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OXYGENATION IN WATER-BREATHING ANIMALS; 11. OXIDATIVE STRESS IN SHARKS AND RAYS; 12. OXYGEN SENSING: THE ROLE OF REACTIVE OXYGEN SPECIES; 13. ISCHEMIA/REPERFUSION IN DIVING BIRDS AND MAMMALS: HOW THEY AVOID OXIDATIVE DAMAGE; PART III. MARINE ANIMAL MODELS FOR AGING, DEVELOPMENT, AND DISEASE 14. AGING IN MARINE ANIMALS 15. OXIDATIVE STRESS AND ANTIOXIDANT SYSTEMS IN CRUSTACEAN LIFE CYCLES; 16. TRANSFER OF FREE RADICALS BETWEEN PROTEINS AND MEMBRANE LIPIDS: IMPLICATIONS FOR AQUATIC BIOLOGY; 17. IMMUNE DEFENSE OF MARINE INVERTEBRATES: THE ROLE OF REACTIVE OXYGEN AND NITROGEN SPECIES; 18. ATTACK AND DEFENSE: REACTIVE OXYGEN AND NITROGEN SPECIES IN TELEOST FISH IMMUNE RESPONSE AND THE COEVOLVED EVASION OF MICROBES AND PARASITES; PART IV. MARINE ANIMAL STRESS RESPONSE AND BIOMONITORING; 19. STRESS EFFECTS ON METABOLISM AND ENERGY BUDGETS IN MOLLUSKS 20. STARVATION, ENERGETICS, AND ANTIOXIDANT DEFENSES 21. ENVIRONMENTALLY INDUCED OXIDATIVE STRESS IN FISH; 22. CHEMICAL POLLUTANTS AND THE MECHANISMS OF REACTIVE OXYGEN SPECIES GENERATION IN AQUATIC ORGANISMS; 23. BIOMARKERS OF OXIDATIVE STRESS: BENEFITS AND DRAWBACKS FOR THEIR APPLICATION IN BIOMONITORING OF AQUATIC ENVIRONMENTS; PART V. METHODS OF OXIDATIVE STRESS DETECTION; 24. DETECTION OF REACTIVE METABOLITES OF OXYGEN AND NITROGEN; 25. ROLE OF SINGLET MOLECULAR OXYGEN IN THE OXIDATIVE DAMAGE TO BIOMOLECULES; 26. TOTAL OXYRADICAL SCAVENGING CAPACITY ASSAY 27. SPECTROPHOTOMETRIC ASSAYS OF ANTIOXIDANTS 28. EVALUATION OF GLUTATHIONE STATUS IN AQUATIC ORGANISMS; 29. MEASUREMENT OF ANTIOXIDANT PIGMENTS AND VITAMINS IN PHYTOPLANKTON, ZOOPLANKTON, AND FISH; 30. CAROTENOID ANALYSIS AND IDENTIFICATION IN MARINE ANIMALS; 31. LINOLEIC ACID OXIDATION PRODUCTS AS BIOMARKERS OF OXIDATIVE STRESS IN VIVO; 32. THE CLASSIC METHODS TO MEASURE OXIDATIVE DAMAGE: LIPID PEROXIDES, THIOBARBITURIC-ACID REACTIVE SUBSTANCES, AND PROTEIN CARBONYLS; 33. PROTEIN CARBONYL MEASUREMENT BY ENZYME LINKED IMMUNOSORBENT ASSAY; 34. EVALUATION OF MALONDIALDEHYDE LEVELS 35. THE USE OF ELECTRON PARAMAGNETIC RESONANCE IN STUDIES OF OXIDATIVE DAMAGE TO LIPIDS IN AQUATIC SYSTEMS

Sommario/riassunto

Reactive oxygen species (ROS) are increasingly appreciated as downstream effectors of cellular damage and dysfunction under natural and anthropogenic stress scenarios in aquatic systems. This comprehensive volume describes oxidative stress phenomena in different climatic zones and groups of organisms, taking into account specific habitat conditions and how they affect susceptibility to ROS damage. A comprehensive and detailed methods section is included which supplies complete protocols for analyzing ROS production, oxidative damage, and antioxidant systems. Methods are also evaluated with
