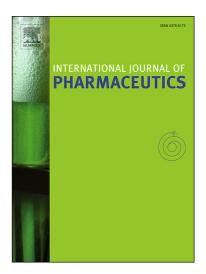
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A stimuli-responsive insulin delivery system based on reversible phenylboronate modified cyclodextrin with glucose triggered host-guest interaction

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Abstract 10

Injection of insulin is an effective therapy to treat most patients with the type I diabetes and some with 11 type II diabetes. Additionally, the release of insulin under specific conditions has attracted widespread 12 interest. In this study, a smart drug carrier that can release insulin depending on the changes in blood 13 glucose levels was designed. Combining two popular molecules through facile synthetic processes, a drug 14 carrier of reversible phenylboronate group modified cyclodextrin (β -CD-EPDME) was fabricated. The 15 drug carrier is composed of cyclodextrin, which can encapsulate insulin, and phenylboronate, which is 16 sensitive to the *cis*-diols in some saccharides. Moreover, β -CD-EPDME can successfully encapsulate 17 insulin and almost completely release insulin in the presence of glucose. The detached phenylboronic acid 18 moiety triggered by glucose can attack the β -CD cavity and form a host-guest complex, which can force 19 out the encapsulated insulin within the cavity. In addition, the insulin released from the β-CD-20 21 EPDME@Insulin complex retains its secondary structure, and the drug carrier has been proven to have low cytotoxicity. Thus, this safe and glucose-responsive drug carrier shows the potential for use in the 22 therapy of diabetes. 23

Keywords: insulin, diabetics mellitus, glucose-sensitive, cyclodextrin, phenylboronic acid. 24

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