Muscles as Molecular and Metabolic Machines

Peter W. Hochachka
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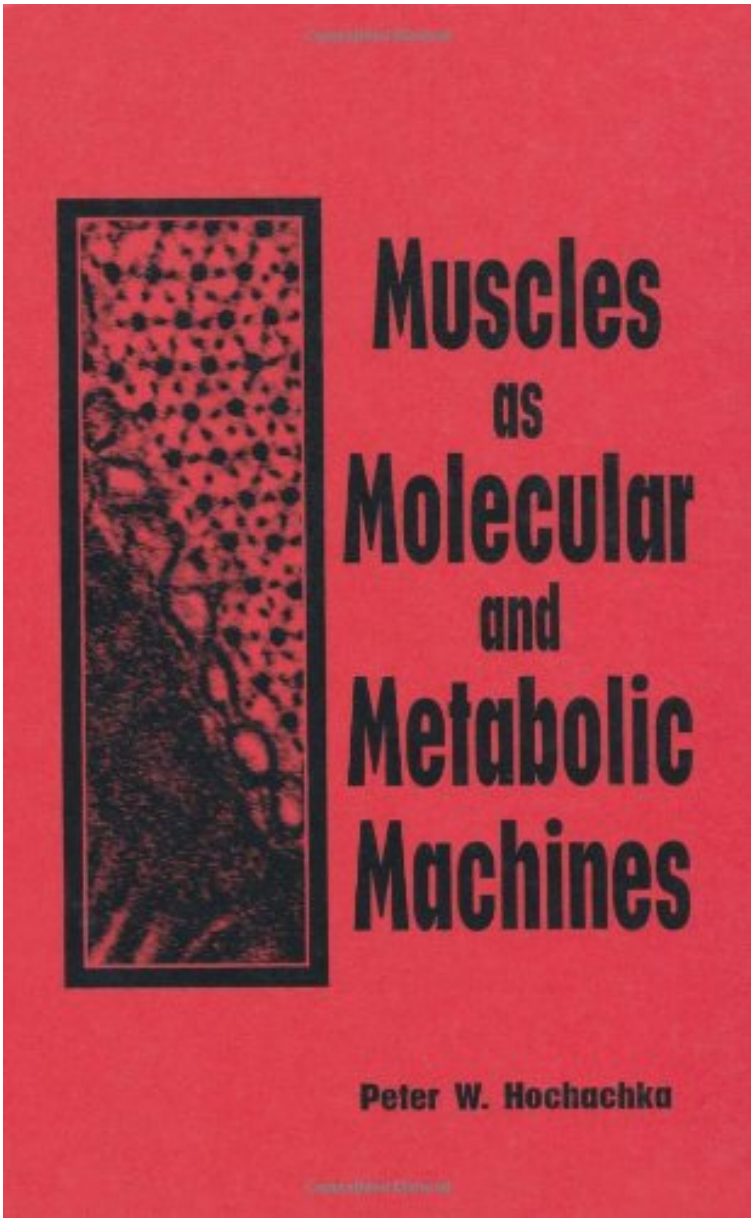

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Peter W. Hochachka : Muscles as Molecular and Metabolic Machines before purchasing it in order to gage whether or not it would be worth my time, and all praised Muscles as Molecular and Metabolic Machines:

This book explores the paradigm of muscles as molecular and metabolic machines in which all structures and functions are exquisitely integrated and matched to each other. The analysis begins with a standard reductionist approach-reviewing the integrated machine parts. The key working components of the complete muscle machine are proteins (soluble, organelle, or membrane localized), and a conservative count indicates that today more than 100 such machine parts are known, essentially all occurring as cell specific isoforms. Random assortment of these machine parts or protein isoforms could generate an astronomical number of "muscle machines" and an equally enormous number of muscle fiber types. The question is, why aren't such large numbers ever seen?To attack this problem, the reductionist approach is complemented with an integrationist/adaptational one. Evidence is presented that the more highly specialized the muscle type, the further one moves from the above extreme; in the most highly specialized muscles, typically only one fiber type is found. It is argued that instead of random assortment of isoforms or machine parts, only specific and often unique combinations can work in appropriate fashion. A few established examples of this fundamental principle are reviewed, but emphasis is placed on the fact that we know dreadfully little about why this is so and what kinds of further studies are needed. The issue of why the very large numbers of fiber types theoretically possible are never even approximately realized has never before been addressed. Indeed, it is rarely recognized. Muscles as Molecular and Metabolic Machines is the first work of its kind on the subject.

"Muscles as Molecular and Metabolic Machines is a marvelous reference for the clinician with an inquiring mind who enjoys searching the frontiers of knowledge in the biomolecular and metabolic pathways in muscle...The writing is clearly superior scholarship and reflects the author's more than 30 years of biomolecular research on metabolic pathways of the marvelous machine called muscle." Arthur J. Nelson, JOSPT, 23(5), May 1996