

# GUEST EDITORIAL

## *Special Issue on 'Integrated Physiology: Extreme Environment'*

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A successful military operation not only necessitates cutting-edge, contemporary weapon systems but also, fittest men behind these machines. These men, desirably with the highest order of physiological and psychological well-being to operate in the harshest of battle fields shape the battle field dynamics through grit and valour. Defence Institute of Physiology & Allied Sciences (DIPAS, DRDO), a Delhi based DRDO laboratory, has been contributing towards the operational readiness of Indian troops in varied environmental conditions through physiological, biomedical and ergonomic approaches. The translational research in DIPAS has been contributing towards safe induction of troops to high altitude and desert environments, sustenance in extreme environmental conditions and improving soldier performance in demanding operational conditions.

This special issue of DLSJ is an attempt to create awareness on the recent R&D efforts being made at DIPAS & other premier research Institute in India to improve combat efficiency of Indian troops. The articles bring to light the challenges at high altitude resulting due to cold and hypoxia and discuss trajectories of their early detection and clinical management. The patho-physiological effects of hypoxia and effects of extreme altitude on multiple organ systems continue to remain an enigma worldwide. Their vivid manifestations across different time durations acute, sub-chronic, chronic or generational further add to their complexity. I am happy to note that the articles on molecular and patho-physiological basis of high-altitude illnesses address these multifaceted problems encountered at extreme altitude.

This special issue also examines various interventional strategies and the contemporary research

tools for soldier performance in high altitude. Articles on mitigation strategies for cold injury, right ventricular hypertrophy and other high-altitude maladies through photocompounds & photoceuticals, provide insight into possible prophylactic and therapeutic approaches for addressing these health problems. The 'Man-Molecule & Molecule-Man' approach being followed for identifying physiological, genomic and proteomic targets as well as intervention strategies to ameliorate high altitude maladies is well addressed through articles on skeletal muscle health, role of mitochondrial DNA methylation in thrombosis, emerging trans-sulfuration pathways and gut health at high altitude.

OMICS technologies have revolutionized biomedical research with ability to provide new understanding on events occurring at sub-cellular and cellular level. With the advent of AIML technologies, biological information can be tiered from population to personal levels. The chapters underscoring the relevance of OMICS data and related data mining strategies for unravelling intricate molecular information like SUMO site prediction, acclimatization patterns across populations, parallels between sepsis and high-altitude responses and computational strategy to examine functional properties of SNPs address emerging trends in biomedical sciences.

As editor to this special issue, I hope that the articles being published serve as a primer for basic and translational research in environmental and military physiology and lead to incorporation of contemporary research tools for high altitude research. I appreciate all the authors and reviewers who have made sincere efforts in improving the scientific content at various stages of publication.

