Indian Journal of Experimental Biology
Vol. 63, January 2025, pp. 76-85
DOI: 10.56042/ijeb.v63i01.6157

Antivenom potential of chitosan gold nanoparticles

Kanchan Saha & Sumana Sarkhel*

Department of Human Physiology with Community Health, Vidyasagar University, Paschim Medinipur721 102, West Bengal, India

Received 12 October 2023; revised 27 July 2024

Nanoparticle molecules have gained interest in medicine due to their properties of increased cellular uptake and efficacy. Keeping this in mind, the current study aimed to explore the neutralizing potential of chitosan gold nanoparticles (CH-AuNP) against the venom of *Vipera russelli*, in *in vitro* and *invivo* studies. UV-Vis Spectra of CH-AuNP exhibited absorbance at 530 nm. Dynamic light scattering report corroborated that there was a formation of monodispersed nanoparticles with hydrodynamic diameter of about 89.65 nm. The zeta potential of CH-AuNP was found to be 24.7 mV. X-ray diffraction analysis of CH-AuNP which confirmed the cubic crystal shape of the gold nanoparticles. SEM studies of the synthesized CH-AuNP exhibited particle sizes ranging from 7 to 18 nm.*In vitro* haemagglutination, enzyme assays and coagulation effect of venom on blood were tested with and without the presence of CH-AuNP. *Invivo*assays included lethality, haemorrhage and nephrotoxicity with and without the presence of CH-AuNP. Results obtained in the anti-haemolytic assay with chitosan and CH-AuNP revealed 86.72% and 93.01% protection against viper venom induced haemolysis. The CH-AuNp also accorded significant protection against venom induced coagulation and proteolytic activity. The *invivo* studies revealed that the CH-AuNP neutralized venom induced lethargy and haemorrhagic activity. It can therefore be stated that the CH-AuNP can potentially have a therapeutic effect on venom induced patho-physiological changes.

Keywords: Russell's viper venom, Chitosan gold nanoparticle, Lethality, Haemorrhagic action,Nephrotoxicity