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Endemic diseases of geochemical origin and methodological approaches towards their prevention and elimination

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Prevention of diseases of geochemical origin belongs to one of the most important problems of modern biogeochemistry and geochemical ecology.
Theoretical analysis of their formation in context of the Darwin theory of the origin of species, Vernadsky ideas of evolution of the biosphere and evolutionary biology has led to the conclusion that the phenomenon mentioned above reflects the natural laws of biogeochemical evolution of the biosphere.
In the virgin (anthropogenically untouched) biosphere the development of both the species and the entire ecosystems was subjected to and controlled by self-organization and self-regulation. This mechanism was based on survival of species most successful in the use of global, regional and local environmental resources due to species variation and memory of generations. A higher speed of biological responding reactions and evolution in comparison with changes of the environment helped to survive while severe competition of living individuals and associations in their struggle for life resulted in formation of a system of biogeocenoses and species with only the best fit to geochemical conditions in all ecological niches at any given moment.
The modern state of this system referred to as the noosphere and treated as the next phase of evolution of the biosphere has started with appearance of human intelligence that provided Homo sapience with the most powerful tool for survival and expansion over the planet. At the noosphere stage the man, firstly, started fast colonization of the areas with different and often alien geochemical conditions and, secondly, changed the environment itself at a rate which exceeded that required for the living beings to adapt to these changes. The result is the disruption of the optimum natural functioning of biogeochemical cycling of chemical elements, leading to the emergence of a significant number of endemic diseases of geochemical nature. To prevent and (in some cases) eliminate such diseases one should establish the optimum natural geochemical parameters for species according to their natural habitats, to evaluate the risk of endemic diseases due to discrepancy between the chemical parameters of the current habitat and the natural one.
The proposed approach allowed us to develop a new methodology for mapping zones of ecological and geochemical risk and noticeably simplify the procedure of monitoring distribution and prevention of all diseases of geochemical nature.
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