Advances in
Psychosomatic
Medicine
Hunger and Satiety
in Health and Disease
7
Volume Editor:
F. Reichsman (New York, N.Y.)
S.Karger
BaselMUnchenParisLondonNew YorkSydney

Hunger and Satiety in Health and Disease
Advances in
Psychosomatic Medicine
Vol. 7
Founded by:
BERTHOLD STOKVIS ; FELIX DEUTSCH ; ARTHUR JORES

Editors: J. BASTIAANS, Leiden; H. FREYBERGER, Hamburg; L. LEVI, Stockholm;
Z.J.LIPOWSKJ, Hanover, N.H.; J.C.NEMIAH, Boston, Mass.; E.MEYER, Baltimore,
Md.; F. REICHSMAN, Brooklyn, N.Y.; P. SAINSBURY, Chichester; H. WEINER, New
York,N.Y.

s. Karger Basel Mnchen Paris London New York Sydney
Hunger and Satiety
in Health and Disease
Editor: F. REICHSMAN, Brooklyn, N.Y.
With 31 figures and 14 tables

Advances in Psychosomatic Medicine
Vol. 1: Symposium of the Fourth European Conference on Psychosomatic
Research, Hamburg, April 1959.
VIII + 328 p., 35 fig., 1960
Gateways.
IV + 106 p., 1962
Vol. 3: Proceedings of the Vth International Congress of Psychotherapy,
VI + 207 p., 17 fig., 5 tab., 1963
Vol. 4: Training in Psychosomatic Medicine.
X + 221 p., 1 fig., 1964
Contents

Foreword............................................................ XII

A. Regulation of Food Intake

Genetic Aspects of Regulation of Food Intake............... 2
J.L. FULLER, Binghampton, N.A.
Mode of Gene Action ............................................ 4
Selection for Weight Gain....................................... 5
Comparisons of Inbred Lines ...................................... 7
Summary of Selected and Inbred Lines............................ 7
Genetics and Regulation of Food Intake in Man.................. 8
Mutations Producing Obesity ..................................... 9
Characteristics of Fat Mutant Mice.............................. 10
Experimental Studies............................................ 11
Experiment 1: Development of Food and Water Intake in Some Obese Mutant Mice ........................................ 12
Method.............................................................. 12
Results (Body Weight, Food and Water Intake) ................. 12
Results (Activity and Oxygen Consumption) ..................... 15
Discussion ......................................................... 16
Experiment 2: Effect of Palatability Changes on Food Intake of Some Mutant Mice ........................................ 16
Method and Subjects............................................. 16
Results............................................................. 17
Discussion ......................................................... 17
Contents VI

Experiment 3: Deprivation Enhancement of Saccharin Intake ...... 18
Method.............................................................. 19
Results ............................................................ 19
Experiment 4: Water Intake in Mice Fed a Liquid Diet .......... 20
Method.............................................................. 21
E.B. HUNT, jr., University Park, Pa.

I. Introduction .......................................................... 148
II. The Classification and Definition of Obesity .......................... 149
III. Obesity and Diabetes. Some Evolutionary and Ethnic Comparisons ... 153
IV. Physique Obesity and Aging .......................................... 158
V. Obesity, Longevity and Disease ...................................... 160
VI. Familial Obesities .................................................... 161
VII. Urbanization, Ancestry and Careers of Obese Black and White Americans 164
VIII. Summary .......................................................... 167
IX. References .......................................................... 168

Eating Behavior and Obesity in Men and Animals ...................... 173

The Eating Behavior of Obese Humans .................................. 175
Responsiveness to Internal State ....................................... 176
Responsiveness to External Cues ...................................... 179
The Eating Behavior of the Human Newborn ......................... 184
Causal Relationship Between Weight and Eating Behavior .......... 187
References .......................................................... 191

Psychiatric Observations on Obesity

194
I. Introduction .......................................................... 194
II. Evidence for Psychological Factors in Obesity ...................... 195

Contents IX
A. Observations on Families of Obese Children ...................... 195
B. Psychotherapeutic Observations .................................... 196
C. Group Characteristics of the Obese ................................ 197
D. Sociocultural Factors ................................................ 198

III. Psychiatric Classifications of Obesity ............................. 199
A. The Relationship Between Psychopathology and Obesity ........ 199
B. Abnormal Eating Patterns .......................................... 200
C. Age of Onset of Obesity and Body-Image Disturbance .......... 201

IV. Behavioral Disturbances Associated with Obesity ................ 201
A. Disturbance of Feeding Behavior ................................... 201
B. Disturbance of Body-Image ......................................... 204
1. Primary Body-Image Disturbances .................................. 205
2. Body-Image Disturbances Secondary to the Obese State ....... 206

V. Behavioral Alterations During Weight Reduction ................ 206
VI. Summary .......................................................... 210

Acknowledgements ..................................................... 212
References .......................................................... 212

The Treatment of Obesity ............................................. 217

Introduction ......................................................... 217
Pharmacologic Treatment ........................................... 218
Studies on Amphetamines ......................................... 218
Chorionic Gonadotropin ........................................... 219
Diguanides ............................................................. 220
Thyroid Analogues .................................................. 220
Physical Activity ..................................................... 221
Psychosocial Treatment ............................................. 222
In-Patient-Treatment .............................................. 222
Group Treatment .................................................... 222
Behavior Modification ............................................ 223
Behavior Modification in Groups ............................... 223
Patient Self-Help Groups ......................................... 224
Discussion ........................................................... 225
Summary ............................................................. 226
References .......................................................... 227
Discussion ........................................................... 229

I. HIRSCH, New York, N.Y.
1. The Relative Stability of Body Weight .......................... 229
2. Morphologic and Metabolic Changes in Adipose Tissue ........ 230
3. Both Human and Animal Obesity May Have a Variety of Etiologies ... 230

Contents X
40 Modes of Eating Behavior ........................................ 231
A Model for Feeding Behavior and Obesity ........................ 232
Use of the Model .................................................... 235
Further Considerations ............................................. 240
References ............................................................. 242

II. Anorexia
Experimental Observations on Anorexia .......................... 243
BoK. ANAND, New Delhi
Anorexia Nervosa-Historical ....................................... 243
Nervous Regulation of Feeding .................................... 244
Anatomical Substrates of Satiety and Anorexia ................. 245
Local Chemical Mechanisms Related to the Production of Anorexia .... 246
Relation of Fats and Proteins to Feeding .......................... 248
In the past few decades a prodigious amount of research has been carried out in animals and man in the area to which this volume of the Advances in Psychosomatic Medicine is devoted: Hunger and Satiety in Health and Disease. This work has been done in many countries on all continents, in many excellent laboratories and by many gifted and outstanding investigators with a wide variety of orientations. These endeavours have led to an accumulation of much new knowledge and, at times, to important and brilliant discoveries.

We designed the present volume to give the reader an overview of the considerable progress which has been made in the field. By their selection of contributors from the fields of genetics, neuro- and general physiology, epidemiology, clinical medicine, social-psychology and psychiatry, the Editors have attempted to give a balanced picture of the many complex problems discussed in the three main sections of the volume. While we assembled a roster of distinguished authors and discussants from many different disciplines, we are aware that they could not cover, in the available space, as much of the accumulated data as they would have liked to. At the same time, the authors and discussants have not failed to point to the
large gaps which continue to exist in our knowledge of the regulation of food intake, of obesity and of anorexia.

The Editors want to express their appreciation to all the authors and discussants for their contributions. We are particularly grateful to Dr. JULES HIRSCH for his many, very helpful suggestions and advice.

FRANZ REICHSMAN, M.D.
Coordinating Editor