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Stimuli Responsive Polymeric Nanocarriers for Drug Delivery Applications

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Stimuli-responsive polysaccharides for colon-targeted drug delivery **20**

Ankita Tiwari*, Amit Verma*, Pritish Kumar Panda*, Shivani Saraf*,
Ankit Jain[†], Sanjay K. Jain*

*Pharmaceutics Research Projects Laboratory, Department of Pharmaceutical Sciences,
Dr. Hari Singh Gour Vishwavidyalaya, Sagar (MP), India, [†]Institute of Pharmaceutical
Research, GLA University, Mathura (UP), India

20.1 Introduction

Polysaccharides are polymers of monosaccharides, that is, sugars and are found in abundant quantities. They are inexpensive and having wide range of availability with different structures they can be easily modified chemically and biochemically. Moreover, they depict good stability, safety, low toxicity, hydrophilicity, gelling ability and biodegradability, which propose their applicability for target-specific delivery systems. Most common problem which faced by employing polysaccharides in colon targeting is their good water solubility. So an ultimate strategy is to modify the solubility with retention in their biodegradability. Enormous numbers of polysaccharides like chitosan (CT), chondroitin sulfate, dextrans, cyclodextrins, guar gum, pectin, inulin, locust bean gum, amylose, etc., have already been employed in colon-specific delivery systems [1].

The colon-specific drug delivery system has the prospective to deliver the drugs for release in colon which consists of the development of prodrug, coating with pH-responsive polymers, application of colon-specific biodegradable polymers, employing various systems like timed released systems, osmotic systems, and pressure controlled drug delivery systems. Plenty of successful approaches have been employed for colon-targeted delivery system to attain the targeted drug delivery, and varieties of polymers specifically biodegradable have been reckoned for their diverse applications by utilizing colonic bacteria which holds great promise. Polysaccharides which are suitable for bacterial enzymes that are present in adequate quantity are to be oppressed in colonic delivery of drugs. Based on this method, many polysaccharides have been studied and considered for colon-targeted drug delivery and they include numerous polysaccharides like pectin, guar gum, amylose, inulin, dextran, CT, chondroitin sulfate, etc. These natural polysaccharides have extensive potential to colonic drug delivery as they possess many derivatizable groups, a wide range of molecular weights, diverse chemical compositions, low toxicity, biodegradability, and good stability properties which make it unique [2] (Table 20.1).