

RADIATION CROSSLINKED HYDROGELS WITH EGG WHITE PROTEINS FOR WOUND HEALING

F. Gulino¹, E. Muscolino¹, S. Alessi¹, D. Nuzzo², P. Picone², D. Giacomazza³, C. Dispenza^{1,3}

¹ *Dipartimento di Ingegneria, Università degli Studi di Palermo, Viale delle Scienze 6, 90128 Palermo, Italy;*

² *Istituto per la Ricerca e l'Innovazione Biomedica, Consiglio Nazionale delle Ricerche, Via U. La Malfa 153, 90146 Palermo, Italy;*

³ *Istituto di BioFisica, Consiglio Nazionale delle Ricerche, Via U. La Malfa 153, 90146 Palermo, Italy.*

* Corresponding author: emanuela.muscolino@unipa.it

The wound healing process is a complex and dynamic interaction among cytokines, growth factors, blood, and the extracellular matrix. [1] Due to the influence of potential physiological conditions, such as diabetes, any disorder of these factors will lead to chronic wound healing. In chronic wounds, an excessive inflammatory response prevents the proliferation of the healthy tissue, causing a serious infection which can also result in an amputation. If not treated properly, chronic wound might even be life-threatening. [2]

Egg white proteins, such as ovoalbumin, ovotransferrin and lysozyme, are attracting interest especially because of their demonstrated antioxidant and antibacterial activities. [3] These bioactive proteins can then be used to enrich advanced wound dressing films that can help control wound oxidative stress and thereby accelerate wound healing and/or prevent bacterial infection.

Wound dressing films can be easily produced crosslinking polymers, such as polyvinyl alcohol (PVA) or polyvinyl pyrrolidone (PVP), by high-energy radiation. [4] This technique does not require expensive initiators and catalysts and it can guarantee simultaneous product sterilization, depending on the irradiation doses. PVA hydrogels obtained by irradiation are also transparent, a desirable property for wound dressings. When PVA is mixed with selected polysaccharides, the hydrogel wound dressings have shown faster healing rates and scarless healing, probably due to antioxidant properties of polysaccharide fragments produced upon irradiation. [4]

The aim of this work is to develop novel hydrogel formulations, based on blends of synthetic polymers and polysaccharides, and incorporating egg white proteins and/or their peptides, to investigate their applicability as advanced wound dressings.

References

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