

How fat works

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Book Review

How fat works, by Philip A. Wood, presents a biochemist and molecular geneticist's viewpoint on how dietary fats are normally metabolized and stored in the body and how derangements in these processes can lead to obesity and the metabolic syndrome. This book covers an extraordinary range of topics, from the molecular and biochemical details of cellular cholesterol homeostasis and fatty acid oxidation to metabolic responses to different dietary regimens, metabolic adaptations to exercise, and diet and drug therapies for hyperlipidemia. Wood also looks at public health aspects of obesity and media coverage of health research. All of the topics discussed are certainly timely, as health professionals, students, and the public are continuously bombarded with half-truths about the causes and consequences of obesity. Wood's explanations of key biochemical processes in fat metabolism and genetic determinants of individual responses to diet and exercise are clearly written and will provide clinicians and students with an appreciation of the key scientific breakthroughs and multilayered regulatory processes involved. The connection between the obesity epidemic and the risk for development of diabetes and cardiovascular disease as well as the concept of genomic medicine are also clearly elaborated. The potential importance of alterations in fatty acid oxidation in the etiology of obesity based on transgenic and knockout mouse models are the subject of the author's own research [...]

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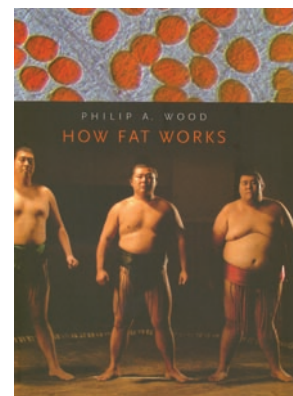


How fat works

Philip A. Wood
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How fat works, by Philip A. Wood, presents a biochemist and molecular geneticist's viewpoint on how dietary fats are normally metabolized and stored in the body and how derangements in these processes can lead to obesity and the metabolic syndrome. This book covers an extraordinary range of topics, from the molecular and biochemical details of cellular cholesterol homeostasis and fatty acid oxidation to metabolic responses to different dietary regimens, metabolic adaptations to exercise, and diet and drug therapies for hyperlipidemia. Wood also looks at public health aspects of obesity and media coverage of health research. All of the topics discussed are certainly timely, as health professionals, students, and the public are continuously bombarded with half-truths about the causes and consequences of obesity.

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The potential importance of alterations in fatty acid oxidation in the etiology of obesity based on transgenic and knockout mouse models are the subject of the author's own research and are described with great clarity. Evidence is accumulating that human obesity is associated with a metabolic inflexibility or inability to increase fat oxidation in response to a shift in dietary intake of fat and that this defect may contribute to the development of obesity and its metabolic complications

(1). Thus, the sections of the book on fat oxidation are quite timely and will be of use to many readers. However, the lengthy discussion of the conversion of excess glucose to fat often goes too far in extrapolating results from mouse models to human biology. Most researchers in the field do not agree that the conversion of excess carbohydrate to fatty acids is a major contributor to the development human obesity.

Wood's approach is ambitious and covers a lot of ground. Although he often stops to repeat his main points, many readers may get lost in the molecular details, rapid switches between topics, and often less-than-clear illustrations.

Some readers may be disappointed, given the title of the book, with the depth of coverage of the subjects of adipose tissue and adipocyte metabolism. For example, the emerging concept of the lipid droplet as a dynamic subcellular organelle that is surrounded by a family of lipid proteins that regulate triglyceride deposition and release (2) is not described. The reader will also not have the opportunity to gain a full appreciation of the elaborate biochemical cascades that modulate adipocyte fat storage and release, nor appreciate fully how adipocyte metabolism is altered in human obesity and may contribute to the development of comorbidities. Although the endocrine functions of fat cells and adipose tissue are mentioned, they are not well described from either the basic scientific or clinical points of view.

This book emphasizes the central concept of energy balance: that energy intake (calories) must balance energy expenditure for body weight to remain stable. Although a careful reading will provide the reader the key point that high- or low-fat diets are equally "fattening" calorie for calorie, there is also quite a bit of somewhat confusing discussion about the effects of high-fat and high-carbo-

hydrate diets on body fat. Although Woods does make clear the essential concept that the short-term weight loss achieved on high-protein, high-fat diets is due to a decrease in total caloric intake, his discussion of the effectiveness of Atkins-style and low-glycemic-index diets is infiltrated with anecdotes and personal opinions, detracting from the overall high quality of this book.

The analysis of the behavioral literature in this book is less comprehensive and academically rigorous than the analyses and descriptions of the metabolic processes. Important concepts for understanding the regulation of energy and fat intake such as dietary variety and energy density are not clearly evaluated. In one section the author seems to suggest that "willpower" can usually overcome metabolic abnormalities that predispose to obesity. The emerging concept (3) that alterations in fuel metabolism and the neuroendocrine regulation of food intake may drive obese individuals to maintain a higher body weight is not clearly described.

In summary, this timely book raises many key issues in the field of obesity and lipid metabolism and will be useful to supplement courses for medical and graduate students. A strength of the book is that it connects the basic biochemistry and molecular biology of lipid metabolism to the clinical situation. Despite some shortcomings, the book will be a good catalyst for generating discussions of the controversial issues in the field. It also provides the reader with an understanding of the breadth of new knowledge that will be necessary in order to attack the obesity epidemic.

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