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

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The author has questioned the classic theory of aging, developed througout the last century, based upon acceptance of logic that the force of natural selection (NS) inexorably weakens as fecundity declines over time. With this work, he has demonstrated a worth-mentioning effort in arguing how aging provides hidden, compensating benefits that makes it adaptive in compliance with Darwin's theory.

Contrarily to the multifactorial occurence of aging, the author states that decay of the ontogenetic emergent property is the primary, single cause of aging in humans and other mammals, for nurturing progenie towards independence. He relies on several principles, such as: 1) NS does not inexorably decline during the reproductive lifetime, 2) aging causes NS to decline, not vice versa, and 3) accumulation of maladaptive mutations, physiological dysregulation, and other disruptive influences on somatic integrity do not cause aging, but rather are consequences of it, 4) multiple life sustaining traits are distributed throughout the body as elements of the developmental regulatory process. In summary, his model states: " Humans age because morphostasis, a post-ontogenetic, temporary non-aging interval of young adulthood that results from developmental regulatory redundancy, an emergent property of ontogenesis, is unmaintainable ". He argues that the existence of a common mechanism involving both developmental stage until reproductive fitness and aging is pursuant to Darwin's theory. He states that aging is inseparable from reproduction because they share the same mechanism which facilitates both traits. Completion of development and onset of aging are continuous functions, with the peak of physiological resilience that discriminates first negentropic to later entropic bodily processes. The switch occurs when "unmaintainable" regulatory redundancy progressively decays from the end of morphostasis.

Despite the worthy work, I find some limitations in fully sharing his model:

1) in his view, presuming aging to be multifactorial based upon known negative effects of intrinsic as well as extrinsic/environmental damages, and affirming tha the cause of aging exists within its process are erroneous assumptions of the "classic theory" of aging. The author considers folly that the cause of mammalian aging resides in its impressively diverse phenotype; however, affirming this principle as part of current biogerontology is questionable.

2) it seems somehow confusing to promote the concept of morphostasis by merging physiological and behavioural features of humans for fully realizing their reproductive fitness and nurturing of progenie.

3) I agree that reduced survival is not necessarily reduced aging; however, it is questionable to state that "physiological dysregulation resulting from aging follows an irreversible programmatic progression", since some dysfunctions that occur

while aging can be reversed

4) I appreciate the proposal of aging theories, however, some parts (e.g. " Eventually, all redundant elements are lost and aging stops, giving the appearance of a mortality plateau. Any subsequent assault on the soma causes death. Thus, aging is a direct consequence of systems redundancy that temporarily ensures increased reliability and lifespan of adult organisms until critical mass is lost"; " the more the mechanism [of reproductive processes] is employed, the greater the chance of damage and loss of redundancy. This is one explanation for why reproduction decreases life span"; " for the most part, general DNA damage is a consequence of aging") are actually too much speculative.

5) a better explanation of what regulatory redundancy is for the author is needed, since it is a pillar of his model.

6) time scale is an issue in his explanations: aging and natural selection are based on massively different time courses; some of the arguments for negatively criticise the "classic theory" rely on this issue (one example is when author discuss on trade-offs due to limited reources).

7) the ambiguity between the terms of peak reproductive probability vs reproductive fitness vs fecondity is argued by the author as a bias in the report of timing of aging onset. He also argues that the Disposable Soma Theory wrongly assumes aging and survival as similar; I agree with the need of a clear use of terms, however, his explanation on morphostasis suffer from the same problem

8) considering that author's arguments strongly relate to the strength of natural selection, it is not clear for readers how to measure such a strength.

In summary, his conclusion that "the developmental program can also be considered an aging program since development and aging are continuous functions that cause construction of new organisms while making their deconstruction inevitable", although very interesting, is not fully shreable due to lack of valid demonstrations of author's suggestions. In particular, he concluded that 1) the mechanism of aging is a product of NS, since reproductive success mechanism is inseparable from aging and that 2) aging is programmed/adaptive, but in my humble opinion his arguments does not fullfill the need for supporting these principles.