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Crisis of current genetic concepts and the way to resolve it

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Statement of the Problem: During last 30 years, most of the basic genetic terms (mutation, recombination, genotype, gene, allele, etc.) became fuzzy due to the discovery of multiple non-canonical phenomena like inheritance of acquired traits, protein inheritance, paramutations, and genotrophy. As a result, there is a significant gap between factual material and current genetic concepts, thus reflecting the need for a paradigm shift. And modern genetic concepts are required, which will be equally valid for all known canonical and non-canonical genetic phenomena.

Methodology & Theoretical Orientation: We accomplished a critical analysis of current genetic concepts (gene theory, mutation theory, the chromosome theory of inheritance, the DNA theory of inheritance) to find the key origins of the terminological fuzziness.

Findings: The current concepts stand on the idea that any genetic term simultaneously describes three following aspects: Phenomenology; the source of variation and the underlying mechanism. For instance, any mutation is considered as an alteration which is stable and heritable, stochastically arising, and affecting DNA sequences. We name this idea “the integral concept of variability”. Meanwhile, the available factual material clearly demonstrates that the above-mentioned aspects are autonomous from each other and thus cannot be covered by the same term. Some heritable alterations gradually decline, some are clearly predictable under certain environmental influences, some do not affect DNA sequences, and some alterations of DNA sequences are not heritable. We propose that each genetic term should describe only one aspect of variability. This idea (we name it “the differential concept of variability”) was already shown to be successful for a lot of genetic terms.

Conclusion & Significance: The way to resolve the fuzziness of genetic terminology and the crisis of current genetic concepts is a paradigm shift based on the differential concept of variability.

Biography

Oleg N Tikhodeyev is the author of the original approach for resolving multiple ambiguities and contradictions in current genetic concepts. He has shown that the key source of such ambiguities and contradictions is the erroneous belief that the same genetic term (for example, mutation) is able to comprise both specific phenomenology and the underlying mechanisms (Tikhodeyev, 2015). This belief became widely accepted after 1952 when the hereditary role of DNA had been demonstrated. In modern genetic concepts, the terms describing molecular mechanisms should be clearly distinguished from those describing phenomenology because there is no strict correlation between phenomenology and molecular mechanisms (Tikhodeyev, 2016).

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