candidates for drug delivery and wound healing not only due to their non-toxicity, biodegradability and biocompatibility, but mainly due their non-animal source as they are obtained through a fermentation process. However, the best candidates still present limitations including lack of intrinsic wound healing, antimicrobial properties, and controlled drug delivery via the skin.

Given the high need on the use of biopolymers in many fields of medicine, this work aims to merge material design based on microbial biopolymers with biocompatible ionic liquids (ILs) to develop skin drug delivery biomaterials, in the form of free-standing films and hydrogels. Motivated by the possibility of tailoring ILs towards specific applications, new synthetic routes will be applied to design biocompatible ILs with the ability to disrupt hydrogen bonds relevant for biopolymer dissolution purposes, and pharmaceutical drugs, specially those with anti-bacterial, aesthetic and anti-inflammatory response. At the end, this work aims the design of new biomaterials aiming at drug delivery improvement.