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Self-assembled starch excipients: From sustained release to chrono-delivery

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Starch and its derivatives, well known as natural hydrophilic polymers, swellable and gel forming materials, are largely present as excipient in various types of pharmaceutical formulations. More traditional uses consist in binding, compaction, disintegration or as film forming matter. In the last decades, studies at molecular level have shown how starch structure can be modulated to obtain specific matrix-forming properties and control the release of bioactive agents. The molecular self-assembly involves weak forces (hydrogen bonds, ionic interactions or van der Waals forces) between chains and is the driving element in the construction of new structures. The release profiles as well as the mechanical properties of these materials can be tailored specifically for their intended uses considering that, via self-assembling, minor alterations can greatly modify and improve the releasing properties. Derivatization operated to improve hydrophilicity and introduce ionic character on starch chains can give additional opportunities for its usage as a multi-tasking excipient. The continuous improvements of pharmaceutical formulations have been achieved by means of hydrogels, in particular environmentally sensitive hydrogels, considered as 'smart' delivery systems able to release the drug at the appropriate time and site in response to specific physiological triggers. The rich panoply of their structures and properties highly recommend the starch derivatives as excipients for drug sustained release or for chrono-delivery systems.

Biography

Mircea Alexandru Mateescu is a PhD from Bucharest Polytechnic University and receiver of a "Honorary Laurea" from Rome University "La Sapienza". He is a full Professor at UQAM since 1994. His research relates to Multifunctional Proteins and to Drug Targeting. He is the Co-inventor of more than 30 patents covering therapeutic enzymes and new excipients for drug delivery. He developed fruitful collaborations with pharmaceutical companies and was involved in several technological transfers. He published more than 130 papers in reputed journals, one book, and 8 book-chapters. He is the holder of Bombardier Prize (1999) for Technological Innovation, of Venezia Prize (Italian Chamber of Commerce, 2012), of Research-Career Prize (UQAM, 2014).

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