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Swellable/erodible delivery systems for time-controlled release of drugs into the gastrointestinal tract

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In oral delivery, it is often advantageous to have the onset of drug release delayed for a programmable period of time following administration. This would indeed allow the chronotherapeutic needs of several pathologies with night or early morning symptoms to be addressed with no negative impact on patient compliance. Moreover, a lag time prior to release would enable targeting of the colon, as required by intestinal disease conditions or in the case of bioactive molecules that show poor stability and permeability in the upper intestine, such as biotechnological drugs. Delivery systems intended for time-controlled release, i.e., able to incorporate a lag phase in their release patterns, are often in the form of a drug-containing core enclosed in a functional polymeric barrier. In particular, swellable/erodible systems are provided with hydrophilic polymer barriers, most frequently coatings that undergo progressive swelling and erosion when in contact with aqueous fluids. As a result, the time at which the drug starts being released from the core is postponed. The duration of the lag phase primarily depends on the physico-chemical properties of the polymer, above all the viscosity grade, and on the thickness of the layer applied. By affecting the structure of the latter, the manufacturing technique may also play a role, and a different outcome in terms of performance has been obtained by using double-compression, film-coating or hot-processing (injection-molding, 3D printing by fused deposition modeling). In this presentation, progress in the field of oral delivery systems for time-controlled release based on swellable/erodible polymers is outlined.

Biography

Alessandra Maroni, PhD, is an Assistant Professor at the University of Milan since 2002. Her main research interests are in the area of oral delivery and formulation. She is a peer reviewer for the leading journals in the field, serves on the Editorial Advisory Board of Journal of Pharmaceutical Sciences and is a member of the scientific societies CRS, CRS Italy Chapter, AFI, ADRIITELF and SCI. She has authored over 50 publications, including journal articles, patent applications and book chapters, and more than 100 conference presentations.

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