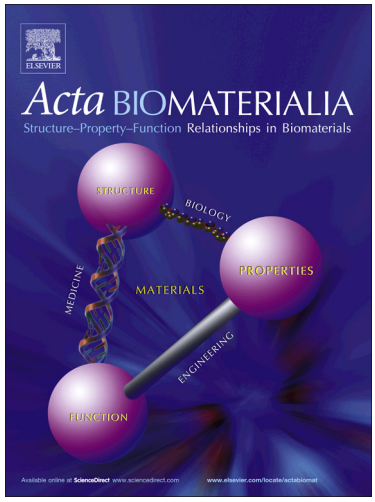

Full length article

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PII: S1742-7061(18)30376-3
DOI: https://doi.org/10.1016/j.actbio.2018.06.030
Reference: ACTBIO 5540

To appear in: *Acta Biomaterialia*

Received Date: 15 February 2018
Revised Date: 6 June 2018
Accepted Date: 21 June 2018

Please cite this article as: Juriga, D., Laszlo, I., Ludanyi, K., Klebovich, I., Hoon, C.C., Zrinyi, M., Kinetics of Dopamine release from Poly(aspartamide)-based prodrugs, *Acta Biomaterialia* (2018), doi: https://doi.org/10.1016/j.actbio.2018.06.030

Kinetics of Dopamine release from Poly(aspartamide)-based prodrugs

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1 Abstract

Preparation of novel biocompatible and biodegradable polymer based prodrugs that can be applied in complex drug delivery systems is one of the most researched fields in pharmaceutics. The kinetics of the drug release strongly depends on the physicochemical parameters of prodrugs as well as environmental properties, therefore precise kinetical description is crucial to design the appropriate polymer prodrug formula. The aim of the present study was to investigate the dopamine release from different poly(aspartamide) based dopamine drug conjugates in different environments and to work out a kinetic description which can be extended to describe drug release in similar systems. Poly(aspartamide) was conjugated with different amounts of dopamine. In order to alter the solubility of the conjugates, 2-aminoethanol was also grafted to the main chain. Chemical structure as well as physical properties such as solubility, lipophilicity measurements and thermogravimetric analysis has been carried out. Kinetics of dopamine release from the macromolecular prodrugs which has good water solubility has been studied and compared in different environments (phosphate buffer, Bromelain and α-Chymotrypsin). It was found that the kinetics of release in those solutions can be satisfactorily described by first order reaction rate. For poorly-soluble conjugates, the release of dopamine was considered as a result of coupling of diffusion and chemical reaction. Beside the time dependence of dopamine cleavage, a practical quantity, the half - life of the release of loading