Sameer Alshehri et al., J Pharm Drug Deliv Res 2017, 6:5
DOI: 10.4172/2325-9604-C1-023

Investigation of BBN-HPMA conjugates for targeting Gastrin Releasing-Peptide (GRPR) Receptor

Sameer Alshehri, Wei Fan, Wenting Zhang and **Jered C Garrison**
University of Nebraska Medical Center, USA

Background: Compared to small radiolabeled bombesin (BBN) peptide conjugates, targeting efficacy of macromolecular conjugates modified with BBN analogues in tumors expressing gastrin releasing-peptide receptor (GRPR) is largely unexplored. Our goal was to investigate the targeting efficacy of BBN-conjugated polymeric system in vitro and *in vivo*.

Methods: Four concentrations, 2, 5, 10 and 15 mol% of L-BBN peptide, were conjugated to HPMA copolymer. As a control, 10 mol% D-BBN-HPMA was synthesized. Using PC-3 human prostate cancer cell line, 1 hr cellular internalization studies for all conjugates and 4 hr cellular internalization studies as well as confocal imaging studies for the 10% L-BBN-HPMA and 10% D-BBN-HPMA were performed. Results: After 1 hr, cellular internalization studies showed high uptake of 10% L-BBN-HPMA by around 13.76% internalized activity compared to 0.61%, 3.58%, 6.00% and 9.35% for 2% L-BBN-HPMA, 5% L-BBN-HPMA, 10% D-BBN-HPMA and 15% L-BBN-HPMA, respectively. Similarly, after 4 hr, 10% L-BBN-HPMA showed higher internalized radioactivity (16.96%) compared to 10% D-BBN-HPMA (9.59%).The confocal imaging study showed higher fluorescent signal for 10% L-BBN-HPMA compared to 10% D-BBN-HPMA by two folds. Surprisingly, biodistribution studies showed higher retention in liver and spleen for all conjugates except 2% L-BBN-HPMA. Interestingly, the retention in spleen was found to be directly proportional to the concentration of peptide/polymer.

Conclusion: The results indicate that incorporating of BBN peptides in the HPMA copolymer construct enhances the internalization into PC-3 cells, with 10% molar concentration being the optimum concentration. However, due to high retention in liver and spleen, further modifications to the construct are needed.

Biography

Sameer Alshehri has received his MS degree in pharmaceutics from Massachusetts College of Pharmacy and Health Sciences University, Boston in 2015. He then started his PhD studies at University of Nebraska Medical Center in Pharmaceutical Sciences. Since then he has been actively participating in research-related radiopharmaceuticals. His main focus is designing targeted HPMA copolymers for treatment and imaging of bombesin receptor-expressing tumors such as prostate cancer.

sameer.alshehri@unmc.edu

Notes: