

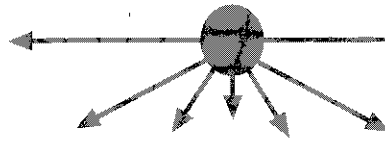
Encyclopedia of
ENDOCRINE

DISEASES

Editor-In-Chief
Luciano Martini

Volume I
A – D

Contents of Volume I



Contents of Volumes 1–4	ix	Adrenal Cortex, Anatomy	50
Contents by Subject Area	xvii	Ilias Vrezas, Holger S. Willenberg, and Stefan R. Bornstein	
Foreword	xxix	Adrenal Cortex, Development	53
Preface	xxxix	Michel Grino	
Guide to the Encyclopedia	xxxiii	Adrenal Cortex Development, Regulation of	61
		Michel Grino	
	A	Adrenal Cortex, Physiology	68
		Christian A. Koch	
		Adrenal Insufficiency	75
		Evangelia Charmandari and George P. Chrousos	
ABCA1 Defects	1	Adrenal Suppression	81
Gerd Schmitz and Wolfgang Drobnik		Maria Alexandra Magiakou and George P. Chrousos	
Abetalipoproteinemia	6	Adrenal Tumors, Molecular Pathogenesis	90
John R. Wetterau and Richard E. Gregg		Christian A. Koch and George P. Chrousos	
Acetylation	9	Adrenarche, Premature	99
Paolo Portaleone		Catherine Dacou-Voutetakis, Sarantis Livadas, Antony Voutetakis, and Maria Dracopoulou	
Acromegaly, Clinical Features of	13	Adrenergic Mechanisms	106
Ariel L. Barkan		José Marino-Neto, Marcelo Sabi, and Marta Aparecida Paschoalini	
Acromegaly, Diagnosis of	18	Adrenergic Receptors	112
Klaus von Werder		Linda F. Hayward, Patrick J. Mueller, and Eileen M. Hasser	
Acromegaly, Therapy for	21	Aging and Longevity of Human Populations	116
Anat Ben-Shlomo and Shlomo Melmed		Kenneth G. Manton	
ACTH (Adrenocorticotrophic Hormone)	25	Aging and the Male Reproductive System	122
George Mastorakos and Evangelia Zapanti		David A. Gruenewald	
ACTH, α-MSH, and POMC, Evolution of	30	Aging, Animal Models for	126
Robert M. Dores and Phillip B. Danielson		George A. Kuchel, Qing Zhu, Blanka Rogina, and Stephen H. Clark	
Adenylyl Cyclase	35	Aging, Immunology and	131
Ferenc A. Antoni		Victor Appay	
Adipocytokines	41		
Tohru Funahashi, Ichiro Shimomura, and Yuji Matsuzawa			
Adrenal Androgens	45		
Lucia Ghizzoni and Alessandra Vottero			

Aging: Muscle	135	Antidiuretic Agents	249
Blake B. Rasmussen and Elena Volpi		P. A. van Zwieten	
Agonadism, Male and Female	139	Anti-Müllerian Hormone	255
Marco A. Rivarola and Alicia Belgorosky		Nathalie Josso and Nathalie di Clemente	
Albright's Fibrous Dysplasia	147	Antithyroid Drugs	261
Shaifali Kaushik, Michael Montileone, and Atmaram Yarlagadda		Anthony D. Toft	
Aldosterone in Congestive Heart Failure	151	Asherman's Syndrome	265
Karl T. Weber, Yao Sun, Ivan C. Gerling, and Robert A. Ahokas		Theodore A. Baramki and Carolyn J. Alexander	
Aldosterone Receptors	158	Assisted Reproductive Technology (ART)	269
Marc Lombès and Maria-Christina Zennaro		Shahar Kol	
Alkaline Phosphatase	164	Atherogenesis	278
David Goltzman and Dengshun Miao		Lina Badimon and Vicenta Llorente-Cortés	
Alternative Promoters	170	Atherosclerosis	288
Erik Jansen, Torik A. Y. Ayoubi, Wim J. M. Van de Ven, and John W. M. Creemers		Jesus A. Araujo and Aldons J. Lusis	
Alternative Splicing	173	Atrial Natriuretic Factor and Family of Natriuretic Peptides	295
Scott A. Akker, Bernard C. E. Khoo, and Shern L. Chew		Kenneth K.-Y. Ma and Adolfo J. de Bold	
Alzheimer's Disease and Hormones	181	Autoimmune Polyglandular Syndrome	301
Sigbritt Rasmuson and Tommy Olsson		Andrew Muir	
Amidation	188	Autonomic Nervous System, Aging and	312
Joseph Bell, Betty A. Eipper, and Richard E. Mains		K. E. Hall and John W. Wiley	
Amiodarone and Thyroid	192	Auxology, Childhood	316
Wilmar M. Wiersinga		M. A. Preece	
Anderson's Disease (Chylomicron Retention Disease)	197		
Nathalie Berriot-Varoqueaux, Marie-Elisabeth Samson-Bouma, and Lawrence P. Aggerbeck			
Androgen Biosynthesis and Gene Defects	201	Bardet-Biedl Syndrome	323
Mark R. Vanderwel and Richard J. Auchus		Philip L. Beales	
Androgen Biosynthesis Inhibitors and Androgen Receptor Antagonists	210	Baroreceptor Responses	327
Stephen E. Borst, David T. Lowenthal, and George Zavros		Edward M. Stricker and Alan F. Sved	
Androgen Insensitivity Syndrome	214	Bartter's Syndrome	331
Yuan-Shan Zhu and Julianne Imperato-McGinley		I. Lenga and K. S. Kamei	
Androgens, Gender and Brain Differentiation	221	Beckwith-Wiedemann Syndrome (BWS)	336
Julianne Imperato-McGinley and Yuan-Shan Zhu		Juan F. Sotos and Jesús Argente	
Angiogenesis	227	Benign Prostatic Hyperplasia (BPH)	341
Andreas Bikfalvi		Jaspreet S. Sandhu and Alexis E. Te	
Angiotensin, Evolution of	234	Biological Rhythms	345
Werner Kloas		Gregory E. Demas and Lance J. Kriegsfeld	
Anorexia Nervosa	237	Bisphosphonates	352
Jesús Argente and María Teresa Muñoz		H. Fleisch	
		Body Composition During Growth	362
		Kenneth J. Ellis	

Body Proportions	369	Cardiovascular Disease: Impact of Sex Steroid Replacement	468
William J. M. Gerver		Jeffrey L. Anderson	
Body Weight, Body Composition, and Aging	373	Cardiovascular Disease in Diabetes	476
Lyndon J. O. Joseph and Alice S. Ryan		Helaine E. Resnick and Barbara V. Howard	
Bone Mass Measurement	378	Catecholamines	480
Paul D. Miller		Brian B. Hoffman	
Bone Remodeling, Dynamics of	386	CCK (Cholecystokinin)	485
Susan M. Ott		Rodger A. Liddle	
Bone Structure	392	Chemokines	490
Paul R. Odgren, Alison Gartland, April Mason-Savas, and Sandy C. Marks, Jr. [†]		Naofumi Mukaida	
Bone Turnover Markers	401	Childhood Cancer, Endocrine Effects of	495
Patrick Garnero and Pierre D. Delmas		Bernadette M. D. Brennan and Steve M. Shalet	
Brain, Effects of Steroid Hormones	414	Chondrodysplasias	502
Russell D. Romeo and Bruce S. McEwen		Nancy B. Schwartz and Miriam Domowicz	
Breast Disease: Impact of Sex Steroid Replacement	419	Chronic Fatigue Syndrome and Fibromyalgia	510
Michael E. Carney		D. J. Torpy	
		Circadian Rhythms: Hormonal Facets	514
		Johannes D. Veldhuis, Ali Iranmanesh, Steven Pincus, and Daniel Keenan	
	C	Collagen Metabolism	520
		Jason P. Mansell and Allen J. Bailey	
Calcitonin Gene-Related Peptide (CGRP)	425	Collagen Metabolism Disorders	530
María J. Moreno, Danica B. Stanimirovic, and Edith Hamel		Jason P. Mansell and Allen J. Bailey	
Calcitonin, Overview	436	Congenital Adrenal Hyperplasia, Prenatal Diagnosis and Therapy	538
Sunil J. Wimalawansa		Maguelone G. Forest	
Caloric Restriction, Aging and Oxidative Stress	444	Congenital Adrenal Hypoplasia Syndromes	548
Holly Van Remmen and Arlan Richardson		Constantine Tsigos	
Captopril	447	Congenital Lipoid Adrenal Hyperplasia	552
Florentin Tache, Alexandru Farca, Andrei Medvedovici, and Victor David		Delphine Mallet and Yves Morel	
Carbenoxolone	451	Conn's Syndrome	559
Decio Armanini and Cristina Fiore		Franco Mantero and Oliver Bedendo	
Carbohydrate Metabolism and Hormone–Fuel Interrelationships	455	Conn's Syndrome, Diagnosis of	561
Keith Tornheim		Franco Mantero and Oliver Bedendo	
Carbohydrate Metabolism: Diabetes Mellitus, Genomic Aberrations	463	Constitutional Delay of Growth and Puberty (CDGP)	563
Mona M. Sabra and Alan R. Shuldiner		Joost Rotteveel and Henriette A. Delemarre-Van de Waal	
		Contraception, Male	570
		C. Hay and F. C. W. Wu	
		Corticotropin-Releasing Hormone (CRH) and Inflammation	575
		George Mastorakos and Ioannis Ilias	

[†]Deceased.

Corticotropin-Releasing Hormone, Family of	580	Delayed Puberty, Male	635
Robert J. Denver		Alan D. Rogol	
Corticotropin-Releasing Hormone, Placenta	584	Depression, Thyroid Function and	639
Katia P. Karalis and Joseph A. Majzoub		Luis R. Arce and Ivor M. D. Jackson	
Craniopharyngiomas	587	DHEA and the Elderly	647
David Anthony Price		Keizo Ohnaka and Ryoichi Takayanagi	
Cytokine Actions, Cellular Mechanism of	590	Diabetes Insipidus, Nephrogenic	651
Michael David		Torsten Schöneberg	
Cytokine Receptors	595	Diabetes Insipidus, Neurogenic	655
Diana Boraschi, Giovanna Mantovani, Aldo Tagliabue, and Alberto Mantovani		James A. Holt and Gary L. Robertson	
Cytokines, Constitutive Secretion	601	Diabetes Mellitus, Diagnosis and Treatment in the Elderly	661
Nobuyuki Tanaka and Kazuo Sugamura		Odilia I. Bermudez	
Cytokines, Evolutionary Aspects and Functions	604	Diabetes, Type I	666
Gregory Beck and Anton Dormer		Jennifer Miller, William E. Winter, and Desmond A. Schatz	
Cytokines, Extracellular Transport and Processing	609	Diabetes, Type 2	671
Shoichiro Miyatake, Yumiko Kamogawa, and Ken-ichi Arai		Fernando Ovalle and W. Timothy Garvey	
	D	Diabetic Nerve Disease, Neuropathy	677
		Kelli A. Sullivan and Eva L. Feldman	
Delayed Puberty and Hypogonadism, Female	615	Drug Effects and Thyroid Function	680
Leo Dunkel		Jim R. Stockigt	
Delayed Puberty and Hypogonadism, Male	622	Dysbetalipoproteinemia and Type III Hyperlipidemia	687
Dennis M. Styne		William R. Hazzard	

Y

Gastrinomas	101	GIP (Gastric Inhibitory Polypeptide)	202
Robert T. Jensen		Raymond A. Pederson and Christopher H. S. McIntosh	
Gastrin-Releasing Peptide	107	GI Tract, General Anatomy (Cells)	208
Thomas J. McDonald		Frank Sundler	
Gastrointestinal Neuroendocrine Tumor Syndromes (GI NETS)	111	GI Tract, General Pathology of Endocrine Growths	216
Robert T. Jensen		Guido Rindi and Enrico Solcia	
Gender Assignment and Psychosocial Management	125	Glucagon and Glucagon-like Peptides	220
Heino F. L. Meyer-Bahlburg		Daniel M. Kemp and Joel F. Habener	
Genes and Gene Defects Affecting Gonadal Development and Sex Determination	135	Glucagon-like Peptide 2 (GLP-2)	225
Robert S. Viger and David W. Silversides		Julie Lovshin and Daniel J. Drucker	
Genetic Testing for Pituitary Disease	141	Glucocorticoid Receptor	229
Ian Marshall and Michael P. Wajnarajch		Evangelia Charmandari, Tomoshige Kino, and George P. Chrousos	
Germ Cell Differentiation Signaling Events, Male	146	Glucocorticoid Resistance Syndromes and States	235
Giovanna Berruti		A. Vottero and G. P. Chrousos	
Ghrelin	150	Glucocorticoids and Immunity	242
Matthias H. Tschöp, Sabrina Diano, and Tamas L. Horvath		Denis Franchimont	
GI-CGRP (Calcitonin Gene-Related Peptide)	157	Glucocorticoids in Aging: Relevance to Cognition	248
Peter Holzer		Nilay V. Patel	
Gigantism: Excess of Growth Hormone	162	Glucocorticoids, Overview	253
M. J. E. Walenkamp and J. M. Wit		Evangelia Charmandari and George P. Chrousos	
GI Hormone Development (Families and Phylogeny)	168	Glucose, Impaired Tolerance	260
Anders H. Johnsen		Thomas A. Buchanan	
GI Hormones and Endocrine Pancreas: Expressional Regulation	173	Glucose Physiology, Normal	263
Lars-Inge Larsson		Hans J. Woerle and John E. Gerich	
GI Hormones and Endocrine Pancreas: Growth	177	Glucose Toxicity	271
Jean Morisset, Jean Lainé, and Sophie Julien		Donald A. McClain	
GI Hormones as Growth Factors	183	Glycation- and/or Polyol Pathway-Inducing Complications	275
Robin P. Boushey and Daniel J. Drucker		Paul J. Thornalley	
GI Hormones in Cancer	189	Glycoproteins	279
Andrew D. Gilliam and Susan A. Watson		Akira Kobata	
GI Hormones Outside the Gut: Central and Peripheral Nervous Systems	194	Goitrogens, Environmental	286
Graham J. Dockray		Eduardo Gaitan	
GI Hormones Outside the Gut: Other Tissues	199	Gonadotropin-Induced Ovulation	295
Lars-Inge Larsson		Seth G. Derman	
		Gonadotropin-Releasing Hormone (GnRH) Actions	299
		John E. Pawlowski and Margaret E. Wierman	

Gonadotropin-Releasing Hormone Deficiency, Congenital Isolated	302	Growth, Normal Patterns and Constitutional Delay	409
Lawrence C. Layman		Raymond L. Hintz	
Gonadotropin-Releasing Hormone, Family of	306	Guanylyl Cyclase Receptors	415
Stacia A. Sower, Nathaniel V. Nucci, and Matthew R. Silver		Naohisa Tamura and David L. Garbers	
Gonadotropin-Releasing Hormone Receptor Gene, Mutation of	317	Gynecomastia	422
Alfredo Ulloa-Aguirre, Guadalupe Maya-Núñez, Daniela Söderlund, and P. Michael Conn		Glenn D. Braunstein	
Gonadotropins and Testicular Function in Aging	322		
Christina Wang			
Gonadotropin-Secreting Tumors	326		
Albert Beckers, Antonio Ciccarelli, Hernan Valdes-Socin, Daniela Betea, Adrian Daly, Patrick Petrossians, and Achille Stevenaert			
G Protein-Coupled Receptors	331		
Diane Gesty-Palmer and Louis M. Luttrell			
G Proteins and Effectors	344		
Masaru Ishii and Yoshihisa Kurachi			
Graves' Dermopathy	349		
Mark F. Prummel			
Graves' Disease	351		
Mark F. Prummel			
Graves' Disease, Hyperthyroidism in	354		
Mark F. Prummel			
Graves' Ophthalmopathy	357		
Mark F. Prummel			
Growth and Chronic Disease	364		
D. Simon and P. Czernichow			
Growth and Glucocorticoids	371		
Leena Patel and Peter E. Clayton			
Growth Factor Receptors	378		
Rajini Parakati and Joseph X. DiMario			
Growth Hormone (GH)	383		
Gerhard Baumann			
Growth Hormone-Binding Proteins	390		
Adrian C. Herington			
Growth Hormone Deficiency, Genetic	396		
John Atlas Phillips III and David T. Karzon			
Growth Hormone Insensitivity	404		
Martin O. Savage, Joanne C. Blair, Michael B. Ranke, and Cecilia Camacho-Hübner			
		H	
			
		Hamartoma, Pituitary	427
		Mohamad Maghnie, Stefano Ghirardello, and Giulia Meloni	
		Hashimoto's Disease	434
		Wilmar M. Wiersinga	
		Hepatocyte Growth Factor	436
		Kunio Matsumoto and Toshikazu Nakamura	
		Hormone Replacement Therapy, Male	443
		Chee Yeung Chan and Julianne Imperato-McGinley	
		Hormone Replacement, Transdermal	450
		Brenda S. Houmard and Valerie L. Baker	
		Hot Flash: Impact of Sex Steroid Replacement	453
		Ronit Haimov-Kochman and Drorith Hochner-Celnikier	
		Hunger and Satiation	459
		Nori Geary	
		11β-Hydroxylase Deficiency	469
		David Gillis and Ariel Rosler	
		21-Hydroxylase Deficiency, Classical	476
		Shankar Kanumakala and Garry L. Warne	
		21-Hydroxylase Deficiency, Genetics of	485
		Perrin C. White	
		17α-Hydroxylase/17,20-Lyase Deficiency	491
		Richard J. Auchus and Walter L. Miller	
		3β-Hydroxysteroid Dehydrogenase Deficiency	498
		Kenji Fujieda, Jun Nakae, and Tokuo Mukai	
		Hyperandrogenism, Functional	504
		Eliahu Levitas, Aviva Levitas, and Arie Koifman	
		Hyperandrogenism, Gestational	508
		Howard D. McClamrock	

Hyperandrogenism, Hyperinsulinemic Eytan R. Barnea	514	Hypocalcemia, Therapy Nasser E. Mikhail	630
Hypercalcemia and Hypercalcemia Treatment Barbara K. Kinder	517	Hypoglycemia Darleen A. Sandoval and Stephen N. Davis	636
Hypercalciuria Ita Pfeferman Heilberg	530	Hypoglycemic State, Non-Diabetic Pierre J. Lefebvre and André J. Scheen	641
Hypercholesterolemias, Familial Defective ApoB (FDB) and LDL Receptor Defects Jan Borén and Olov Wiklund	537	Hypoparathyroidism Maurizio Gasperi, Filomena Cetani, and Claudio Marcocci	645
Hypercortisolism and Cushing's Syndrome Alejandro Ayala and George P. Chrousos	540	Hypopituitarism K. J. Bradley and J. A. H. Wass	652
Hypergonadotropic Hypogonadism Vivian Sobel and Julianne Imperato-McGinley	549	Hypopituitarism, Hormonal Therapy for F. M. Swords, W. M. Drake, P. V. Carroll, and J. P. Monson	662
Hyperosmolar Nonketotic Hyperglycemia Andrew J. Krentz	555	Hyporeninemic Hypoaldosteronism Haruhiko Hatakeyama and Takuo Watanabe	672
Hyperparathyroidism, Primary Elizabeth A. Streeten and Michael A. Levine	558	Hypothalamic Anovulation, Functional Boaz Weisz and Ariel Hourvitz	675
Hyperphosphatemia Richard M. Edwards	567	Hypothalamic Disease Sylvia L. Asa	678
Hyperreninemia Pierre-François Plouin, Laurence Amar, Sylvie Le Coz, and Antoine Chedid	572	Hypothalamic Hypogonadism Antonio Liuzzi	688
Hypertension, Overview Morton P. Printz and Rebecca L. Jaworski	577	Hypothalamic Hypothyroidism Luca Persani	693
Hypertension and Diabetes Meryem Tuncel and Norman M. Kaplan	589	Hypothalamic–Pituitary Unit Adriano B. Tavares and Eli Y. Adashi	697
Hypertension, Endocrine Angelo M. Capricchione, Nathaniel Winer, and James R. Sowers	592	Hypothalamic Regulation of Appetite and Obesity Satya P. Kalra and Pushpa S. Kalra	699
Hypertension, Neurogenic Markus P. Schlaich and Murray D. Esler	603	Hypothalamus, Anatomy of Béla Halász	707
Hypertension, Renin and Elena Kaschina, U. Muscha Steckelings, and Thomas Unger	609	Hypothalamus–Pituitary–Thyroid Axis Eric Fliers	716
Hyperthyroidism, Childhood and Adolescence Scott A. Rivkees	615	Hypothyroidism, Causes of Wilmar M. Wiersinga	719
Hyperthyroidism, Subclinical Bernadette Biondi, Emiliano A. Palmieri, Gaetano Lombardi, and Serafino Fazio	621	Hypothyroidism, Congenital Annette Grüters	722
Hypertriglyceridemia Khalid Z. Al-Shali and Robert A. Hegele	624	Hypothyroidism, Congenital, Long-Term Follow-Up Jean-Michel Dubuis and Guy Van Vliet	728
		Hypothyroidism, Congenital, Screening Programs J. E. Toublanc and P. Boileau	731

Hypothyroidism, Diagnosis of 734

Wilmar M. Wiersinga

Hypothyroidism, Subclinical 737Christian Meier, Beat Müller, and
Jean-Jacques Staub**Hypothyroidism, Systemic Manifestations of 742**

Massimo Tonacchera and Luca Chiovato

Hypothyroidism, Treatment of 750

Anthony D. Toft

Immune System, Hormonal Effects on 755

Maurizio Cutolo

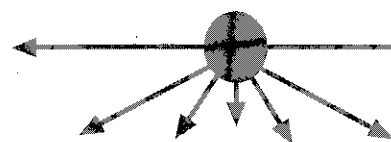
Implantation 761

Lechoslaw T. Putowski

Impotence and Aging 764

John E. Morley

Contents of Volume 3



Contents of Volumes 1-4	ix	Interferon- τ	50
Contents by Subject Area	xvii	R. Michael Roberts	
Foreword	xxix	Interferons	53
Preface	xxx	Nachum Dafny, Pamela B. Yang, and Staley A. Brod	
Guide to the Encyclopedia	xxxiii	Interleukin-2	60
		Hironobu Asab	
	I	Interleukin-6	64
		Takuya Ohtani and Toshio Hirano	
		Intrauterine Growth Retardation	71
		Juliane Léger and Claire Lévy-Marchal	
		In Vitro Fertilization (IVF)	77
		David H. Barad	
		Iodine	82
		Alvin Taurog	
		Iodine Deficiency	89
		John T. Dunn	
		Iodine, Radioactive	100
		Amit Allahabadia and Jayne A. Franklyn	
		Ion Channels	103
		Keiji Imoto	
		Irradiation, Thyroid and	108
		Furio Pacini	
			J
		Janus Kinases and Cytokine Receptors	115
		Mehul Shah and Pravin B. Sehgal	
Incidentaloma, Adrenal	I		
Martin Reincke			
Infertility, Overview	6		
G. David Adamson and Valerie L. Baker			
Insulin Action, Post-Receptor Mechanisms	14		
Shuichi Okada, Sean Crosson, Masatomo Mori, Alan R. Saltiel, and Jeffrey E. Pessin			
Insulin and Insulin-like Growth Factors, Evolution of	23		
Manfred Reinecke			
Insulin-like Growth Factors	32		
Derek Le Roith and Martin L. Adamo			
Insulin-Resistant States, Role of Free Fatty Acids (FFA)	36		
Guenther Boden			
Insulin Secretion, Functional and Biochemical Aspects	40		
Willy J. Malaisse			
Insulin Secretion, Physiology	45		
Eli Ipp			

K		M	
			
Kallmann's Syndrome and Idiopathic Hypogonadotropic Hypogonadism	119	Magnesium Disorders	207
Michael Zitzmann and Eberhard Nieschlag		Chester H. Fox, Delano Ramsoomair, Cathleen Carter, and Rbrian M. Touyz	
Ketone Bodies	125	McCune–Albright Syndrome	212
Oliver E. Owen and Richard W. Hanson		Erica A. Eugster and Ora H. Pescovitz	
Kidney Disease in Diabetes	137	Medullary Thyroid Carcinoma	218
Christine K. Abrass		Cornelis J. M. Lips, Jo W. M. Höppener, and Rob B. van der Luijt	
Kidney Stones	140	Melatonin	228
A. Ross Morton and Eduard A. Iliescu		Josephine Arendt	
Kininases	146	Menstrual Cycle: An Integrative View	238
Randal A. Skidgel, Ervin G. Erdös, and Peter A. Deddish		Lee Caperton and Robert Brzyski	
Klinefelter's Syndrome	154	Mineralocorticoids and Mineralocorticoid Excess Syndromes	242
François Pralong		John M. C. Connell and Marie Freel	
L		Mitogen-Activated Protein (MAP) Kinases and Receptors	252
		Paul Shapiro, Hyukjin Cha, Surabhi Dangi, and Chad Hancock	
Lactic Acidosis	157	Mixed Lipemias	258
Andrew J. Krentz		Jan W. A. Smit and Louis M. Havekes	
Langerhans Cell Disease	159	Motilin	263
Polyzois Makras, Gregory Kaltsas, and Ashley B. Grossman		Pierre Poitras	
Leptin	164	Müllerian Inhibiting Substance: New Insights	268
Robert V. Considine		Christopher Peter Houk and Patricia K. Donahoe	
LH (Luteinizing Hormone)	171	Multiple Autoimmune Endocrinopathy	271
Gary R. Marshall		Joseph Jay Schwartz, Terry F. Davies, and Mona Shimshi	
Lipid Disorders in the Elderly	178	Multiple Endocrine Neoplasia (MEN) Type 2	278
Wilbert S. Aronow		Christian A. Koch	
Lipid Second Messengers and Receptors	182	Myxedema Coma	283
Dayanand D. Deo, Nicolas G. Bazan, and Jay D. Hunt		Nikolaos Stathatos and Leonard Wartofsky	
Lipoprotein(a)	188	N	
Florian Kronenberg and Gerd Utermann			
Lithium	197	Natriuretic Peptides	287
John H. Lazarus		Johji Kato and Tanenao Eto	
Low HDL/High HDL Syndromes	199	Natriuretic Peptide System, Evolution of	291
Ken-ichi Hirano, Shizuya Yamashita, Naohiko Sakai, and Yuji Matsuzawa		Yoshio Takei	

Natural and Synthetic Growth Hormone**Secretagogues 295**

Romano Deghenghi, Ezio Ghigo, and
Fabio Broglio

Neuroendocrine System and Aging 300

William E. Sonntag

Neurofibromatosis 307

Marjon H. Cnossen and
Sabine M. P. F. de Muinck Keizer-Schrama

Neurohypophysial Hormone Regulatory Systems 314

Roger Acher

Neurokinins 330

J. Michael Conlon

Neurological Disease and Diabetes, Autonomic 334

Aaron I. Vinik and Tomris Erbas

Neuropeptide Y 340

Martin C. Michel

Neuropeptide Y, Evolution of 343

Dan Larhammar

Neurotensin 346

Arthur Shulkes

Neurotransmitters, Overview 350

Floyd E. Bloom

Newborn Ambiguous Genitalia Management 357

Charles Sultan, Claire Jeandel, René
Benoit Galifer, Jean-Charles Picaud, and
Serge Lumbroso

Nontoxic Goiter 367

A. R. M. M. Hermus and D. A. K. C. Huysmans

Noonan Syndrome 371

Jacqueline A. Noonan

Norepinephrine Receptors 375

Paul A. Insel and Ross D. Feldman

Norepinephrine Transporter 382

Simi Vincent

Normetanephrine and Metanephrine 387

Jacques W. M. Lenders and Graeme Eisenhofer

Nuclear Factor- κ B and Glucocorticoid Receptors 391

Türk Rhen and John A. Cidlowski

Obesity and Diabetes, Regulation of Food Intake 399

Stephen C. Woods and Randy J. Seeley

Obesity, Childhood and Adolescence 403

Wieland Kiess, Susann Blüher, Thomas Kapellen, and
Antje Böttner

Obesity Regulation 408

Burkhard Göke and Rüdiger Göke

Obesity, Treatment of 414

George A. Bray

Opioid/Orphanin Gene Family, Evolution of 419

Phillip B. Danielson and Robert M. Dores

Osteoporosis, Overview 425

Michael Kleerekoper and Fadi Al-Khayer

Osteoporosis in Older Men 432

Michele Iannuzzi Sucich and Anne M. Kenny

Osteoporosis in Older Women 436

Karen M. Prestwood and Gustavo Duque

Osteoporosis in Reproductive Age Women: Impact of Sex Steroid Replacement 441

Kimberly Elford and Paul Claman

Ouabain 447

Paolo Manunta, Mara Ferrandi, and Giuseppe Bianchi

Outflow Tract Obstruction, Congenital 451

Kenneth H. H. Wong

Ovarian Androgen-Producing Tumors 454

Michael DiMattina

Ovarian Failure Treatment Strategies: Egg Donation 457

Esther Eisenberg

Ovarian-Follicular Apparatus 461

Alan S. Penzias

Ovarian Hyperstimulation Syndrome 463

Seth L. Feigenbaum

Ovarian Stimulation: Clomiphene Citrate 467

Joseph G. Gianfortoni

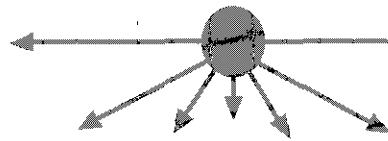
Oxidative Stress and Aging 470

Arthur K. Balin and R. G. Allen

P		
		
Paget's Disease of Bone	475	Peptide YY (PYY) 585
Sakamuri V. Reddy		Helen M. Cox
Pancreatic Cancer	482	Phentolamine 589
Woody Denham and Richard H. Bell, Jr.		Massimo Mannelli
Pancreatic Islet Cell Tumors	486	Phenylethanolamine N-Methyltransferase 591
Vincent Marks		Kazumasa Isobe, Kazuhiro Takekoshi, and Yasushi Kawakami
Pancreatic Polypeptide (PP)	488	Pheochromocytoma 594
Tetsuya Kono, Xiao-Ping Wang, William E. Fisher, Dana K. Andersen, and F. Charles Brunnicardi		Karel Pacak, Graeme Eisenhofer, and Christian A. Koch
Parathyroid Cancer	497	Phosphatidylinositol Turnover and Receptors 597
Connie Taylor and Elizabeth Shane		Fumikazu Okajima
Parathyroid Glands, Pathology	505	Pineal Gland 604
Zubair W. Baloch and Virginia A. LiVolsi		Russel J. Reiter
Parathyroid Hormone (PTH)	513	Pineal Gland, Evolution of 609
Thomas J. Gardella and Henry M. Kronenberg		Vincent M. Cassone
Parathyroid Surgery	521	Pineal Tumors 615
Julie Ann Sosa and Robert Udelsman		Susan M. Webb and María-José Barahona
Pediatric HIV Infection and		Pituitary Adenomas, TSH-Secreting 624
Hypothalamic–Pituitary–Adrenal Axis	528	Philippe Caron
Robert Rapaport and Sharon E. Oberfield		Pituitary Adenylate Cyclase-Activating
Peptide Hormones and Growth Factors:		Polypeptide (PACAP)/Glucagon Superfamily 629
Cellular Signaling Mechanisms	532	Nancy M. Sherwood and Bruce A. Adams
Catherine Mounier and Barry I. Posner		Pituitary Gland Anatomy and Embryology 636
Peptide Hormones, Biological Diversification		Béla Halász
by Posttranslational Processing	540	Pituitary Gland, Evolution of 644
Margery C. Beinfeld		Aubrey Gorbman [†] and Claudia Gorbman
Peptide Hormones, Biosynthesis and		Pituitary Gland: Growth and Growth Failure 647
Posttranslational Processing of	545	Giuseppe Oppizzi
Donald F. Steiner		Pituitary Lactotroph Disorders 654
Peptide Hormones, Intracellular Transport	556	Crista E. Johnson, Anil K. Dubey, and Paul R. Gindoff
Gerard J. M. Martens		Pituitary Region, Non-Functioning Tumors of 661
Peptide Hormones, Regulated Secretion	561	Rolf-C. Gaillard
Priscilla S. Dannies		Pituitary Tumors, ACTH-Secreting 668
Peptide Hormones, Regulation and	566	Pietro Putignano, Francesca Pecori Giraldi, and Francesco Cavagnini
Gene Expression		Pituitary Tumors, Clonality 673
Richard C. Nicholson		R. N. Clayton and W. E. Farrell
Peptide Hormones, Segregation Mechanism	573	Pituitary Tumors, Molecular Pathogenesis 681
Priscilla S. Dannies		Shereen Ezzat
Peptide Hormones, Subcellular Structure	575	Pituitary Tumors, Surgery 687
Priscilla S. Dannies		Brooke Swearingen
Peptide Neurotransmitters and Smooth		Platelet-Derived Growth Factor (PDGF) 690
Muscle in the Gut	579	Arne Östman and Carl-Henrik Heldin
John R. Grider, Karnam S. Murthy, and Gabriel M. Makhoul		

[†]Deceased.

Contents of Volume 4



Contents of Volumes 1–4	ix	Pregnancy Endocrinology	52
Contents by Subject Area	xvii	Zohar Nachum, Eliezer Shalev, and Izhar Ben-Shlomo	
Foreword	xxix	Premature Aging Syndromes	58
Preface	xxxI	Payam Mohaghegh	
Guide to the Encyclopedia	xxxiii	Premature Ovarian Failure	65
		L. April Gago and Kenneth A. Ginsburg	
		Premenstrual Syndrome (PMS)	73
		William R. Keye, Jr.	
		Primary Aldosteronism (PAL)	76
		Michael Stowasser	
		Prohormone Convertases	84
		Savita Dhanvantari, Niamh X. Cawley, and Y. Peng Loh	
		Prohormones	91
		Theodore C. Friedman and David R. Cool	
		Prolactin (PRL)	99
		Nira Ben-Jonathan and Robert Hnasko	
		Prolactin, Evolution of	104
		Patricia M. Ingleton and Deborah M. Power	
		Prolactinoma, Clinical Manifestations	111
		Mark E. Molitch	
		Prolactinoma, Diagnosis	114
		Mark E. Molitch	
		Prolactinoma, Pathogenesis	118
		Wouter W. de Herder and Steven W. J. Lamberts	
		Prolactinoma, Therapy	121
		Mark E. Molitch	
		Prostate Cancer	125
		Jaspreet S. Sandhu and Peter N. Schlegel	
		Pseudohermaphroditism, Male, Due to	
		5α-Reductase-2 Deficiency	131
		Yuan-Shan Zhu and Julianne Imperato-McGinley	
Polycystic Ovary Syndrome (PCOS)	I		
Barry W. Donesky			
Polycystic Ovary Syndrome: Implications			
for Cardiovascular, Endometrial, and			
Breast Disease	4		
David Cibula			
Postnatal Non-Endocrine Overgrowth	7		
Juan F. Sotos and Jesús Argente			
Postnatal Normal Growth and Its Endocrine			
Regulation	24		
Raphael Rappaport			
Potassium Homeostasis, Regulation of	29		
Paola Russo, Gianvincenzo Barba, Antonella Venezia, and			
Alfonso Siani			
Prader-Willi Syndrome	34		
Urs Eiholzer			
Precocious Puberty, Central (Female)	40		
D. Mul, W. Oostdijk, and S. L. S. Drop			
Precocious Puberty, Central (Male)	46		
Raphael David and Bina Shah			
Precocious Puberty, Gonadotropin-			
Independent	50		
Ana Claudia Latronico			

Pseudohypoparathyroid States	136	Sexual Function and Androgens	229
Roderick John Clifton-Bligh and Aidan McElduff		Ronald S. Swerdloff, Fouad R. Kandeel, and Christina Wang	
Pseudoprecocious Puberty, Female	143	Sexual Maturation, Female	234
Pierre C. Sizonenko		Pierre C. Sizonenko	
Pseudoprecocious Puberty, Male	147	Sexual Maturation, Male	240
Jorma Toppari		Pierre C. Sizonenko	
Puberty, Male: Mechanisms of Onset and Progression	151	Shock	245
Margaret H. MacGillivray		Marie L. Crandall and Ronald V. Maier	
Puberty: Physical Activity and Growth	157	Short Stature and Chromosomal Abnormalities	250
James N. Roemmich and Alan D. Rogol		Michael B. Ranke	
		SHOX Disorders	256
		Rüdiger Blaschke, Antonio Marchini, Beate Haecker, Judith L. Ross, Werner F. Blum, and Gudrun A. Rappold	
	R	Skeletal Development	261
		Sandy C. Marks, Jr. [†] , Alison Gartland, and Paul R. Odgren	
Receptor–Ligand Interactions	163	Skeletal Development During Childhood and Adolescence	273
Dale F. Mierke and Maria Pellegrini		Eckhard Schoenau and Frank Rauch	
Receptor-Regulated Phospholipases	167	Smoking and the Thyroid	278
Mordechai Liscovitch		Luigi Bartalena, Maria Laura Tanda, and Enio Martino	
Receptor Serine/Threonine Kinases	174	Sodium Iodide Symporter	283
Peter ten Dijke and Ester Piek		Armin E. Heufelder and Werner Joba	
Receptor Tyrosine Kinase	181	Somatostatin Analogs	288
Mitsuhiko Okigaki and Yasunao Yoshimasa		Viktor Boerlin	
Renal Osteodystrophy	190	Somatostatin, Evolution of	297
Neil J. Weiner and Paul L. Kimmel		Richard E. Peter and Xinwei Lin	
Renal Vein Renin	198	Spermatogenesis, Endocrine Control of	300
Achille Cesare Pessina and Gian Paolo Rossi		Guido Verhoeven and Karel De Gendt	
Renin	204	Steroid Metabolism and the Metabolic Syndrome	306
Armin Kurtz		Jonathan R. Seckl and Brian R. Walker	
Resistance to Thyroid Hormone (RTH)	208	Steroid Receptors, Evolution of	312
Gisab Amaral de Carvalho and Roy E. Weiss		Michael E. Baker	
Resistant Ovary Syndrome	217	Stress, Aging, and Central Nervous System Interactions	320
A. R. Genazzani, F. Cristello, and P. G. Artini		Farideh Eskandari, Afshin Bidari, and Giovanni Cizza	
		Stress and Endocrine Physiology	325
	S	George P. Chrousos	
		Stroke	333
SERMS (Selective Estrogen Receptor Modulators)	221	Patrick C. A. J. Vroomen and Geoffrey Donnan	
Clodia Osipo and V. Craig Jordan			

[†]Deceased.

Substance P	339	Thyroid Gland Development, Molecular Biology	456
J. Michael Conlon		Mario De Felice and Roberto Di Lauro	
Superovulation and Intrauterine Insemination	343	Thyroid Hormone Action	462
Isaac Kligman and Jeffrey E. Roberts		Warner S. Simonides	
		Thyroid Hormone-Binding Proteins	474
		Luigi Bartalena	
		Thyroid Hormone Metabolism	480
		Josef Köhrle	
		Thyroid Hormone Receptors	490
		Onno Bakker	
		Thyroid Imaging	496
		I. Ross McDougall, Benjamin Franc, and Jason Cohen	
		Thyroiditis, Infectious	505
		Alan P. Farwell	
		Thyroiditis, Postpartum	509
		L. D. K. E. Premawardhana, A. B. Parkes, and J. H. Lazarus	
		Thyroiditis, Subacute	515
		Peter A. Singer	
		Thyroid Nodule	521
		Laszlo Hegedüs	
		Thyroid Peroxidase	530
		Francesco Boi and Stefano Mariotti	
		Thyrototoxic Bone Disease	534
		Daniela Bisbocci	
		Thyrototoxicosis: Diagnosis	543
		Claudio Marcocci and Roberto Rocchi	
		Thyrototoxicosis Factitia	551
		Enio Martino, Fausto Bogazzi, and Luigi Bartalena	
		Thyrototoxicosis, Overview of Causes	554
		Claudio Marcocci and Roberto Rocchi	
		Thyrototoxicosis, Systemic Manifestations	560
		Claudio Marcocci and Filomena Cetani	
		Thyrototoxicosis, Treatment	568
		Claudio Marcocci and Filomena Cetani	
		Thyrototoxic Storm	573
		Nikolaos Stathatos and Leonard Wartofsky	
		Thyrotropin-Releasing Hormone (TRH)	577
		Eric Fliers, Karl Bauer, and Theo Visser	

T

Testes, Embryology of	347
Lauri J. Pelliniemi	
Testicular Tumors	352
Matthew I. Milowsky and George J. Bosl	
Thalassemia, Endocrine Sequelae	356
Bessie E. Spiliotis	
Thirst and Dehydration in the Elderly	362
Margaret-Mary G. Wilson	
Thyroglobulin	366
Jan J. M. de Vijlder, Simone A. R. van de Graaf, and Carrie Ris-Stalpers	
Thyroid, Aging and	369
Stefano Mariotti and Francesco Boi	
Thyroid Autoimmunity	372
Anthony P. Weetman	
Thyroid Carcinoma	385
Martin Jean Schlumberger and Sophie Leboulleux	
Thyroid Disease and Pregnancy	395
Gregory A. Brent and Jerome M. Hershman	
Thyroid Disease, Epidemiology of	401
Mark Vanderpump	
Thyroid Disease, Genetic Factors in	409
Giuseppe Barbesino	
Thyroid Disorders in the Elderly	422
Jerome M. Hershman	
Thyroidectomy	426
Julia J. Jones and Orlo H. Clark	
Thyroid Fine Needle Aspiration Cytology	430
Armando Bartolazzi	
Thyroid Function Tests	442
Albert G. Burger	
Thyroid Gland, Anatomy and Physiology	453
Wilmar M. Wiersinga	

Tissue Plasminogen Activator (t-PA)	581	U
Maria Teresa Sartori and Giuseppe Cella		
Tissue Renin–Angiotensin– Aldosterone System	586	Undescended Testes
Yao Sun and Karl T. Weber		E. Martin Ritzén
Toxic Adenoma	594	
Knut Krohn, Dagmar Führer, and Ralf Paschke		V
Toxic Multinodular Goiter	600	
Dagmar Führer, Knut Krohn, and Ralf Paschke		Vitamin D
Transforming Growth Factor (TGF) Alpha	605	Ian R. Reid
J. Justin Hsuan		Vitamin D Deficiency, Rickets, and Osteomalacia
Trichlormethiazide	612	David Feldman and Peter J. Malloy
Paolo Menè		Von Hippel-Lindau Syndrome
TSH (Thyroid-Stimulating Hormone; Thyrotropin)	615	Gladys M. Glenn, Peter L. Choyke, McClellan M. Walther, Steven K. Libutti, Emily Y. Chew, H. Jeffrey Kim, Lindsay Middleton, Edward H. Oldfield, and W. Marston Linehan
D. Aled Rees and Maurice F. Scanlon		
TSH Function and Secretion	620	
Susan R. Rose		X
TSH-Producing Adenomas and Resistance to Thyroid Hormones	627	
Paolo Beck-Peccoz and Luca Persani		X-Linked Adrenoleukodystrophy/ Adrenomyeloneuropathy
TSH Receptor (Thyrotropin Receptor)	632	William B. Rizzo
Yuji Nagayama		
Tumor Necrosis Factor (TNF)	636	
Masatoshi Yamazaki and Haruyo Iwasawa		
Turner Syndrome	642	Contributors
Theo C. J. Sas and Sabine M. P. F. de Muinck Keizer-Schrama		Glossary
		Index
		695
		725
		773