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Titolo	Mechanobiology of Hydrostatic Pressure : Frontiers of Biomechanics // by Jiro Nagatomi
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Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (147 pages)
Collana	Frontiers of Biomechanics, , 2199-8523 ; ; 5
Disciplina	571.43
Soggetti	Biomechanics Biophysics Cell interaction Cytology Biomedical engineering Continuum mechanics Materials Fluidics Mechanobiological Cell Signaling Cell Biology Biomedical Engineering and Bioengineering Continuum Mechanics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Part 1. What is hydrostatic pressure and why is it important for Biomechanics -- Chapter 1. Physics of hydrostatic pressure, continuum mechanics (hydrostatic stress) vs. fluid mechanics (HP as a thermodynamic quantity) -- Chapter 2. Hydrostatic pressure in nature (plant, deep sea biology, bacteria/microorganism) -- Chapter 3. Hydrostatic pressure in mammalian physiology and pathology, various organ systems -- Part 2. In vitro studies of HP mechanobiology -- Chapter 4. HP vs stretch (Bladder, lungs, vascular) -- Chapter 5. HP vs flow (Vascular, Bone) -- Chapter 6. HP vs osmotic (cancer, brain, kidney),- Chapter 7. Static vs dynamic HP (Chondrocyte, IVD) -- Chapter 8. In vitro systems criticism (ocular) -- Part 3. Events and

pathways involved in HP Mechanotransduction.-Chapter 9. Intracellular signal transduction -- Chapter 10. Cell volume regulation, aquaporin, membrane, cytoskeleton -- Chapter 11. Membrane bound ion channels and calcium signaling -- Chapter 12. ATP release, purinergic signaling, DAMP, inflammasome -- Chapter 13. ECM synthesis, fibrosis, EMT -- Conclusion.

Sommario/riassunto

This book compiles and reorganizes previously published research to give readers a clear overview of how living systems respond to hydrostatic pressure—a force present from the deepest oceans to the human body. Although scientists have recognized its importance for decades, many questions remain. By bringing together work from across the field, this volume provides a comprehensive look at both the physical forces involved and the biological processes they influence. The central theme is how cells sense pressure and convert it into biological signals, a process known as Mechan transduction. The book is organized into three sections: the first explains what hydrostatic pressure is and why it matters; the second reviews laboratory studies on pressure and fluid flow in different organ systems; and the third examines studies on pressure and stretching forces. Through this reorganized collection of research, the book offers readers a deeper understanding of the essential role hydrostatic pressure plays in biology and health.