

3-rd International Conference

Homo sapiens liberatus

Moscow, Russia
February 20-21, 2020



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3-rd International Conference *Homo sapiens liberatus*

On the occasion of the 85-th Anniversary of Director of A.N.Belozersky Institute
and Dean of Faculty of Bioengineering and Bioinformatics,
M.V.Lomonosov Moscow State University

Professor V.P.Skulachev

Abstract Book

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were associated with improvement of the mitochondrial apparatus. SkQ1 is an antioxidant and has been developed as such to counteract oxidative damage in mitochondria. One would expect that the effects of SkQ1 are mediated by the suppression of ROS production. Nevertheless, we did not detect enhanced production of ROS by brain mitochondria when the AD-like pathology developed and progressed, and well-pronounced structural disturbances in hippocampal mitochondria were observed in OXYS rats. We explored the mechanisms of the anti-AD effects of SkQ1 through deep RNA-seq and focused upon the cell-specific gene expression alterations in the hippocampus. OXYS rats had 1,159 differentially expressed genes (DEGs) relative to Wistar rats (control), and 6-month treatment with SkQ1 decreased their number twofold. We found that 10.5% of all DEGs in untreated (control) OXYS rats were associated with mitochondrial function, whereas SkQ1 eliminated differences in the expression of 76% of DEGs (93 from 122 genes). Using transcriptome approaches, we found that the anti-AD effects of SkQ1 are associated with an improvement of the activity of many signaling pathways and intracellular processes. SkQ1 changed the expression of genes in neuronal, glial, and endothelial cells, and these genes are related to mitochondrial function, neurotrophic and synaptic activity, calcium processes, immune and cerebrovascular systems, catabolism, degradation, and apoptosis. Thus, we assume that MD may be considered a predictor of the early development of the late-onset form of AD in humans and the repair of the mitochondrial apparatus by SkQ1 is a promising strategy to maintain brain health and to treat AD. A RSF (project 19-15-00044) and RFBR (project 18-015-00320) supported this work.

work we studied the color variations of the head and three parts of the alitrunk of the ants *Formica exsecta* of the Kuzokotsky peninsula (Karelia, 66.5° N, 33.6° E). According to Dlussky (1967), from 3 to 11 classes (variants) of coloration were usually distinguished in *Formica* ants. The samples were compared using the phenotypic diversity (average number of phenotypes), the proportion of rare morphs, and phenotypic distances. In the most common (76.6%) variant of head coloration found in *F. exsecta*, the pigment occupies the entire occipital area and reaches the front edges of the eyes. There is also a variant of the spot on the forehead (20.6%) and in 2.8% of specimens the head is not pigmented. Among the coloration variants of the prothorax, the most common variant was Pn2 (85.6%) with one central spot. The next most frequent cases (14.4%) were Pn1 (lack of pigment, 7.2%), Pn3 (one large central spot and two smaller lateral spots, 3.4%), and Pn4 variant (so-called "crown", 3.8%). The complete pigment filling characteristic of species of the *F. rufa* group was found very rarely. The most common patterns for mesothorax are Mn1 (no pigment, 44.4%) and Mn4 (single dorsal spot, 38.3%). The next most prevalent (15.3%) was a new morph (Mn3) - a pigment collected in the form of a compact dark dot. Metathorax: the En1 variant is the most numerous - the complete absence of pigment in the propodeum (95.2%). Based on the proposed characteristics, a scheme of color morphs of *F. exsecta* is described. Analysis of the new scheme of coloring morphs showed that a shift towards lighter coloration is observed. Such non-invasive methods based on the assessment of color variability can be used to assess the speed and direction of selection. The proposed method can be useful for environmental and population studies, to compare the degree of relatedness between neighboring populations and in laboratory conditions to assess the effects of diet and other rearing conditions.

Gilev A.V. (2002) Zool. Zhurn. (in Russian).-V. 81.-№3.-P. 336-341.

Variations in coloration in ants as a characteristic of the direction of natural selection

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The variability of the trait serves as one of the important characteristics of its determinism. If the genetic component in the phenotypic variability of the trait is small (this is equivalent to low heritability), then it is the phenotypic plasticity and the width of the reaction norm that determine the adaptive capabilities of populations. The ants variability in coloring of the head and the alitrunk is used to distinguish species and intraspecific populations. In phenetics, an approach was developed that avoided subjectivity and provided easily comparable results (Gilev, 2002). This is the unification and cataloging of phenes, which is a necessary stage in population research. In this

