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# Compared biocompatibility of elastin-like recombinamer-based hydrogels formed through physical or chemical cross-linking

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**Introduction.** Biocompatibility studies, which are essential to determine whether these materials could be potentially used in the biomedical field, are often lacking for many novel biomaterials. These biomaterials include recombinant protein-based ones, the biocompatibility of which, in contrast to classic materials, has not been extensively explored in the scientific literature. Herein results from cytotoxicity and biocompatibility testing of two different families of injectable hydrogel forming elastin-like recombinamers (ELRs) are presented.

**Methods.** Both types of ELRs were obtained by recombinant DNA technology and bioproduction in *E. coli*. One of these ELRs forms hydrogels through chemical cross-linking [1], while the other one assembles in a physical manner [2]. Cytocompatibility was assessed *in vitro* by culturing HUVECs on ELR substrates, while luciferase expressing hMSCs embedded in ELR hydrogels were used *in vivo*. The inflammatory response was measured by ELISA of sera samples towards different cytokines. Macroscopic evaluation of the hydrogels after 1, 3 and 6 months was also performed. Samples were histologically processed for microscopic observation.

**Results.** HUVECs showed good proliferation and viability after 9 days in vitro, whereas luciferase-expressing hMSCs were viable for at least 4 weeks as regards bioluminescence emission when embedded in ELR hydrogels and implanted subcutaneously into immunosuppressed mice. Moreover, both kinds of hydrogels were also injected subcutaneously into mice and serum concentrations of TNFα, IL-1β, IL-4, IL-6 and IL-10 were measured by ELISA. Results regarding cytokine levels were similar to those for the negative control, thus confirming the lack of an innate immune response. Furthermore, no signs of inflammation or fibrosis were found by macro- and microscopic evaluation.

**Conclusions.** Taken together, these data suggest that the two ELR families presented here possess good cyto- and biocompatibility and may serve as a precedent for similar future studies with other novel biomaterials.

## References

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