

Editorial

The Molecular Clock, the Biological Clock and General Physiology and Biophysics

The double stranded, circular, mitochondrial DNA (mt-DNA), with an approximate length of 16 kilobases (16,569 base pairs), constitutes an extremely sensitive molecular clock that may be used to measure the genetic distance between individuals. This unique property of mt-DNA is based on the fact that each sperm, including the mammalian one, contains mitochondria that are, however, excluded when the nucleus enters the ovum. Thus, although the offspring inherits equal parts of nuclear DNA from both parents, the inheritance of mt-DNA is from the mother only. Taking into consideration an estimated mutation rate of 2–4 % per million years in diverging lineages, this would mean that 2 to 4 nucleotide bases in each 100 will mutate every million years. By means of computer assisted lineage constructs it was suggested that the line of evidence leads to a common, single female ancestor somewhere in Africa, between 140,000–290,000 years ago. But, another line of evidence based on parsimony analysis, points rather to Asia as the ancient home, since the mt-DNA type which is most closely related to other primates was found to be present most frequently among the Asians. These conclusions indicate, that even in the Garden of Eden, at the dawn of prehistory, there could be more than one claimant as the original Eve, hence the supremacy of any single female might be questioned.

In comparison to the biological age of the mankind, the biological age of General Physiology and Biophysics (GPB) – 18 years – seems to be short. But is it really? What everything may happen with a scientific journal within an interval of 10 years only? Let us assume that top scientists have a mean life expectancy of 78 years. In their career, the first 28–30 years are spent as pre- and postgraduate students. The following 10 years are spent acting as research associates of different degree and usually only at the age between 35 and 40 they succeed to get self sufficient, working on more or less independent, grant-backed projects. Taking into consideration the differences in conditions and facilities for research in different parts of the world, these degrees of development may be, and usually also are reached a little earlier in Anglo-Saxonian countries, including North America and later in other European and Asian countries. Hence, an estimated 8–10 years of experience in scientific editorial work is needed to stand successfully on a leading editorial post in a respected scientific journal, even an internationally recognized

scientist may become eligible for the post of the Editor-in-Chief not earlier than in the age group of 45–55. Editors-in-Chief usually leave after having worked for approximately 10 years, that are filled with hard work and during which they serve untiringly as the molecular clock of the respective journal. When investigating GPB in terms of its molecular clock, it should have the 2nd Editor-in-Chief, and the line of evidence also confirms this. It may be of particular importance that the Editor-in-Chief acting in GPB at present is already called Coordinating Editor and was also a member of the Editorial Board when the journal started. Nevertheless, 24 members of the 45 man Editorial Board, that were standing over the cradle of the journal, still have remained its active members. Therefore, like in the case of the molecular clock, and without any doubt about the supremacy of Jozef Zachar, there may be more claimants for being the original co-founders of GPB. Early in evolution, approximately 1.2 billion years ago, bacteria found themselves exposed to a highly dangerous environment, containing abundant amounts of reactive oxygen species and free radicals. In these life threatening conditions, they had to seek protection by means of internalized, simple antioxidative compounds. And indeed, indole pigments appeared in photosynthetic bacteria at an earlier state of phylogeny than their enzyme based counterparts. The evolution of photosynthesis that followed, brought even more oxygen radicals, representing a risk for all organisms exposed to light. Thus, indoles, like melatonin (5-methoxy-N-acetyltryptamine) became important in photoprotection, assuring survival under extreme environmental challenges including radiation, heat and toxins. A single molecule of the highly lipophilic and easily diffusing melatonin can simultaneously detoxify two hydroxyl radicals and reduce one hydrogen peroxide molecule to water. As the most powerful endogenous hydroxyl radical scavenger, exceeding with scavenging potency even those of the mannitol and glutathion, melatonin is highly evolutionarily conserved and present in organisms as different as algae and humans. It is almost exclusively synthesised and secreted during darkness at night and mediates information concerning the temporal position and duration of darkness. The principal hormone of the pineal gland, melatonin is involved in central master clock mechanisms that regulate, time and trigger both the developmental and aging processes. The 24-h, diurnal rhythm of melatonin is very robust in young animals and humans, however, the cycle frequently deteriorates during aging and is totally abolished in neurodegenerative diseases. Because of the features described above, melatonin is recognized as the biological clock. GPB, already in the earliest phases of its foundation, also became exposed to several life threatening, dangerous influences: an uncertain circle of contributors, an uncertain quantity and quality of incoming manuscripts and, last but not least, competition with other well established and highly recognized journals, mostly published in the western hemisphere. The defense mechanisms utilized in early phases of GPB's phylogeny, to resist the threats mentioned, were based on the strong reviewing of the manuscripts obtained.

But, in contrast to other journals, instant assistance was provided to mostly young, excellent, but internationally inexperienced authors, reporting original, interesting and important results. This policy requested experienced, enthusiastic and hard working collaborators around a smooth and reliable functioning Editorial Staff. The permanent efforts of these enthusiastic individuals, guarding GPB against any influx of mediocre papers, coupled with a clock like regularity in publishing the single issues of the journal, represented and still represent the biological clock of GPB

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