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One-pot synthesis of polymeric hydrogel with Albumin nanoparticles

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Applications of polymeric hydrogels in the biomedical field include contact lenses, artificial corneas, wound dressing, coating for sutures, catheters, and electrode sensors. Polymeric hydrogels have the property of absorbing and retaining different amounts of water due to their three-dimensional networks constitution. These hydrogels can be produced by chemical polymerization or by utilization of ionizing radiation technique which the main advantage is the absence of any chemical initiator Hydrogel dressings have shown very interesting properties as temporary skin cover for wound and burn healing, pain relief, moist environmental maintenance, a barrier to microorganism contamination, oxygen access in the injured area. Polymeric hydrogels are composed of hydrophilic polymers networks and water. They are very viscous aqueous systems or even solid systems. They find multiple applications in medicine among other fields.
Wound dressings based on hydrogels have been prepared by a technology based on Rosiak's process (one-pot crosslinking and sterilization). Our group, however, develop an original process to synthesize metallic nanoparticles in a simultaneous way for the crosslinking and sterilization of hydrogels. The radiation-induced crosslinking of Albumin and Papain by intramolecular and intermolecular crosslinking was also developed to improve its biological stability aiming for its use on dressings and radiopharmacy carriers.
This review will discuss aspects of radiation-induced synthesis and its application in the medical field.

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