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Cover: The sponge *Asbestopluma hypogea* is unusual because of its peculiar carnivorous feeding habit. Starved animals are characterized by many elongated filaments (cover picture) crucial for the capture of prey. After capture, these filaments actively regress before being regenerated during a subsequent period of starvation. Martinand-Mari et al. (pp. 3937–3943) show that these events rely on a highly dynamic cellular turnover, implying a coordinated set of mechanisms, including programmed cell death, cell proliferation and cell migration, as complex as those already identified in bilaterian metazoans. The authors also identified a candidate niche for cell renewal by stem cell proliferation and differentiation. Photo credit: Alain Sahuquet.

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