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Preparation of a new drug delivery carrier based on hydrogels of hyaluronic acid cross linked with poly (itaconic anhydride-co-3, 9-divinyl-2, 4, 8, 10-tetraoxaspiro (5.5) undecane) copolymers

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The study reports the preparation of the new drug carrier gel system based on poly (itaconic anhydride-co-3, 9-divinyl-2, 4, 8, 10-tetraoxaspiro (5.5) undecane) (PITAU) copolymer and hyaluronic acid (HA-PITAU). In relation with its composition PITAU has specific conformational structure owing to the unsaturated double bond of 3, 9-divinyl-2, 4, 8, 10-tetraoxaspiro (5.5) undecane comonomer and the spiroacetal moiety, giving macromolecular chains with network type structures. PITAU is biocompatible and biodegradable and present pH and temperature sensitivity. Itaconic anhydride (ITA) has been considered as an alternative to maleic anhydride for introducing polar functionality into polymers. Polymers based on ITA have not received as much attention as lactic acid derived materials. The composition was confirmed by FTIR spectra, evidencing the cross linking bridges between copolymer and hyaluronic acid. SEM microscopy and chemical imaging evidence the homogeneous porous structure of the new 3D network. NIR-chemical imaging technique proves the successful preparation of polymeric drug delivery system by using indomethacin (IND) as bioactive model substance. The dissolution data revealed the interdependence of the ratio between the two compounds and attaining optimum loading capacity. *In vivo* study demonstrated that HA_ PITAU and HA_ PITAU_IND determined similar blood parameters modifications and biochemical responses with distilled water, after intraperitoneal administration in mice. Systemic administration of the tested substances in mice did not modify their immune reactivity comparing with control group. All these results reveal a good *in vivo* biocompatibility. The bioactive compound caused a significant antinociceptive effect occurring after 60 minutes and lasts about 3 hours in tail flick test.

Biography

Aurica P Chiriac has completed her PhD in 1994. She has published more than 100 papers in reputed journals and she is the Editorial Board Member of some reputed journals. She has participated in more than 15 Romanian projects and 5 European projects.

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