

Skeletogenesis and regeneration in the brittle star *Amphiura filiformis*.

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One of the most pertinent questions in regenerative biology concerns the extent to which it recapitulates embryonic development. We use the brittle star *Amphiura filiformis*, a member of the echinoderm phylum of marine invertebrate deuterostomes, as a model to compare skeletogenesis during adult regeneration and embryonic development. We first characterized the cellular and morphogenetic aspects of arm regeneration and skeletogenesis in this species. Next, we carried out a large-scale spatio-temporal expression analysis to characterize genes involved in adult arm regeneration. Finally we perturbed FGF signalling using the SU5402 inhibitor and found that this treatment interferes with skeleton formation during both embryonic development and adult regeneration of the brittle star. Consistently with this phenotype, a cohort of skeletogenic genes was specifically downregulated by SU5402 treatment both in the embryo and adult regenerating arm. In conclusion, we found vast similarities between skeleton development during regeneration and embryogenesis in terms of morphology and its underlying molecular network.