

## NEW INSIGHTS INTO THE REPAIR PHASE OF ECHINODERM ARM REGENERATION

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Regeneration is a complex post-embryonic developmental process during which lost body parts are completely reformed. The first post-injury events are overall known as repair phase and include wound closure, inflammatory and immune response, extracellular matrix and tissue remodelling. These are fundamental for the effectiveness of the subsequent regeneration. Indeed, their impairment can limit or prevent the regenerative phenomena.

Echinoderms are deuterostomes invertebrates which possess amazing regenerative abilities. Here, the brittle star *Amphiura filiformis* and the starfish *Echinaster sepositus* were selected as valid experimental models to study the main events of the repair phase using microscopy and molecular techniques and to provide a comparative perspective with mammals, which are known for their limited regenerative abilities.

Our results showed that re-epithelialisation is faster and more effective in echinoderms than in mammals, whereas the inflammatory response, analysed through TNF- $\alpha$ -like immunodetection, is comparable between them. Gene expression pattern of *fibrinogen-like* and *ficolin* in echinoderms is a promising starting point to deepen immune system response after injury. Moreover, differently from mammals, delayed and limited collagen deposition characterise echinoderms' repair phase.

Overall, the higher effectiveness of echinoderms' repair processes suggests that this step is crucial for the success of the subsequent regenerative process. Further analyses are necessary to better understand similarities and differences between animals able or unable to regenerate.