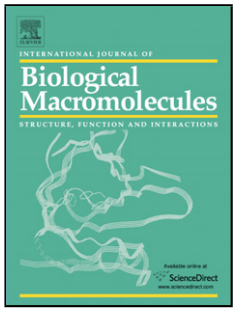

Title: Construction and Immunogenicity Analysis of Nanoparticulated conjugate of Heat-Stable Enterotoxin (STa) of Enterotoxigenic Escherichia coli

Authors: Nasr-Eldin M. Aref, Maha Nasr, Rihab Osman

PII: S0141-8130(17)31249-7
DOI: http://dx.doi.org/10.1016/j.ijbiomac.2017.08.077
Reference: BIOMAC 8069

To appear in: *International Journal of Biological Macromolecules*

Received date: 7-4-2017
Revised date: 9-8-2017
Accepted date: 11-8-2017

Please cite this article as: Nasr-Eldin M.Aref, Maha Nasr, Rihab Osman, Construction and Immunogenicity Analysis of Nanoparticulated conjugate of Heat-Stable Enterotoxin (STa) of Enterotoxigenic Escherichia coli, International Journal of Biological Macromoleculeshttp://dx.doi.org/10.1016/j.ijbiomac.2017.08.077

Construction and Immunogenicity Analysis of Nanoparticulated conjugate of Heat-Stable Enterotoxin (STa) of Enterotoxigenic Escherichia coli

Nasr-Eldin M. Aref[1], Maha Nasr[2]*, Rihab Osman[2]

[1]Department of Animal Medicine, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt

[2]Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University, Egypt

Correspondence to:

Maha Nasr, PhD

Email: drmahanasr@pharma.asu.edu.eg**,** maha2929@gmail.com

Cellular phone number: +(202)01003450279

Fax: (02)24051107

Postal Address: Ain Shams University- Faculty of Pharmacy- Department of Pharmaceutics and Industrial Pharmacy- Monazamet El Wehda El Afrikia St., El Abbassia, Cairo (Egypt)

Abstract

The ultimate goal of this research was to overcome the low immunogenicity of the biological macromolecule (heat stable enterotoxin STa) *via* its conjugation to biodegradable PLGA nanoparticles (NP). STa was first isolated from Enterotoxigenic Escherichia coli (ETEC), purified and identified using reported HPLC procedures. Optimized homogenous PLGA NP, prepared using the nanoprecipitation technique were used for conjugating STa using the carbodiimide synthesis. Covalent binding of STa to PLGA NP was confirmed *via* FTIR and ^{1}HNMR analysis. Safety and tolerability of the developed nanoparticulated STa-PLGA conjugate were confirmed by MTT assay on A549 lung cancer cells. After subcutaneous immunization, STA-PLGA NP conjugate induced a significant immune response in mice showing a strong binding and neutralizing antibody titer. The developed novel STa-PLGA NP conjugate is expected to provide promising protection against enterotoxigenic Escherichia coli (ETEC).

Keywords: STa; PLGA nanoparticles; immunization