SENESCENCE PATTERNS IN AFRICAN MOLE-RATS (BATHYERGIDAE, RODENTIA)

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From an evolutionary viewpoint, senescence is an intriguing phenomenon. Many theories have been developed to identify its ultimate and proximate causes, but the process is so complex that even today, barely any question about how and why organisms age is fully answered. Consequently, even well established theories on the evolution and mechanisms of senescence are still subject to research and debate.

For two reasons, African mole-rats (Bathyergidae) are especially suited to test evolutionary theories of aging. First, all members of the family are strictly subterranean, leading to the prediction that senescence should be generally slow in this family because extrinsic mortality through predation or climatic extremes is low. Second, the family exhibits an exceptional diversity of social and mating systems, ranging from solitary/polygamous to (eu)social/monogamous species. Social and reproductive strategies are fundamental life history components and therefore expected to affect longevity (as an integrative life history trait), too. The family therefore provides an interesting substrate to examine the influence of these factors on senescence.

Our main results presented here are: (i) In accordance with evolutionary aging theories, bathyergids have an extraordinarily high potential for long life span for their body size. (ii) Within the family, the positive allometric relation between body size and longevity which is characteristic of mammals is absent. Instead, on the species level there is a strong negative correlation between body size and maximum life span. This is, amongst other factors, probably caused by differences in social and mating systems. (iii) Within two eusocial species of the genus Fuko*mys*, aging rates of reproductive and non-reproductive animals diverge, with reproductives living significantly longer than non-reproductives. This is in disagreement with at least two established evolutionary aging theories. Possible factors underlying this unusual pattern are discussed.