
BOOK REVIEW

Dietary Fat: The Adorable Culprit

Fat detection: taste, texture, and post ingestive effects (Frontiers in Neuroscience series), by Montmayeur J.-P. and le Coutre J. 2010. Boca Raton, FL: CRC Press. ISBN: 9781420067750 (hardback); US\$149.95; pp 643.

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“Fat detection” is a comprehensive opus devoted to bring together numerous relevant aspects of mammalian fat consumption.

The book contains 22 chapters written by leading experts in their respective fields and is organized in 7 parts. The volume covers elaborate contributions on the importance of dietary fats, the peripheral detection of lipid components, and how fat stimuli are represented in the mammalian brain. Furthermore, the establishment of preferences for fat-rich foods and influences on the control of food intake are discussed. The field trip ends with interesting details about how genetic factors may influence fat preference and metabolism and a series of chapters concerning the development of diseases associated with fat-intake. A particular strength of the book is that the editors, J.-P. Montmayeur and J. le Coutre, managed whenever possible to combine articles focusing on data deriving from animal models with those obtained in human studies. This allows the reader to identify to what extent findings originating from research on model organisms may apply to humans as well.

The first part explains the evolutionary forces that might have created humans exhibiting pronounced craving for fat-rich food sources. The constant search for the most energy dense nutrient, fat, to allow the development of larger and larger brains metabolizing much of the consumed energy obviously came with a trade-off, namely more and more obese people once the hunt for calorie-rich food became restricted to the supermarket around the corner.

For many years the multimodal perception of fat components by olfactory, textural, and postingestive cues was a widely accepted concept established by numerous animal experiments and human psychophysical studies. However, the question if fat actually has a taste on its own was less well studied. This now has changed somewhat as in recent years an ever increasing number of publications point to a gustatory component in the perception of fat contained in the diet. Consequently, the second part of the book is devoted to the discussion of the underlying putative mechanisms for peripheral fat detection. The individual

contributions to this part of the book are just as the entire volume up-to-date and discuss the gustatory mechanisms for fat detection from the perspectives of rodent and human experimental data. Special emphasis is placed on several “hot” candidate receptors for the detection of free (long-chain) fatty acids, which are favored by many researchers as the main constituents for gustatory fat perception. At this point it has to be said that, although clearly the exiting recent discovery of candidate fat taste receptors justifies an in-depth discussion about all the proposed molecules, it becomes somewhat annoying to the reader that this topic is reviewed by multiple authors from a very similar perspective. It would have been really great to read how the various laboratories putting forward candidate receptors relate their proposed candidate(s) to additional putative fat taste receptors.

The question of how fat stimuli are represented centrally is addressed by 2 chapters: one focusing on the processing of orosensory fat detection and one on visual cues provided by images of food items typically associated with high or low fat contents. The transition between the parts on peripheral and central fat recognition is not all that smooth: Although the reader after 5 chapters on the gustatory mechanism of fat detection in rodents and human might be quite convinced that there is something like a taste of fat and that most likely free fatty acids are the main taste stimuli, the very first paragraph on neural representation states “. . . (fat) sensing is not chemospecific, but instead based on texture. This fat sensing is not related to free fatty acids . . .” Without some editorial help highlighting this unresolved issue in fat taste research, the reader might come to the conclusion that working through the previous 110 pages was not really too fruitful.

The need for fat, its detection, and recognition does not automatically mean that we, or laboratory animals, like it and prefer to eat fat-rich diets. The next 2 parts of the book explain, first, that humans and animals show strong preferences for fat-enriched food and second, how appetite regulation is controlled. Fat ingestion seems to cause an effervescent rewarding system associated with a rush in opioid-peptides and endocannabinoids. In combination with

a whole battery of fat-regulated hunger-satiety hormones delaying the onset of satiety, an overconsumption of fat-rich food appears to become almost inescapable.

Detrimental consequences by (over)consumption of dietary fats are to some extent individual, arguing for the presence of genetic predispositions and/or individual lifestyle factors. Two chapters discuss the heritability of fat preferences in humans and laboratory animals on one hand, and, restricted to humans, individual variations including physical activity, ethnic background, age, meal composition, etc. in postprandial lipid metabolism.

Finally, the association between lipids and disease in humans are discussed. Of course, the most obvious diseases associated with fat consumption, obesity and metabolic syndrome, are addressed, however, also links between essential fatty acids and cognitive function are exemplified.

In summary, the book can be recommended to a broader readership because it represents a rich source of information on the many facets interconnecting the various factors influencing fat perception, fat preference, and metabolic

function. However, several unresolved issues in this research field would require a tighter connection between the single chapters to make the book more accessible to readers from outside the field. In the absence of additional information and few cross-references between the individual contributions (one of rather few pleasant exceptions is the excellent article by Ackroff and Sclafani), the reader is left quite alone with issues such as sex differences in rodent fat taste perception (chapter 4 and 5 state “yes,” chapter 6 observed none) or the already mentioned controversial findings concerning peripheral fat detection (texture vs. gustation). A tighter connection between the various chapters would have resulted in fewer redundancies as well.

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