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# Smart Mucoadhesive Polymeric Biomaterials for Medical /Pharmaceutical Applications and in Vitro Models for Their Evaluation

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Materials used in medicine have to meet some essential conditions, like biocompatibility, non-toxicity, non-immunogenicity and controlled biodegradability. These characteristics are dependent on physical-chemical properties and become indispensable in the elaboration of drug delivery systems, bioadhesives or scaffolds for tissue engineering. Mucoadhesive polymers are intensively tested for medical application because of their ability to link on biological mucosal surfaces, with important applications in drug delivery and tissue engineering. The polymeric characteristics that are relevant for the high levels of retention at the applied and targeted sites by mucoadhesive bonds include hydrophilicity, negative charge potential and the presence of groups capable to form hydrogen bonds. The paper presents new polymer-based formulations and *in vitro/ex vivo* tests of the mucoadhesive properties using synthetic models and biological tissues as close as possible to the human physiological ones. The influence of the polymeric construct as well as some parameters of the human physiological medium (pH, temperature, absorption time, short residence time at tissue level) are discussed as challenges that biomedical researchers have to undergo in applications such as tissue engineering or drug delivery.