Stem cells and (healthy) aging

- "disposable soma" theory (see 1):
  - resources are allocated either to survival or reproduction
  - essential for the propagation of the species in the wild

- "protected aging" when species are protected from extrinsic causes of mortality
  - emergence of phenotypes of
    - aging
    - age-related diseases that would rarely manifest in the wild
  - Organismal aging is the failure of an integrated system that balances genetic programs for
    - survival
    - Reproduction

- The ability of an organism to ensure healthy function during adult life depends on homeostatic mechanisms.
  - in organs of mature vertebrates resident stem cells participate
    - in tissue maintenance
    - regeneration after injury,.
  - tissue dependent variations of the stem cell role in homeostasis/ injury recovery (see e.g. 3)
    - **ongoing generation** but play a limited role in damage repair
    - minimal role in maintenance but vigorously engage in **regeneration after injury**
    - contributing to **ongoing production** of differentiated cells and **repairing tissue** after injury.

- during "protected aging" the extent to which stem cells maintain their cognate tissues depends on their own health (see 2) is influenced by
  - genetic mutations (see e.g. 4,5)
  - epigenetic changes (see e.g. 6,7)
  - extrinsic environmental milieu (see e.g.,8,9)

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