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An investigation to reduce the prevalence and severity of anemia among school age children in Southwest Ethiopia

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Intermittent hypoxia treatment (IHT) has been gradually progressing during last decades as a non-medication treatment of diseases and a method for physical performance enhancement. Oxygen status profoundly influences the balance between stem cell (SC) pluripotency and differentiation. Modern studies show that IHT pretreatments of cultured SCs ameliorate their function after the transplantation. However, there is another approach to SCs stimulation - the adaptation of the whole organism to IHT (inhalation of hypoxic gas mixtures, periodic exposure to altitudes, etc.). Different intensities and durations of hypoxia could have important and diverse effects on SCs development. Potential mechanisms underlying both beneficial and adverse effects of IHT have been described. It was shown an important link between the factors that regulate stem and progenitor cell behavior and the hypoxia-inducible factors, providing a molecular framework for the hypoxic control of differentiation and cell fate. Basic investigations led to the proliferation of various methods of IHT exposure, the development of different medical equipments - hypoxicators - for its implementation in medical practice. However, wide array of different protocols and measurements makes the results difficult to harmonize. Our investigations on humans have shown that a two-week program of normobaric, cyclic 5 min exposures to $10\% O_2$ modulates circulating hematopoietic stem and progenitor cells (HSPC) and augments humoral and cellular components of innate immunity. These results raise the possibility that IHT induced HSPC emigration from niches into the circulation, followed by homing and sequestration in target tissues during post-IHT recovery. Findings support the potential for eventual application of IHT for treatment of many diseases.

Biography

Tatiana V Serebrovskaya is Professor of Physiology, Doctor of Biology, PhD Academician of Int. Acad. Sci., and Principal Researcher of the Bogomoletz Institute of Physiology, Kiev, Ukraine. He is the author of more than 300 scientific publications, including two monographs.

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