

STRESS RESPONSES IN BIOLOGY AND MEDICINE

Stress of Life in Molecules, Cells, Organisms, and Psychosocial Communities

Editors

PÉTER CSERMELY, TAMÁS KORCSMÁROS, AND KATALIN SULYOK

This volume is the result of a conference entitled **2nd World Conference on Stress**, held on August 23–26, 2007 in Budapest, Hungary.

CONTENTS

Introduction. *By* PÉTER CSERMELY, TAMÁS KORCSMÁROS, AND KATALIN SULYOK xi

Part I. Stress Proteins: Molecular Stress

New Tricks for an Old Dog: The Evolving World of Hsp70. <i>By</i> KEVIN A. MORANO	1
Heat Shock Factors at a Crossroad between Stress and Development. <i>By</i> MALIN ÅKERFELT, DIANE TROUILLET, VALÉRIE MEZGER, AND LEA SISTONEN	15
Extracellular Heat Shock Proteins in Cell Signaling and Immunity. <i>By</i> STUART K. CALDERWOOD, SALAMATU S. MAMBULA, AND PHILLIP J. GRAY JR.	28

Part II. Stress and Cellular Functions

Membrane Regulation of the Stress Response from Prokaryotic Models to Mammalian Cells. <i>By</i> LASZLO VIGH, HITOSHI NAKAMOTO, JACQUES LANDRY, ANTONIO GOMEZ-MUNOZ, JOHN L. HARWOOD, AND IBOLYA HORVATH	40
---	----

Temperature Stress: Reacting and Adapting: Lessons from Poikilotherms. <i>By</i> JOHN L. HARWOOD	52
Endoplasmic Reticulum Stress. <i>By</i> GÁBOR BÁNHEGYI, PETER BAUMEISTER, ANGELO BENEDETTI, DEZHENG DONG, YONG FU, AMY S. LEE, JIANZE LI, CHANGHUI MAO, EVA MARGITTAI, MIN NI, WULF PASCHEN, SIMONA PICCIRELLA, SILVIA SENESI, ROBERTO SITIA, MIAO WANG, AND WEI YANG	58
Chaperones, and Proteases—Guardians of Protein Integrity in Eukaryotic Organelles. <i>By</i> CLAUDIA LEIDHOLD AND WOLFGANG VOOS	72
Oxygen, Hypoxia, and Stress. <i>By</i> CORMAC T. TAYLOR AND JACQUES POUYSSEGUR	87
Review on Bacterial Stress Topics. <i>By</i> ANNA MARIA GIULIODORI, CLAUDIO O. GUALERZI, SARA SÓTO, JORDI VILA, AND MARÍA M. TAVÍO ...	95
Variation in Stress Responses within a Bacterial Species and the Indirect Costs of Stress Resistance. <i>By</i> THOMAS FERENCI AND BENY SPIRA	105

Part III. Plant Stress

Molecular Mechanisms of Light Stress of Photosynthesis. <i>By</i> IMRE VASS, KRISZTIÁN CSER, AND OTILIA CHEREGI	114
The Plant Host–Pathogen Interface: Cell Wall and Membrane Dynamics of Pathogen-Induced Responses. <i>By</i> BRAD DAY AND TERRY GRAHAM	123
Long-Term Acclimation of Plants to Elevated CO ₂ and Its Interaction with Stresses. <i>By</i> ZOLTÁN TUBA AND HARTMUT K. LICHTENTHALER	135

Part IV. Stress at the Level of the Organism

Heat Shock Proteins and Protection of the Nervous System. <i>By</i> IAN R. BROWN .	147
Heavy Metal Ions in Normal Physiology, Toxic Stress, and Cytoprotection. <i>By</i> MICHAEL A. LYNES, Y. JAMES KANG, STEFANO L. SENSI, GEORGE A. PERDRIZET, AND LAWRENCE E. HIGHTOWER	159
Interleukin-1 System in CNS Stress: Seizures, Fever, and Neurotrauma. <i>By</i> TAMAS BARTFAI, MANUEL ALAVEZ-SANCHEZ, SIV ANDELL-JONSSON, MARIANNE SCHULTZBERG, ANNAMARIA VEZZANI, ERIK DANIELSSON, AND BRUNO CONTI	173

Part V. Stress in Medicine

Chaperonopathies by Defect, Excess, or Mistake. <i>By</i> ALBERTO J. L. MACARIO AND EVERLY CONWAY DE MACARIO	178
Heat Shock Proteins in Cancer. <i>By</i> MICHAEL SHERMAN AND GABRIELE MÜLTHOFF	192
Drugging the Cancer Chaperone HSP90: Combinatorial Therapeutic Exploitation of Oncogene Addiction and Tumor Stress. <i>By</i> PAUL WORKMAN, FRANCIS BURROWS, LEN NECKERS, AND NEAL ROSEN ...	202

Stress, Heat Shock Proteins, and Autoimmunity: How Immune Responses to Heat Shock Proteins Are to Be Used for the Control of Chronic Inflammatory Diseases. <i>By</i> WILLEM VAN EDEN, GEORGE WICK, SALVATORE ALBANI, AND IRUN COHEN	217
New Molecular Mechanisms of Duodenal Ulceration. <i>By</i> SANDOR SZABO, XIAOMING DENG, TETYANA KHOMENKO, LONGCHUAN CHEN, GANNA TOLSTANOVA, KLARA OSAPAY, ZSUZSANNA SANDOR, AND XIMING XIONG	238
Metabolic Syndrome: Psychosocial, Neuroendocrine, and Classical Risk Factors in Type 2 Diabetes. <i>By</i> N.G. ABRAHAM, E.J. RUNNER, J.W. ERIKSSON, AND R.P. ROBERTSON	256
Stress Sensitization in Schizophrenia. <i>By</i> KUNIO YUJI, MICHIO SUZUKI, AND MASAYOSHI KURACHI	276

Part VI. Psychosocial Stress

Glucocorticoid Hyper- and Hypofunction: Stress Effects on Cognition and Aggression. <i>By</i> JEANSOK J. KIM AND JÓZSEF HALLER	291
Cognitive Activation Theory of Stress, Sensitization, and Common Health Complaints. <i>By</i> HOLGER URSIN AND HEGE ERIKSEN	304
The Catecholamine–Cytokine Balance: Interaction between the Brain and the Immune System. <i>By</i> J. SZELÉNYI AND E.S. VIZI	311
Chronic Stress and Social Changes: Socioeconomic Determination of Chronic Stress. <i>By</i> MÁRIA S. KOPP, ÁRPÁD SKRABSKI, ANDRÁS SZÉKELY, ADRIENNE STAUDER, AND REDFORD WILLIAMS	325
Attitude toward Death: Does It Influence Dental Fear? <i>By</i> GÁBOR FÁBIÁN, ORSOLYA MÜLLER, SZILVIA KOVÁCS, MINH TÚ NGUYEN, TIBOR KÁROLY FÁBIÁN, PÉTER CSERMELY, AND PÁL FEJÉRDY	339
Stress, Immune Function, and Women's Reproduction. <i>By</i> PABLO A. NEPOMNASCHY, EYAL SHEINER, GEORGE MASTRORAKOS, AND PETRA C. ARCK	350
Index of Contributors	365

The New York Academy of Sciences believes it has a responsibility to provide an open forum for discussion of scientific questions. The positions taken by the participants in the reported conferences are their own and not necessarily those of the Academy. The Academy has no intent to influence legislation by providing such forums.