conferenceseries.com

J Tissue Sci Eng 2018, Volume 9
DOI: 10.4172/2157-7552-C4-055

JOINT EVENT

11th International Conference on
Tissue Engineering & Regenerative Medicine
&
4th International Conference on Synthetic Biology and Tissue Engineering
October 18-20, 2018 Rome, Italy

Amino groups are crucial for chitosan to stop bleeding

Haibo Lu[1] and **Shibi Lu**[2]
[1]First Affiliated Hospital of Chinese PLA General Hospital, China
[2]General Hospital of Chinese PLA, China

Marine organisms adhere themselves onto wet surfaces by adhesive proteins containing L-3, 4-dihydroxyphenylalanine (DOPA). Several research groups have incorporated DOPA, or other compounds that contain 3, 4-dihydroxybenzene, into backbone of polymeric materials, and have found the improved adhesive properties. Although current positively charged chitosan hemostatic agents have limited adhesive property, especially to wet surfaces underneath blood pool, there is no report about modifying chitosan with 3, 4-dihydroxybenzene to achieve improved adhesive property so far, and the exact mechanism of chitosan's positive charging is still unknown. Using two methods, we modified chitosan with 3, 4-dihydroxybenzene. One is modifying with 3, 4-dihydroxybenzaldehyde (DHBH), the other is with DOPA. The chemical structures of chitosan, Celox, DHBH, DMCTS, DOPA and DOPAMCTS were characterized with Fourier transform infrared (FTIR) spectroscopy. The coagulation test was performed to compare the hemostatic property of DMCTS and DOPAMCTS to that of chitin, chitosan and Celox. FTIR results revealed extreme similarity of chemical structures of chitosan and Celox, especially in presence of N-H bending vibration of primary amines, the incorporation of 3, 4-dihydroxybenzene from DMCTS and DOPA into backbone of chitosan. The coagulation time of chitosan, Celox and DOPAMCTS was significantly shorter than that of chitin and DMCTS. The blood drops touching Celox, chitosan and DOPAMCTS particles appeared significant surface-tension phenomenon. In conclusion, amino groups are crucial for chitosan to stop bleeding. Modification with 3, 4-dihydroxybenzene does not impair the hemostatic property of chitosan as long as the free or protonated amino group does not be modified. It is feasible to modify chitosan with 3, 4-dihydroxybenzene to develop a novel hemostatic dressing.

luhaibo304@163.com