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Global Challenges of the 21st Century

- 1) Technological development and human health/ quality of life*
- 2) Climate change and environmental sustainability*
- 3) Democracy and cohesion in Europe*

The Human Carotid Body and Adaptation to High Altitude

The carotid body (CB) is a polymodal chemosensory organ that plays an essential role in initiating respiratory and cardiovascular adjustments to maintain blood gas homeostasis. Much of the available evidence suggests that the CB dysfunction and altered oxygen homeostasis are involved in the pathophysiology of several human disorders, including ventilatory altitude acclimatization and sleep-disordered breathing. In case of deprivation of adequate oxygen supply to the brain, a condition called hypoxia, the CB cells undergo profound morphological changes. Experimental data show that a long-term hypoxic exposure enlarges several-fold the size of the CB causing glomus cell hypertrophy and hyperplasia. In humans such a physiological adaptive response to prolonged hypoxia occurs during adaptation to high altitudes, or pathologically in patients suffering from systemic hypertension and/or cardiopulmonary diseases with concomitant hypoxemia. It is also well established that hypoxia causes glomus cells to depolarize and release a variety of both excitatory and inhibitory transmitters, which signal brain centres to initiate an appropriate cardiovascular and respiratory response that would correct the state.

Nikolai Lazarov received his MD from the Medical University of Sofia in 1981, his PhD in Neurobiology in 1991, and his DSc in 2000. Prof. Lazarov became Associate Professor in 1994 and was promoted Full Professor in 2001. Currently he is a Professor of Anatomy and Cell Neurobiology at the Department of Anatomy and Histology of the Medical University of Sofia and Head of the same department. He is also a collaborating Professor and Head of the Department of Synaptic Signaling and Communications of the Institute of Neurobiology of the Bulgarian Academy of Sciences. Prof. Lazarov was an AvH Fellow in Ulm and Munich. His research interests are in the areas of neuroscience, with a focus on functional morphology and neurochemistry of the trigeminal sensory system, and also on peripheral arterial chemoreceptors. Dr. Lazarov is the current President of the Bulgarian Anatomical Society. He was Chairman of the Executive Board of the Bulgarian National Science Fund and is currently its Vice President.