

1. Record Nr.	UNINA9910741154303321
Titolo	High altitude sickness - solutions from genomics, proteomics and antioxidant interventions // Narendra Kumar Sharma and Aditya Arya, editors
Pubbl/distr/stampa	Singapore : , : Springer, , [2022] ©2022
ISBN	981-19-1008-1
Descrizione fisica	1 online resource (222 pages)
Disciplina	616.2
Soggetti	Anoxemia Mountain sickness Genomics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface -- About the Book -- Contents -- About the Editors -- 1: Introduction to High Altitude and Hypoxia -- 1.1 Introduction -- 1.2 High Altitude and Oxygen Availability -- 1.3 Acclimatization at High Altitude -- 1.3.1 Acute Mountain Sickness -- 1.3.2 High Altitude Cerebral Oedema (HACE) -- 1.3.2.1 Intracellular Oedema -- 1.3.2.2 Ionic Oedema -- 1.3.2.3 Vasogenic Oedema -- 1.3.3 High Altitude Pulmonary Oedema (HAPE) -- 1.4 Hypobaric Hypoxia and Brain -- 1.4.1 Brain as a Vulnerable Site of Oxidative Stress -- 1.4.2 Hypobaric Hypoxia and Memory Functions -- 1.5 Other Neurological Effects at High Altitude -- References -- 2: High Altitude Sickness: Environmental Stressor and Altered Physiological Response -- 2.1 Introduction -- 2.1.1 High Altitudes -- 2.1.2 Environment at High Altitudes and Defining ``Hypoxia`` -- 2.1.2.1 Identifying the Concept of ``Hypoxia`` -- 2.1.2.2 Types of Hypoxia -- 2.1.2.3 Symptoms of High Altitude Hypoxia -- 2.1.3 Ultraviolet Radiation -- 2.1.4 Cold -- 2.2 Physiological Changes at High Altitude -- 2.2.1 Acclimatization to High Altitude -- 2.2.1.1 Pulmonary Ventilation or Hyperventilation -- 2.2.1.2 Polycythaemia -- 2.2.2 Affinity of Haemoglobin for Oxygen at Sea Level and At High Altitudes -- 2.2.3 High Altitude and Oxidative Stress -- 2.3 Conclusion -- References -- 3: High Altitude Related Diseases:

Milder Effects, HACE, HAPE, and Effect on Various Organ Systems -- 3.1
Introduction -- 3.2 Epidemiology of High Altitude Sickness -- 3.3
Mechanisms of High Altitude Sickness -- 3.4 Milder Effects of High
Altitude (AMS) -- 3.5 High Altitude Pulmonary Oedema (HAPE) -- 3.6
High Altitude Cerebral Oedema (HACE) -- 3.7 High Altitude Related
Cardiac Perturbations -- 3.8 High Altitude Related Perturbations in
Muscles -- 3.9 High Altitude Related Perturbations in Kidney -- 3.10
High Altitude Related Perturbations in Liver.
3.11 Conclusion -- References -- 4: High Altitude-Induced Oxidative
Stress, Rheumatoid Arthritis, and Proteomic Alteration -- 4.1 Oxidative
Stress -- 4.1.1 Oxidants -- 4.1.1.1 Endogenous Source -- 4.1.1.2
Exogenous Source -- 4.1.2 Antioxidants -- 4.2 High Altitude Mediated
Oxidative Stress -- 4.2.1 High Altitude and Oxidative Damage -- 4.2.2
RONS Generation at High Altitude -- 4.2.3 Hypoxia and Oxidative
Stress -- 4.3 Rheumatoid Arthritis (RA) -- 4.3.1 Oxidative Stress in RA
-- 4.3.2 High Altitude and RA -- 4.3.3 Reactive Species Measurement
in RA -- 4.4 Oxidative Stress Measurement -- 4.5 High Altitude and
Proteomic Alteration -- 4.6 Conclusion -- References -- 5: Oxidative
Stress, ROS Generation, and Associated Molecular Alterations in High
Altitude Hypoxia -- 5.1 Introduction -- 5.2 Mechanisms of Oxidant
Generation -- 5.2.1 Oxidants Generation in Mitochondria -- 5.2.2
Oxidant Generation in Phagocytic and Non-phagocytic Cells -- 5.3
Defence Mechanism Against Oxidative Stress -- 5.3.1 Enzymatic
Antioxidants -- 5.3.2 Non-Enzymatic Antioxidants -- 5.4 Organ-Level
Oxidative Damage Manifested by Cellular ROS -- 5.4.1 Oxidative
Damage in Lungs -- 5.4.2 Oxidative Damage in Brain -- 5.4.3
Oxidative Damage in Heart -- 5.5 Oxidative Perturbations Mediated
Changes in Proteome -- 5.6 Conclusion -- References -- 6: High
Altitude Induced Thrombosis: Challenges and Recent Advancements in
Pathogenesis and Management -- 6.1 Introduction -- 6.2 Genetic Risk
Factors for VTE -- 6.2.1 Factor V Leiden -- 6.2.2 Deficiency of Protein
C, Protein S and Antithrombin -- 6.2.3 Prothrombin Mutation -- 6.3
Acquired Risk Factors for VTE -- 6.3.1 Surgery/Trauma -- 6.3.2
Advanced Age -- 6.3.3 Cancer -- 6.3.4 Oral Contraceptives and
Hormone Replacement Therapy -- 6.3.5 Immobilization -- 6.4 Modern
Lifestyle Risk Factors for VTE -- 6.4.1 Virchow's Triad.
6.5 Hypoxia at High Altitude -- 6.6 High Altitude Thrombo-Embolism
(HATE) -- 6.7 Pathogenesis of HATE -- 6.7.1 Ascent to an Elevated
Region -- 6.7.2 Long Haul Air Travel -- 6.7.3 Simulated Hypobaric
Hypoxia -- 6.8 Evidence from Pre-Clinical Studies -- 6.9 Clinical
Management of HATE -- 6.10 Conclusion -- References -- 7: Current
Problems in Diagnosis and Treatment of High-Altitude Sickness -- 7.1
Introduction -- 7.2 Acute Mountain Sickness (AMS) -- 7.3 High-
Altitude Cerebral Edema -- 7.4 High-Altitude Pulmonary Oedema
(HAPE) -- 7.5 Prevention Strategies for Acute Mountain Sickness (AMS)
and High-Altitude Cerebral Edema (HACE) -- 7.5.1 Non-
Pharmacological Strategies -- 7.5.2 Other Strategies -- 7.5.3
Pharmacological Strategies -- 7.6 Treatment of HAI -- 7.6.1 Treatment
of Acute Mountain Sickness -- 7.6.2 Treatment of High-Altitude
Cerebral Edema -- 7.6.3 Treatment of High-Altitude Pulmonary Edema
-- 7.7 Better Prophylactics and Therapeutics -- References -- 8:
Proteomics as a Potential Tool for Biomarker Discovery -- 8.1
Introduction -- 8.2 How Proteomics Is Useful? -- 8.2.1 History of
Proteomics -- 8.2.2 Overview of Proteomics -- 8.2.3 Types of
Proteomics -- 8.2.3.1 Protein Expression Proteomics -- 8.2.3.2
Structural Proteomics -- 8.2.3.3 Functional Proteomics -- 8.2.3.4
Clinical Proteomics -- 8.2.4 Proteomics as a Platform to Discover
Potent Biomarker -- 8.3 Common Proteomic Approaches -- 8.3.1 Two-

Dimensional Gel Electrophoresis (2DGE) -- 8.3.2 Two-Dimensional Difference Gel Electrophoresis (2D-DIGE) -- 8.3.3 Mass Spectrometry (MS) -- 8.3.3.1 MALDI-TOF MS -- 8.3.3.2 ESI MS/MS -- 8.3.3.3 Surface-Enhanced Laser Desorption Ionization (SELDI) -- 8.3.3.4 "Short-Gun" Approach -- 8.3.4 Isotope-Coded Affinity Tag (ICAT) -- 8.3.5 Isobaric Tag for Relative and Absolute Quantitation (iTRAQ) -- 8.4 Biomarker and Disease -- 8.4.1 Autoimmune Disease. 8.4.1.1 Rheumatoid Arthritis (RA) -- 8.4.1.2 Systemic Lupus Erythematosus (SLE) -- 8.4.1.3 Type 1 Diabetes (Diabetes Mellitus) -- 8.4.1.4 Multiple Sclerosis -- 8.5 Conclusion -- References -- 9: Serum and Plasma Proteomics for High Altitude Related Biomarker Discovery -- 9.1 Introduction -- 9.2 Plasma and Serum and Their Potentials in the Diagnosis -- 9.3 Proteomics Approaches to Study Plasma and Serum -- 9.3.1 Immunoblotting -- 9.3.2 2D Gel Electrophoresis and Mass Spectrometry -- 9.3.3 Non-gel Based Quantitative Proteomics -- 9.4 Key Considerations for Biomarker Discovery for High Altitude Physiology -- 9.5 Potentials Biomarker Candidates in High Altitude Pathophysiology -- 9.5.1 Antioxidant Signaling -- 9.5.2 Lipid Metabolism -- 9.5.3 Cytoskeleton Remodeling -- 9.5.4 Post-Translational Modifications -- 9.6 Future Prospects and Conclusion -- References -- 10: Saliva Proteomics as Non-Invasive Application for Biomarker Studies -- 10.1 Saliva: A Novel Informative Sample -- 10.2 Hypobaric Hypoxia: A Pathophysiological Condition -- 10.3 Redox Stress: Molecular Responses in Hypobaric Hypoxia -- 10.4 Use of Biological Fluids Such as Plasma/Serum in Search of Potential Protein Markers -- 10.5 Saliva as a Diagnostic Fluid in Translational Studies -- 10.6 Saliva in Response to Hypobaric Hypoxia -- 10.7 Proteins Evolved as Biomarkers for Hypobaric Hypoxia -- 10.7.1 Alpha-Enolase -- 10.7.2 Cystatins -- 10.7.3 Apoptosis Inducing Factor 2 (AIF2) -- 10.7.4 Prolactin Inducible Protein (PIP) -- 10.7.5 Carbonic Anhydrase 6 (CA6) -- 10.7.6 Phospholipid Transfer Protein (PLTP) -- 10.7.7 Interleukin 1 Receptor Antagonist (IL1R1) -- 10.7.8 Albumin, Alpha-1 Acid Glycoprotein, and Alpha-1 Antitrypsin -- 10.8 Concluding Remarks -- References -- 11: Role of Genomics, Proteomics, and Antioxidant Interventions in Preventing High Altitude Sickness -- 11.1 Introduction. 11.1.1 Role of Genetic Factors Towards High Altitude Sickness -- 11.1.2 Role of Proteomics Towards High Altitude Sickness -- 11.1.3 Role of Antioxidants Towards High Altitude Sickness -- 11.2 Conclusion -- References -- 12: High Altitude Sickness and Antioxidant Interventions -- 12.1 Introduction -- 12.2 Acute Mountain Sickness (AMS), High Altitude Cerebral Edema (HACE), and High Altitude Pulmonary Edema (HAPE) -- 12.3 Diverse Strategies for Preventing High Altitude Sickness (HAS) -- 12.3.1 Pharmacological Interventions -- 12.3.2 Non-Pharmacological and Miscellaneous Interventions -- 12.4 Cellular Antioxidant System and its Alteration in Relation to HAS -- 12.5 Role of Antioxidant Interventions and Prophylactic Benefits in HAS -- References -- 13: Antioxidant Therapy for High Altitude Sickness and Nano-Medicine -- 13.1 Introduction -- 13.2 From Physiological to Molecular: Change of Perspectives -- 13.3 Stabilization of HIF in Signaling of ROS During Hypoxic Conditions -- 13.4 Association of PGC-1 and Sirtuins with HIF-1 in Signaling of ROS -- 13.5 Nuclear Erythroid-Related Factor 2 -- 13.6 Oxidative Stress Markers at High Altitude -- 13.7 Physiological Consequences of Oxide Generated Stress -- 13.8 Antioxidant Therapy for High Altitude Sickness -- 13.9 Effects on Antioxidant System at High Altitude -- 13.10 Status of Antioxidant Defense System in Body -- 13.11 Antioxidant Therapy: Prevention of High Altitude Sickness -- 13.12 Nano-Medicine in Acute Mountain Sickness -- 13.12.1 Beginning of Nanotechnology -- 13.12.2 Nano-

Formulations -- 13.12.3 Hypoxic Nano-Formulations -- 13.12.4
Hypobaric Hypoxia and Nano-Formulations -- 13.12.5 Nano-Curcumin
for Hypobaric Hypoxia -- 13.12.6 Nanoceria for Hypobaric Hypoxia --
13.12.7 Nano-Formulations Forthcoming for Hypobaric Hypoxia --
13.13 Conclusion -- References.
