

In vitro biocompatibility of a new PVP-Hydrogel

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These experiments show the in vitro biocompatibility of a new PVP-Hydrogel comparing it with Neoheal, an already experimented biomaterial completely biocompatible. The new hydrogel consists of three polymers - Polyvinyl pyrrolidone (PVP), Agar and Polyethylene glycol (PEG) - mixed, reticulated and at the same time sterilized by gamma irradiation at 25 kGy. The target clinical applications of this new biomaterial are the “difficult wounds”.

For the in vitro experimental protocol, it was used a primary culture of fibroblasts taken from the subcutaneous tissue of a newborn mice, seeding the cells on a little square (1cm² area) of both kinds of hydrogel. As the ISO protocol prescribes, the experiments were repeated 3 times for each kind of hydrogel, stopping the culture at the 3rd, 7th and 14th day after the seeding. For all steps, three Petri dishes were used as controls without biomaterials. At each fixed deadline, all Petri dishes were colored using the Wright method for cell counting and other morphological evaluations.

The microscopic analysis revealed the complete biocompatibility of both hydrogels at every step of the experiment and the test produced very interesting results. The new PVP-Hydrogel was found to be more adsorbent, increasing its dimensions day by day and free floating in the medium. The Neoheal, indeed, revealed more sticky properties, adhering to the dish floor but neither swelling nor increasing its volume. These different chemical properties caused a very different behavior of the cells that could grow very well on and under the PVP-Hydrogel, but not on or under the Neoheal.

These results showed that the new PVP-hydrogel is biocompatible with the cells just like the Neoheal, even if in a very different way. Other experiments have to complete the protocol to test the biodegradation and the biocompatibility in vivo of both biomaterials, when they enter in contact with the tissues.

References

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