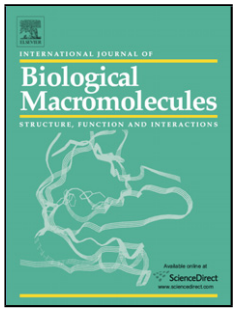

Title: Brain delivery of buspirone hydrochloride chitosan nanoparticles for the treatment of general anxiety disorder

Author: Naimat Kalim Bari Mohammad Fazil Md Quamrul Hassan Md Rafi Haider Bharti Gaba Jasjeet K. Narang Sanjula Baboota Javed Ali

PII: S0141-8130(15)00512-7
DOI: http://dx.doi.org/doi:10.1016/j.ijbiomac.2015.07.041
Reference: BIOMAC 5245

To appear in: *International Journal of Biological Macromolecules*

Received date: 9-5-2015
Revised date: 9-7-2015
Accepted date: 21-7-2015

Please cite this article as: N.K. Bari, M. Fazil, M.Q. Hassan, M.R. Haider, B. Gaba, J.K. Narang, S. Baboota, J. Ali, Brain delivery of buspirone hydrochloride chitosan nanoparticles for the treatment of general anxiety disorder, *International Journal of Biological Macromolecules* (2015), http://dx.doi.org/10.1016/j.ijbiomac.2015.07.041

Abstract

The present work discusses the preparation, characterization and *in vivo* evaluation of thiolated chitosan nanoparticles (TCS-NPs) of buspirone hydrochloride (BUH) for brain delivery through intranasal route. TCS NPs were prepared by ionic gelation method and characterized them for various parameters. The NPs formed were having particle size of 226.7 ± 2.52 nm with PDI 0.483 ± 0.031. Drug entrapment efficiency (EE) and loading capacity (LC) were found to be 81.13 ± 2.8 and 49.67 ± 5.5 %. The cumulative percentage drug permeation through nasal mucosa was 76.21 %. Bioadhesion study carried out on porcine mucin and showed a bioadhesion efficiency of 90.218 ± 0.134 %. Nose-to-brain delivery of placebo NPs was investigated by confocal laser scanning microscopy (CLSM) technique using rhodamine-123 as a marker. The brain concentration achieved after intranasal administration of TCS-NPs was 797.46 ± 35.76 ng/ml with t_{max} 120 min which was significantly higher than achieved after intravenous administration on BUH solution 384.15 ± 13.42 ng/ml and t_{max} of 120 min and intranasal administration of BUH solution 417.77 ± 19.24 ng/ml and t_{max} 60 min.