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Nota di contenuto	Biology in Space and Life on Earth; Contents; Foreword; Preface; List of Contributors; Introduction; 1 Flight Mission Scenarios; 2 Sounding Rocket Experiments; 3 Biobox on Foton and in the Space Shuttle; 3.1 Biobox-1; 3.2 Biobox-2; 3.3 Biobox-3; 3.4 Biobox-4; 4 Biorack in Spacelab and Spacehab; 1 The Gravity Environment in Space Experiments; 1.1 Introduction to Gravity Research; 1.1.1 Principle of Equivalence; 1.1.2 Microgravity; 1.1.3 Artificial Gravity; 1.2 Gravity Phenomena on Small Objects; 1.2.1 Sedimentation; 1.2.2 Hydrostatic Pressure; 1.2.3 Diffusion; 1.2.4 Convection 1.2.5 Diffusion/Convection1.2.6 Buoyancy; 1.2.7 Coriolis Acceleration; 2 Primary Responses of Gravity Sensing in Plants; 2.1 Introduction and Historical Background; 2.2 Evolution of Gravity Sensing Mechanisms under the Earth's Gravity Conditions; 2.3 Specific Location and Unique Features of Gravity Sensing Cells; 2.4 Correlation between Statolith Sedimentation and Gravitropic Responses; 2.5 Is the Actin Cytoskeleton Involved in Gravity Sensing?; 2.6 Gravireceptors; 2.7 Second Messengers in Gravisignalling 2.8 Modifying Gravitational Acceleration Forces - Versatile Tools for

Studying Plant Gravity Sensing Mechanisms2.9 Conclusions and Perspectives; 3 Physiological Responses of Higher Plants; 3.1 Introduction: Historical Overview; 3.2 Terminological Aspects; 3.3 Microgravity as a Tool; 3.3.1 Equipment; 3.3.2 Testable Hypotheses; 3.3.2.1 Gravisensitivity; 3.3.2.2 Stimulus Transformation: Role of the Actomyosin System; 3.3.2.3 Extracellular Matrix as Anti-gravitational Material; 3.3.2.4 Existence of Gravity (Microgravity) Related Genes; 3.3.2.5 Autonomous versus Directed Movements
3.4 Microgravity as Stress Factor3.4.1 Cellular Level; 3.4.2 Developmental Aspects; 3.5 Gravity-related Paradoxes; 3.6 Gravity and Evolution; 3.7 Conclusion and Perspectives; 4 Development and Gravitropism of Lentil Seedling Roots Grown in Microgravity; 4.1 Introduction; 4.1.1 Development of Lentil Seedlings on the Ground; 4.1.1.1 Functional Zones of the Primary Root; 4.1.1.2 Role of the Root Cap; 4.1.1.3 Meristematic Activity; 4.1.1.4 Cell Elongation; 4.1.2 Root Gravitropism on Earth; 4.1.2.1 Perception of Gravity; 4.1.2.2 The Root Statocyte; 4.1.2.3 Gravisensitivity: The Presentation Time
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4.4.1.3 Amyloplasts Positioning

Sommario/riassunto

This concise yet comprehensive treatment of the effects of spaceflight on biological systems includes issues at the forefront of life sciences research, such as gravitational biology, immune system response, bone cell formation and the effects of radiation on biosystems. Edited by a leading specialist at the European Space Agency (ESA) with contributions by internationally renowned experts, the chapters are based on the latest space laboratory experiments, including those on SPACELAB, ISS, parabolic flights and unmanned research satellites.An indispensable source for biologists, medical re