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Exercise Endocrinology, a review

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Book review

Exercise Endocrinology
Katarina T. Borer, Human Kinetics, Champaign, IL 2003, USA

This book describes how hormones and messengers of the autonomic nervous system affect human biology before, during, and after exercise. After general chapters on hormones and neurotransmitters, the focus is on the involvement in specific functions that affect exercise including the regulation of body temperature, fluid balance, and fuel supply. Additionally, there is a focus on interactions of exercise with biological rhythms and reproduction. The value of the book is its consistency thanks to the one-author instead of the multiauthor approach. Combined with the broad area covered, it automatically implicates a limitation with respect to critical evaluation of the significance of the various citations. The book requires basic knowledge of physiology and exercise at the life science bachelor level. It can be highly recommended for master students in movement sciences and others as an introduction to the endocrinology of exercise. It is more of a textbook with a review of the literature than an introduction to research where the author dares to hint at critical issues.

The titles of chapters like 'Regulation of body fluids during exercise,' 'Hormonal regulation of fuel use in exercise,' and 'Endocrinology of biological rhythms and exercise' suggest a problem-oriented approach as we nowadays see a lot in the university teaching system. However, the content of the chapters is structured in the more traditional way, trying to give a complete coverage of aspects involved. The pay off, of course, is inevitably simplification of explanations. I cannot resist mentioning a few on exercise and the nutrient partitioning between structure and storage. The food quotient (FQ) is not the ratio of oxidative carbon dioxide produced and oxygen consumed when a representative sample of diet is combusted in a bomb calorimeter (p. 145) but in the body, where part of the food energy is not converted to metabolizable energy but lost in feces and urine. On the same page, it is stated that exercise- and training-induced increases in metabolic rate usually, but not always, counteract fasting-induced suppression of metabolism. This was and still is a hot topic in obesity research. In a meta-analysis on the effect of exercise, with or without dieting, on the body composition, there was only a marginal difference between the two treatments [Garrow and Summerbell. Eur J Clin Nutr (1995) 49, 1–10]. Aerobic exercise causes a modest loss of weight without dieting as correctly concluded on page 143. Exercise provides some conservation of lean body mass by dieting, probably by maintaining glycogen and water, i.e., not an increased fat loss by an increased metabolic rate as expected. Also, the statements that obese individuals are hypoactive and underweight individuals behave hyperactive (p. 143) are too simple. Obese individuals often have an increased activity-induced energy expenditure. However, even when they spent similar amounts of energy in physical activity, they can do less than normal-weight individuals because of the increased energy cost of moving a larger body mass [Ekelund et al. Am J Clin Nutr (2002) 76, 935–941]. Also, in human subjects in daily life, undereating is associated with a reduced and not an increased physical activity, possibly through a declined physical capacity [Bouten et al. Med Sci Sports Exerc (1996) 28, 967–973].

The application of endocrinology in exercise necessarily limits the readership. Indeed, most examples are taken from the literature on exercise and more specifically on endurance exercise. One wonders why, as phenomena included like hypertension, metabolic syndrome, energy balance, and obesity are linked to our current sedentary society but not necessarily solved with high intensity or endurance exercise. A change from a sedentary to a more physically active lifestyle could already have pronounced effects through mechanisms as illustrated. In some chapters, habitual physical activity is mentioned instead of sustained high intensity exercise levels, but according to the index, it is only mentioned three times where exercise is used throughout all chapters.

All nine chapters have a short and clear introduction on the area covered and the link with other chapters in the book. Each chapter has a substructure with separate headings as explained as well. Thanks to the consistency with one author, there is one list with nearly 3000 references! What I was missing is a summary at the end of each chapter. There was only one at the end of chapter two on the role of the autonomic nervous system in exercise. Fortunately, the index facilitates access to the broad spectrum of subjects treated under the simple title 'exercise endocrinology.' Overall, I would recommend the book, as mentioned above, for master students in movement sciences and others as an introduction to endocrinology of exercise.

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