Review of: "On the Origin of Aging by Means of Natural Selection"

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Potential competing interests: No potential competing interests to declare.

The author developed a theory of origin of aging as an evolutionary driven natural selective process. The authors commented previous contributions on that topic. The problem for the general reader is that the manuscript shifts from time to time between ontogenic effects of aging process with theories that address the origin of aging in evolution. Thus, the manuscript should be re-restructured addressing ontogenic aging, reproduction, aging and lifespan as well as the origin of aging. Also, the manuscript must state which organisms are referred to. Some statements can only be hold for mammals. Plants might have a different / overlapping strategy concerning fertility, reproduction, aging and lifespan..

Below are additional major critical points should be addressed:

1. The chapter: “Linking development to aging: Ontogenetic emergent properties involving developmental regulatory Processes” should be linked much better to the topic of evolution of aging and is as such not fitting well into the scope of the manuscript to address a modified theory of aging. This includes the description on page 19 and 20 of homeostasis an emergent property resulting from cooperative effects of integrated developmental regulatory processes. Emergent properties of ontogenesis promote further development, reproductive fitness, and aging.
2. Similarly, on page 24 the focus is differently emphasized by describing “Regulatory redundancy dynamics link reproductive success with individual aging.” It should be emphasized why this aspect is linked to the evolution / origin of aging.
3. Page 26: In the paragraph “Mechanisms for loss of regulatory redundancy” should be more focused on evolution of aging but not rather how redundancy of aging is reduced / lost.

“Loss of redundancy due to specific types of molecular damage and Aging begins and proceeds in parallel with loss of regulatory redundancy”

These sentences are rather describing individual aging process perhaps the aging process in a population but does not explain the origin of aging. This includes also the theory of accumulation of mutations by time in the aging process. Emphasize here the link to origin of aging or separate the part origin of aging in evolution with ontogenic aging process.

1. On page 29: Effect of reproduction on longevity and also of reproduction and aging. Author suggest that in human ontogeny is completed around 20 years but fertility starts years earlier.

Author may also indicate and discuss interrelation of aging and fertility in men since for human men can be fertile until higher age but show in parallel the classical signs of aging.

This fact is ignored on Page 38 by stating: The last reproductive stage of offspring nurturing is completed in humans as parents' approach 30 years of age.

1. On page 30 it is stated that " Classic theory recognizes the programmatic aging phenotype, but doesn't attempt to explain how or why it occurs."

Many contributions hypothesized how it may occur. However, why a programmatic aging phenotype occurs has not been addressed much.

The author may address the contribution doi: 10.1515/hmbci-2013-0030, in which a different angle of view was used namely what will happen to those populations that will develop into a no-aging phenotype with an unlimited lifespan and hypothesized the requirement of aging for reproduction.

1. On Page 38: The authors stated correctly, that parents must survive long enough to complete the required reproductive stage of nurture that makes their offspring capable of independence.

This is, of course, in contrast to the r-strategy, only valid for the K-strategy that includes parental investment into offsprings. Thus, clarify which organisms are meant here. In this manuscript. Some statements are too general and will not fit to other organismic aging processes. Interestingly also organisms with r-strategy show also aging.

1. Thus, the survival of parents must survive long enough to complete the required reproductive stage of nurture that makes their offspring capable of independence. However, that process, a longer childhood and a longer time period to become into the fertility phase is associated with a longer life span of parents. That could be also likely a co-evolution and not the lifespan or aging of parents is a cause of longer time to go into the fertility phase.
2. On page 41: there is the statement that "Aging is not selected per se. " This statement is a very strong statement and may not be true. See point above.

This statement is changed by the statement on page 38 with: "Aging results from a mechanism that evolved by means of NS to provide the opportunity for achieving reproductive success in humans and other mammals that nurture their young."