



Bioblends of anionic collagen with hyaluronic acid as scaffold to mesenchymal stem cell culture for tissue engineering application

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Abstract – Hyaluronic acid is very expensive biomaterial and used very much for cells adhesion and growth tissue for engineering tissue and cosmetic applications. The goal of this work is using collagen anionic/hyaluronic acid bioblends like scaffold to mesenchymal stem cells culture for tissue engineering applications. The presence of hyaluronic acid helps to increase adhesion and aggregation of cells. The culture of mesenchymal cells on bioblends scaffold could be used to produce new skin for burn skin patient.

One important area of scaffold of hyaluronic acid in tissue engineering is the application of mesenchymal stem cells culture in reparative skin surgery, due it forms a gel-like, highly hydrated matrix that provides the space and plasticity required for the rapid proliferation and migration of the cells [1]. Compounds or bioblends made of anionic collagen (Col) with the combination of hyaluronic acid (HA) from rooster combs(developed by author[2]) for applications as biomaterials in the form of injectable or membrane have been developed to serve as attractive sites for anchoring of new cells, as well as a scaffold for tissue growth. In this study, after the characterization with infrared spectroscopy, scanning electronic microscopy and thermal analysis (differential scanning calorimetry), the mesenchymal stem cells obtained, isolated and marked bone marrow of dogs were used in a concentration of 3.8×10^4 cells/mL on the membrane for growth in 24 wells microplates, which was monitored every 24hs, for 6 days, after these periods, the cells were labeled for analysis of cell viability and cell count by optical microscopy.

The characterization of these bioblends showed that the reductions of thermal stability and presence of collagen microfibrils, however IR spectroscopy results showed that the interactions between both of them happen very well.

The optical microscopy (OM) results showed that cells (in rose or violet color) had morphological characteristic of undifferentiated mesenchymal stem cells, and showed that these cells have adapted very well to the conditions established culture and the collagen membrane with or without hyaluronic acid (Fig. 1). In the analysis of cell viability, cells were presented with an average of 95% of living cells. Besides, there are the higher cells adhesions and sprayed more under this new bioblends, as observed on Figure 1b.

The membranes of anionic collagen with or without hyaluronic acid shown is suitable for study of cell therapy with stem cells, and an alternative future in the treatment of skin lesions or ulcers in burned patient after study of cellular adhesion. These new bioblends scaffolds could be used in other format, such as sponges or gels at low cost.

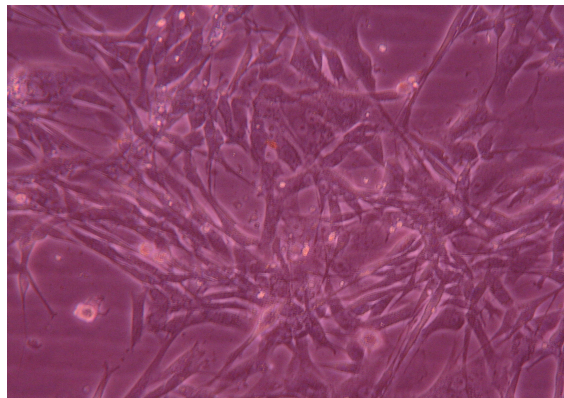


Figure 1: OM images of mesenchymal stem cells cultures on microplates with membranes of anionic collagen:hyaluronic acid, 25:1, after 6 days. Augmentation 200x.

References

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