PROGRESS IN ENDOCRINOLOGY 1988

Volume 2

Proceedings of the 8th International Congress of Endocrinology, Kyoto, 17–23 July 1988

Editors:

Hiroo Imura  
Kyoto University School of Medicine  
Kyoto, Japan

Kazuo Shizume  
Tokyo Women’s Medical College  
Tokyo, Japan

Sho Yoshida  
Chiba University School of Medicine  
Chiba, Japan

EXCEPPTA MEDICA, Amsterdam – New York – Oxford
Contents

The contributions marked with an * were received late and have been included at the end of this volume.

Regulation of growth hormone secretion and disorders of growth

Expression of growth hormone-releasing hormone fusion genes in transfected neuronal cells
  K.E. Mayo and D.J. Kulik 805

Central nervous system control of growth hormone secretion
  E.E. Müller, S.G. Cella, V. de Gennaro Colonna, S. Loche, E. Ghigo, V. Locatelli, D. Cocchi, C. Pintor and F. Camanni 811

Growth hormone releasing hormone therapy in growth hormone deficiency
  W.G. Sippell and R. Hümmelink 819

Growth hormone treatment of children with non-growth hormone deficient short stature
  G. van Vliet 825

Paracrine control of adrenocortical functions

Actions of vasopressin on the adrenal cortex
  A. Spät, T. Balla, P. Enyedi and A.F. Antoni 831

Adrenal renin: An autocrine system modulating aldosterone production
  P.J. Mulrow, E. Kusano, K. Baba, Y. Doi, D. Shier and R. Franco-Saenz 837

Role of catecholamine- and vasoactive intestinal peptide-containing nerves in the regulation of adrenocortical functions
  M. Holzwarth 841

Comparative ontogeny of gonadal development

Onset of puberty and its regulation in the bird

Neuroendocrine control of female puberty in the rat

Regulation of puberty in the lamb: Internal and external cues

Ontogeny of the GnRH pulse generator in the rhesus monkey
  T.M. Plant 867
Corticotropin releasing factor/Pro-opiomelanocortin

Localization and distribution of glucocorticoid receptor immunoreactivity and of glucocorticoid receptor mRNA in the rat brain using immunocytochemistry and in situ hybridization

K. Fuxe, A. Cintra, M. Aronsson, L.F. Agnati, I. Kitayama, A.-C. Wikström, S. Okret and J.-Å. Gustafsson 875

Feedback regulation of ACTH secretion

K.J. Kovács and G.B. Makara 885

Regulation of corticotropin releasing factor secretion

P.M. Plotsky 891

The clinical implications of corticotropin-releasing hormone


Regulation of bone cell growth and function

Differentiation and function of osteoblasts, and bone cell derived cytokines

H. Fleisch, R. Felix, H. Guenther and W. Hofstetter 915

Paracrine regulators of bone cells

T.J. Martin, K.W. Ng, G. Nicholson, S. Yumita and E. Allan 921

TGF beta and bone remodelling


Hormonal regulation of osteoclastic bone resorption

T.J. Chambers 933

Clinical aspects of growth hormone-insulin-like growth factor interaction

Growth hormone regulation of local insulin-like growth factor production

O.G.P. Isaksson, A. Lindahl, A. Nilsson and J. Isgaard 941

The different roles of IGF-I and IGF-II in growth and differentiation

J.J. van Wyk 947

Insulin-like growth factor receptors: Binding and function

R.G. Rosenfeld 957

Growth hormone binding proteins and heterogeneity of circulating growth hormone

G. Baumann 965

Second messengers

Calcium signalling system

I. Kojima 973

The role of phospholipase C in signal transduction and Ca$^{2+}$ transport mechanisms in exocrine glands

I. Schulz, F. Thévenod, S. Schnefel and R. Schäfer 977
Multiple forms of cAMP-dependent protein kinase and their role in cAMP-mediated hormone regulation and gene expression

S.M. Lohmann, W. Buechler, M. Meinecke and U. Walter

Multiple small molecular weight GTP-binding proteins in bovine brain membranes

Y. Takai, A. Kikuchi, T. Yamashita, K. Yamamoto, M. Kawata and M. Hoshijima

Signal transduction

Primary structure and function of signal-transducing G-proteins


Direct G protein gating of ionic channels

A. Yatani, J.Codina, R. Mattera, L. Birnbaumer and A.M. Brown

Role of inositol lipid metabolism in thyrotropin-releasing hormone action

M.C. Gershengorn

The physiology of gonadotropin action

Mechanism of gonadotropin action – Dissociation of receptor binding and cellular activation

M.R. Sairam, J. Linggen, M. Dobias-Goff, J. Sairam and G.N. Bhargavi

Gonadotropin action on oocyte maturation

N. Dekel

Follicle stimulating hormone action on cAMP-dependent protein kinases in the ovary

L. Hedin

Interactions between the cyclic nucleotide dependent pathway and the calcium phospholipid dependent pathway in the Sertoli cell of the rat testis

M. Conti, L. Monaco, S.H. Hall, D.R. Joseph and F.S. French

Regulation of thyroid growth

Thyroid growth in vivo

H. Studer

Growth factors of cultured human thyroid cells

T. Mori, M. Miyamoto, H. Sugawa, T. Enomoto and H. Imura

Iodine regulation of thyroid growth in-vitro

R. Gärtner, G. Bechtner, M. Rafferzedder, A. Dugrillon, W. Greil and C.R. Pickardt

Immunoglobulins stimulating the growth of thyrocytes

Endocrine aspects of hypertension

The renin-angiotensin system in cardiovascular tissue: From molecular biology to therapy

D. Ganten, S. Takahashi, R.E. Lang and T. Unger 1089

Role of adrenocorticotropic and corticotropin releasing factor in blood pressure control

B.A. Scoggins, J.P. Coghlan, A.F. Reid, C.D. Spence, J. Tresham, X. Wang and J.A. Whitworth 1097

Glucocorticoid and mineralocorticoid induced hypertension

E. Gláz, K. Rácz, R. Kiss, I. Varga, S. Orlin, L. Fütő and J. Fehér 1103

Atrial natriuretic factor in hypertension

I.G. Crozier, M.G. Nicholls, A.M. Richards, E.A. Espiner, H. Ikram and T.G. Yandle 1111

Opioid peptides

Regulation of proopiomelanocortin gene expression

C.-L.C. Chen 1119

Control of striatal enkephalin gene expression

J.P. Schwartz, R. Simantov, J.P. Ryan and G.R. Uhl 1125

Regulation of opioid receptors of the brain

F. Piva, D. Dondi, P. Limonta, R. Maggi and L. Martini 1131

Reconstitution of opioid receptors and GTP-binding proteins -signal transduction and its regulation of μ-, δ- and κ-opioid receptor systems

H. Ueda and M. Satoh 1137

Cell-cell interactions in testicular tissue

Peritubular myoid cell-Sertoli cell interactions

M.K. Skinner 1145

Sertoli cell-Leydig cell interactions

O. Avallet, M.-H. Perrard-Sapori, P. Chatelain and J.M. Saez 1151

Testins are Sertoli cell proteins that may be used to study cell-cell interactions within the seminiferous epithelium

C.Y. Chen, C.W. Bardin, C. Boitani, J. Grima and I. Morris 1157

Sertoli cell proteins in the human testis

G. Forti, G.B. Vannelli, T. Barni, C. Orlando, G.C. Balboni, R. Casano and M. Serio 1163

Neurohypophysial hormones

Vasopressin- and oxytocin-containing neurons in the CNS

G. Ju 1171

Biosynthesis of neurohypophysial hormones: The questions remaining

Vasopressin and oxytocin receptors: An overview
S. Jard, J. Elands, A. Schmidt and C. Barberis

Cerebral regulation of vasopressin secretion
M.J. McKinley, M. Congiu, B.J. Oldfield and G. Pennington

Tissue renin-angiotensin systems

The renin-angiotensin systems in endocrine glands: In situ hybridization
and immunocytochemistry
C. F. Deschepper

The ovarian renin-angiotensin system (OVRAS)
A. Lightman, A. Palumbo, P.J. Rzasa, M.D. Culler, C. Jones, V.J. Caride,
A.F. Negro-Vilar, C.F. Deschepper, J.J. Ireland, A.H. Decherney and
F. Naftolin

Testicular renin-angiotensin system
T. Inagami, M. Parmentier, K.N. Pandey, M. Naruse, K. Naruse and
R. Pochet

Angiotensinogen in the brain and peripheral tissues
D.J. Campbell

Gastrointestinal hormones

*New gastrointestinal hormones
N. Yaniahara, C. Yanaihara, T. Mochizuki, M. Hoshino, T. Zhang and
K. Iguchi

Neuropeptides and gut hormones: Techniques for the localization of mature
peptide, mRNA and specific binding sites
J.M. Polak and S.R. Bloom

VIP receptors in gut: Expression, function, structure and biosociology
M. Laburthe, A. Couvineau, C. Rouyer-Fessard, J. Calvo, L. Guijarro and
D. Cambier

Bombesin-like peptide gene expression in the gastrointestinal tract

Endocrine aspects of osteoporosis

Estrogen and osteoporosis
C. Christiansen

Active vitamin D metabolites, calcitonin and osteoporosis
H. Orimo, Y. Ohuchi, T. Nakamura, A. Hattori, A.C. Souza and M. Shiraki

Increases in vertebral density and Ca and P retention by administration of
human parathyroid hormone 1–34 plus calcitriol
R. Neer, D. Slovik, J. Potts Jr, M. Daly, S. Doppelt, C. Lo and D. Rosenthal

Fluoride treatment in osteoporosis with vertebral fractures
P.J. Meunier
Vasoactive hormones

Role of vasopressin in cardiovascular regulation
   I.A. Reid

Endogenous inhibitors of the Na\(^+\) pump, hypertension, cell cytosolic Ca\(^{2+}\) and ANP release

Vasoactive peptides in the urogenital tract
   B. Ottesen, C. Palle, J. Jørgensen and J. Fahrenkrug

Neuropeptide Y and calcitonin gene related peptide
   J.M. Allen

Steroid binding proteins and tissue availability of hormones

Steroid binding proteins and tissue availability of hormones
   C. Longeope

Molecular characteristics of plasma steroid binding proteins
   G.L. Hammond

Adrenocortical hormone binding proteins in different tissues
   M.K. Agarwal

Specific steroid binding proteins: Physiological variations and changes in diseases
   M.G. Forest and M. Pugeat

Advances in thyroid pathology

Thyroid stimulators
   S. Nagataki

*Autoimmune mechanisms for thyroid failure
   A. Pinchera, G.F. Fenzi, S. Mariotti, L. Chiovato, P. Vitti, C. Marcocci,
   G.F. del Prete, A. Tiri, S. Romagnani and M. Ricci

Iodine deficiency thyroid disease
   G. Medeiros-Neto and M. Knobel

Hyperthyroidism and periodic paralysis
   P.P.B. Yeo, K.-O. Lee and J.S. Cheah

Endocrine neoplasia syndromes

Parathyroid cell mitogen in familial multiple endocrine neoplasia Type I
   M.L. Brandi, M.B. Zimering, S.J. Marx, D. DeGrange, P. Goldsmith,
   K. Sakaguchi, E.A. Streeten and G.D. Aurbach

Humoral hypercalcemia of malignancy: Identification and cloning of a PTH-like peptide
   and A.F. Stewart
Transforming growth factor-α as a possible autocrine growth factor for human adenocarcinoma of the lung
  *K. Imanishi, K. Yamaguchi, S. Honda and K. Abe*
  1363

Somatostatin analog treatment of endocrine tumors
  *S.W.J. Lamberts and J.-C. Reubi*
  1369

### Prolactin

Evolutionary origin of prolactins, growth hormones and placental lactogens
  *C.S. Nicoll and R.A. Baldocchi*
  1379

Current concepts in the neural regulation of prolactin secretion
  *A. Negro-Vilar, C. Johnston and F.J. Lopez*
  1385

Neuroregulation of prolactin secretion in normal human subjects
  *F.F. Casanueva, A.L. Charro, R. Valcavi, H.P. Koppeschaar and C. Dieguez*
  1393

Interactions between prolactin and gonadotrophin secretion
  *A.S. McNeilly*
  1399

### MEET THE PROFESSOR

Cushing’s disease: Its diagnosis and management
  *G.M. Besser*
  1405

Thyroid and autoimmunity
  *J. Konishi*
  1409

Prognostic factors for recurrence and survival in breast cancer
  *W.L. McGuire*
  1415

Gut hormones and cancers
  *Y. Miyake, K. Abe, K. Yamaguchi, N. Yanaihara and J.M. Stewart*
  1419

Contraception
  *H.M. Zheng*
  1423

Molecular biology: From cloning to clinic
  *J.D. Baxter*
  1427

Non-toxic goiter
  *P.C. Scriba*
  1433

Obesity – A disorder of intake and expenditure
  *E. Danforth Jr*
  1437

Hyperprolactinemia
  *M.O. Thorner and M.L. Vance*
  1441

Delayed adolescence
  *P.C. Sizonenko*
  1445

Treatment of short stature
  *R. Rappaport*
  1449

The thyroid and pregnancy: Developments in our understanding
  *A.M. McGregor, H.Y.M. Fung, M. Kologlu, B. Harris, C.J. Richards and R. Hall*
  1453
Some aspects of studies of Type I diabetes in China
   J.-L. Chen 1459

The modulation of osteoclastic resorption in the therapy of bone disease
   O.L.M. Bijvoet 1463

Polycystic ovary syndrome and hirsutism
   R.A. Lobo 1467

Pituitary tumors
   G. Faglia 1473

Interrelationships of glucocorticoids and mineralocorticoids in endocrine hypertension
   C.R.W. Edwards 1477

Pathogenesis of NIDDM
   S. Efendic 1481

Hypercalcemia
   T. Fujita 1485

Male hypogonadism
   H.W.G. Baker and A.F. Morrow 1489

Index of authors 1557

Subject index 1565
NON-TOXIC GOITER

PETER C. SCRIBA

Klinik für Innere Medizin, Medical University of Lübeck, Ratzeburger Allee 160, D 2400 Lübeck (FRG)

ETIOLOGY

Obviously the etiology of non-toxic goiter is heterogeneous. While iodine deficiency is the predominant cause (1, 8), there are other reasons for sporadic and endemic goiter, as goitrogens from water and food supplies (2, 5), goitrogenic drugs, and inborn defects of thyroid hormone synthesis and metabolism. In addition, thyroid growth stimulating immunoglobulin may play a role, though some of the observations could have been due to contamination (4) e. g. with EGF (epidermal growth factor).

EPIDEMIOLOGY

Non-toxic goiter remains a major health problem (1), wherever iodine deficiency prevails as an endemic problem. Recent reports show the worldwide distribution of iodine deficiency, with several hundred million people living at the risk of goiter (8). Non-toxic goiter, however, represents only the most obvious example of the whole spectrum of iodine deficiency disorders, which includes retarded growth, mental disability etc. In general it may be said, that most epidemiological data are poor and do not comply with recommendations by PAHO (14). For instance, definition by stages is not regularly applied in studies published.

A better quantization of thyroid size can be achieved by ultrasonography even in epidemiological field studies (7, 16). This procedure has an average error of 10 to 15 % and permitted to demonstrate e. g. the frequency distribution of thyroid volume in Sweden, where iodine intake suffices, as compared to the Federal Republic of Germany, where almost half of the children have enlarged thyroids (7). In addition, ultrasound patterns of the thyroid were abnormal in only 3.6 % of the Swedish adult population as compared to 16 % in Germany.
IODINE PROPHYLAXIS

The eradication of iodine deficiency carries important effects on the quality of life, the productivity and educability of those affected as summarized by the ICCIDD (8). The global prevention of this condition has been advocated by the UN and the WHO. Once installed, the maintenance of iodine prophylactic programs has to be continuously monitored.

The ETA has reported (14), that the sufficient iodine intake in Northern European countries is largely inadvertently, and for instance due to the use of iodophors as desinfecants. Only few countries like Czechoslovakia and Switzerland use adequately iodized salt. In other parts of the world, iodized oil given either intramuscularly or orally is used for prophylaxis (1, 8). We have experience with some 12 000 injections of iodized oil in Tanzania, and could not confirm the increase of thyroid antibodies as claimed by others (16).

DIAGNOSIS IN THE INDIVIDUAL: NON-TOXIC GOITER

Non-toxic goiter remains a condition, which can only be diagnosed after exclusion of other thyroid disorders. Even in countries with a well funded health system, we have to define a rational diagnostic strategy (13) in order to limit the ever increasing expenses. In Table I, the simple determination of the

<table>
<thead>
<tr>
<th>Exclusion of</th>
<th>Rational procedure +)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothyroidism</td>
<td>basal TSH (MCA)</td>
</tr>
<tr>
<td>Thyrotoxicosis</td>
<td>basal TSH (MCA)</td>
</tr>
<tr>
<td>Autonomy</td>
<td></td>
</tr>
<tr>
<td>single nodule</td>
<td>Scintigraphy</td>
</tr>
<tr>
<td>multifocal/disseminated</td>
<td>Quantization, Suppression</td>
</tr>
<tr>
<td>Thyroiditis</td>
<td></td>
</tr>
<tr>
<td>chronic</td>
<td>Autoantibodies</td>
</tr>
<tr>
<td>acute/subacute</td>
<td>ESR etc.</td>
</tr>
<tr>
<td>Nodular alterations incl.</td>
<td></td>
</tr>
<tr>
<td>Thyroid Malignancy</td>
<td>Ultrasonography</td>
</tr>
<tr>
<td></td>
<td>FNA - Cytology</td>
</tr>
</tbody>
</table>

+) NB: Sometimes more, sometimes less may be needed

German Society for Endocrinology - Thyroid Section (13)
basal TSH with a highly sensitive radioimmunoassay is recommended as the first and sole procedure to exclude hypothyroidism and/or thyrotoxicosis. Notably, non-toxic goiter is defined as a condition where the patient is euthyroid and free from thyroiditis or thyroid malignancy. Autonomy is excluded by scintigraphy. Sonography has become the dominating first hand procedure to diagnose thyroiditis and thyroid malignancy and is used for controlled fine needle aspiration (FNA) cytology.

THERAPY

As generally agreed, non-toxic goiter may be treated by surgery. There is also a place for the application of radioiodine (3) in the treatment of non-toxic goiter; certainly this kind of treatment represents a privilege of the somewhat luxurious medicine of countries with a high living standard. Patients aged 60 or older may profit most, though the reduction in thyroid size is only limited. Few if any of these patients need a thyroid hormone replacement therapy after radioiodine.

There is currently a controversy going on, whether to treat young non-toxic goiter patients with thyroxine or iodine (9). As a theoretical background, the debate continues, whether TSH is a direct growth stimulator of the thyroid. If this would be correct, TSH suppressive thyroxine doses should be the logical therapy for non-toxic goiter. Other authors consider growth factors (EGF) and the iodine content of the thyroid cell itself as important for proliferation and hyperplasia of the thyroid gland (15).

Obviously, there are non-toxic goiters with firm nodules which do not respond to medication (6). The optimal patient for medical treatment would rather be a young patient up to 25 years old with a diffuse goiter of recent onset (11). More than 80 % of these patients respond favorably to the treatment. Using sonographic volumetry as an ideal means of controlling the effect, it was shown, that size reductions by 30 - 35 % are to be expected, when thyroxine is given for a period of 3 to 6 months (12). Thereafter, no further decrease of thyroid size can be achieved.

Stopping thyroxine will lead to goiter relapse within a few weeks. Surprisingly, the relapse is slower, when iodine is applied to reduce goiter (9, 12). After successful medical therapy, one has to enter a mean of prophylaxis to prevent recurrence
of goiter by either administering half the amount of the initial thyroxine dose or by 100 to 200 μg iodine/d. What was said is true for endemic goiter in an iodine deficiency area. There are no convincing data on conservative therapy of goiters due to other causes.

As convincingly shown in children (10), treatment with iodine alone can also decrease goiter size by 30 - 40 %. The recommendation to treat adults from 25 to 40 or even 50 years of age with iodine is less clear, waiting for further studies (9). Treatment of patients with goiter by either thyroxine of iodine is not very likely to be successful after approximately 40 to 50 years of age. In patients older than this, one has to consider either surgery or radioiodine or may in other cases just observe the patient.

REFERENCES

## INDEX OF AUTHORS

<table>
<thead>
<tr>
<th>Author</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abe, K.</td>
<td>1363, 1419</td>
</tr>
<tr>
<td>Abendroth, D.</td>
<td>671</td>
</tr>
<tr>
<td>Acher, R.</td>
<td>1505</td>
</tr>
<tr>
<td>Adiga, P.R.</td>
<td>343</td>
</tr>
<tr>
<td>Agarwal, M.K.</td>
<td>1313</td>
</tr>
<tr>
<td>Agnati, L.F.</td>
<td>875</td>
</tr>
<tr>
<td>Albert, E.D.</td>
<td>165</td>
</tr>
<tr>
<td>Allan, E.</td>
<td>921</td>
</tr>
<tr>
<td>Allen, J.M.</td>
<td>1289</td>
</tr>
<tr>
<td>Anand-Srivastava, M.B.</td>
<td>185</td>
</tr>
<tr>
<td>Antoni, A.F.</td>
<td>831</td>
</tr>
<tr>
<td>Araki, E.</td>
<td>377</td>
</tr>
<tr>
<td>Armanini, D.</td>
<td>259</td>
</tr>
<tr>
<td>Aronsson, M.</td>
<td>875</td>
</tr>
<tr>
<td>Assan, R.</td>
<td>1527</td>
</tr>
<tr>
<td>Atger, M.</td>
<td>757</td>
</tr>
<tr>
<td>Augereau, P.</td>
<td>111</td>
</tr>
<tr>
<td>Aurbach, O.D.</td>
<td>1349</td>
</tr>
<tr>
<td>Avallet, O.</td>
<td>1151</td>
</tr>
<tr>
<td>Baba, K.</td>
<td>837</td>
</tr>
<tr>
<td>Bach, J.-F.</td>
<td>1527</td>
</tr>
<tr>
<td>Bailly, A.</td>
<td>757</td>
</tr>
<tr>
<td>Baker, H.W.G.</td>
<td>1489</td>
</tr>
<tr>
<td>Balboni, G.C.</td>
<td>1163</td>
</tr>
<tr>
<td>Baldocchi, R.A.</td>
<td>1379</td>
</tr>
<tr>
<td>Baldwin, B.A.</td>
<td>705</td>
</tr>
<tr>
<td>Bale, A.E.</td>
<td>797</td>
</tr>
<tr>
<td>Balla, T.</td>
<td>831</td>
</tr>
<tr>
<td>Bapat, B.</td>
<td>157</td>
</tr>
<tr>
<td>Barberis, C.</td>
<td>1183</td>
</tr>
<tr>
<td>Bardim, C.W.</td>
<td>1157</td>
</tr>
<tr>
<td>Barnard, R.</td>
<td>601</td>
</tr>
<tr>
<td>Barni, T.</td>
<td>1163</td>
</tr>
<tr>
<td>Barton, M.C.</td>
<td>633</td>
</tr>
<tr>
<td>Bassett, J.M.</td>
<td>125</td>
</tr>
<tr>
<td>Bauleiu, E.-E.</td>
<td>413</td>
</tr>
<tr>
<td>Baumann, G.</td>
<td>965</td>
</tr>
<tr>
<td>Baxter, J.D.</td>
<td>1427</td>
</tr>
<tr>
<td>Bechtner, G.</td>
<td>1071</td>
</tr>
<tr>
<td>Behan, D.P.</td>
<td>75</td>
</tr>
<tr>
<td>Bergström, K.</td>
<td>567</td>
</tr>
<tr>
<td>Bergström, M.</td>
<td>567</td>
</tr>
<tr>
<td>Berkemeier, L.M.</td>
<td>531</td>
</tr>
<tr>
<td>Berry, M.</td>
<td>751</td>
</tr>
<tr>
<td>Besser, G.M.</td>
<td>1405</td>
</tr>
<tr>
<td>Bhargavi, G.N.</td>
<td>1025</td>
</tr>
<tr>
<td>Bidlingmaier, F.</td>
<td>165</td>
</tr>
<tr>
<td>Bijvoet, O.L.M.</td>
<td>1463</td>
</tr>
<tr>
<td>Birkett, S.D.</td>
<td>1177</td>
</tr>
<tr>
<td>Birnbaumer, L.</td>
<td>1009</td>
</tr>
<tr>
<td>Bloom, S.R.</td>
<td>1221</td>
</tr>
<tr>
<td>Boitani, C.</td>
<td>463, 1157</td>
</tr>
<tr>
<td>Boitard, C.</td>
<td>1527</td>
</tr>
<tr>
<td>Bonewald, L.F.</td>
<td>927</td>
</tr>
<tr>
<td>Bottazzolo, G.F.</td>
<td>47</td>
</tr>
<tr>
<td>Bouillaud, F.</td>
<td>717</td>
</tr>
<tr>
<td>Bouillon, T.</td>
<td>1003</td>
</tr>
<tr>
<td>Boyages, S.</td>
<td>1077</td>
</tr>
<tr>
<td>Bradbury, A.F.</td>
<td>335</td>
</tr>
<tr>
<td>Branchaud, C.L.</td>
<td>697</td>
</tr>
<tr>
<td>Brandt, A.M.</td>
<td>553</td>
</tr>
<tr>
<td>Brandt, M.L.</td>
<td>1349</td>
</tr>
<tr>
<td>Brandt, H.A.</td>
<td>897</td>
</tr>
<tr>
<td>Bray, G.A.</td>
<td>711</td>
</tr>
<tr>
<td>Briozzo, P.</td>
<td>111</td>
</tr>
<tr>
<td>Broadus, A.E.</td>
<td>1357</td>
</tr>
<tr>
<td>Brown, A.M.</td>
<td>1009</td>
</tr>
<tr>
<td>Buechler, W.</td>
<td>989</td>
</tr>
<tr>
<td>Burger, H.G.</td>
<td>13</td>
</tr>
<tr>
<td>Burtis, W.J.</td>
<td>1357</td>
</tr>
<tr>
<td>Buzko, E.S.</td>
<td>587</td>
</tr>
<tr>
<td>Cachianes, G.</td>
<td>601</td>
</tr>
<tr>
<td>Calvo, J.</td>
<td>1227</td>
</tr>
<tr>
<td>Calza', L.</td>
<td>407</td>
</tr>
<tr>
<td>Camannii, F.</td>
<td>811</td>
</tr>
<tr>
<td>Cambier, D.</td>
<td>1227</td>
</tr>
<tr>
<td>Campbell, D.J.</td>
<td>1213</td>
</tr>
<tr>
<td>Cantin, M.</td>
<td>185</td>
</tr>
<tr>
<td>Capony, F.</td>
<td>111</td>
</tr>
<tr>
<td>Caride, V.J.</td>
<td>1201</td>
</tr>
<tr>
<td>Carino, M.</td>
<td>241</td>
</tr>
<tr>
<td>Carpener', G.</td>
<td>259</td>
</tr>
<tr>
<td>Casano, R.</td>
<td>1163</td>
</tr>
<tr>
<td>Casanueva, F.F.</td>
<td>1393</td>
</tr>
<tr>
<td>Cassard, A.-M.</td>
<td>717</td>
</tr>
<tr>
<td>Castella, L.</td>
<td>717</td>
</tr>
<tr>
<td>Castro, R.</td>
<td>685</td>
</tr>
<tr>
<td>Cavailles, V.</td>
<td>111</td>
</tr>
<tr>
<td>Celli, S.G.</td>
<td>811</td>
</tr>
<tr>
<td>Chambers, T.J.</td>
<td>933</td>
</tr>
<tr>
<td>Champon, P.</td>
<td>751</td>
</tr>
<tr>
<td>Champigny, C.</td>
<td>717</td>
</tr>
<tr>
<td>Chang, T.-C.</td>
<td>633</td>
</tr>
<tr>
<td>Charlton, H.M.</td>
<td>525</td>
</tr>
<tr>
<td>Charpentier, G.</td>
<td>679</td>
</tr>
<tr>
<td>Charro, A.L.</td>
<td>1393</td>
</tr>
<tr>
<td>Chatelain, P.</td>
<td>1151</td>
</tr>
<tr>
<td>Chavez, B.</td>
<td>495</td>
</tr>
<tr>
<td>Cheah, J.S.</td>
<td>1341</td>
</tr>
<tr>
<td>Chen, B.J.</td>
<td>849</td>
</tr>
<tr>
<td>Chen, C.-L.C.</td>
<td>463, 1119</td>
</tr>
<tr>
<td>Chen, C.Y.</td>
<td>1157</td>
</tr>
<tr>
<td>Chen, E.Y.</td>
<td>509</td>
</tr>
<tr>
<td>Chen, J.-L.</td>
<td>1459</td>
</tr>
<tr>
<td>Chen, Y.I.</td>
<td>383</td>
</tr>
<tr>
<td>Chenu, C.</td>
<td>927</td>
</tr>
<tr>
<td>Chin, W.W.</td>
<td>525, 1233</td>
</tr>
<tr>
<td>Chiodini, P.G.</td>
<td>579</td>
</tr>
<tr>
<td>Chiovato, L.</td>
<td>1551</td>
</tr>
<tr>
<td>Chisari, A.</td>
<td>241</td>
</tr>
<tr>
<td>Chretien, M.</td>
<td>319</td>
</tr>
<tr>
<td>Christiansen, C.</td>
<td>1241</td>
</tr>
</tbody>
</table>
Chrousos, G.P., 897
Chung, B.-C., 477
Cintra, A., 875
Claesson-Welsh, L., 503
Clapp, C., 559
Clark, A., 125
Clarke, I.J., 427
Clayton, R.N., 525
Clements, J.A., 469
Coghlan, J.P., 1097
Congiu, M., 1189
Corbin, C.J., 483
Couvineau, A., 1227
Cozzi, R., 579
Crozier, I.G., 1111
De Gennaro Colonna, V., 811
De Kloet, E.R., 355
De Grange, D., 1349
De Kretser, D.M., 13
Decherney, A.H., 1201
De Prete, G.F., 1551
Delgado, C., 587
Demitrack, M.A., 897
Demura, H., 401
Dennis, M., 771
Derynck, R., 509
Deschepper, C.F., 179, 1197, 1201
Devynck, M.-A., 1275
Dieguez, C., 1393
Dobias-Goff, M., 1025
Doi, Y., 837
Dondi, D., 1131
Doppelt, S., 1255
Dorobek, M.D.W., 489
Dürr, H.G., 165
Dozin, B., 791
Drexhage, H.A., 1077
Drouin, J., 185
Dubois, C., 413
Dufau, M.L., 587
Dupont, B., 55
Ebina, Y., 377
Edwards, C.R.W., 1477
Efendic, S., 1481
Eisenbarth, G.S., 649
Elands, J., 1183
Emeson, R.B., 725
Endo, Y., 545
Enomoto, T., 1063
Enyedi, P., 831
Eriksson, A., 503
Ervin, M.G., 685
Espiner, E.A., 1111
Estivariz, F., 241
Euvrard, C., 413
Evans, W.S., 433

Faglia, G., 1473
Fahrenbach, W.H., 855
Fahrenkrug, J., 1283
Fallo, F., 259
Fauser, B.C.J.M., 451
Fehler, J., 1103
Felix, R., 915
Fenner, D.E., 861
Fenzi, G.F., 1551
Ferrara, N., 559
Feuillan, P.F., 151
Feutren, G., 1527
Finch, C.E., 273
Findell, P., 559
Findlay, J.K., 13, 207
Fisher, D.A., 685
Fleisch, H., 915
Flint, A.P.F., 213
Forest, M.G., 1319
Forti, G., 1163
Foster, C.M., 151
Foster, D.L., 861
Franco-Saenz, R., 837
Frank, M., 125
Freiss, G., 111
French, F.S., 1045
Fricker, L.D., 329
Friederich, E., 325
Fujimoto, M., 145
Fujita, T., 1485
Fukata, J., 737
Funder, J.W., 247, 469
Fung, H.Y.M., 1453
Furmaniak, J., 609
Fütö, L., 1103
Fuxe, K., 875

Ganten, D., 1089
Garcia, M., 111
Garcia, R., 185
Gardner, D.G., 179
Gärtnert, R., 1071
Genazzani, A.R., 407
Genest, J., 185
Geracioti, T.D., 897
Gerdes, H.-H., 325
Gerendai, I., 463
Gershengorn, M.C., 1017
Gesundheit, N., 797
Ghigo, E., 811
Giardino, L., 407
Gierschik, P., 1003
Gláz, E., 1103
Golander, A., 395
Gold, P.W., 897
Goldsmith, P., 1349
Goldstein, B.J., 371
Gonzalez, D., 855
Goodyer, C.G., 697
Graham-Lorence, S., 483
Graycar, J.L., 509
Green, S., 751
Grell, W., 1071
Grieco, D., 791
Grima, J., 1157
Grocock, C.A., 525
Grossman, A., 441
Guenther, H., 915
Gujarro, L., 1227
Guichon-Mantel, A., 757
Guise, J.W., 725
Guldener, A., 1177
Gustafsson, J.-Å., 771, 875
Haglund-Stengler, B., 489
Hai, M.T.V., 757
Haile-Meskel, H., 185
Hall, P.F., 253
Hall, R., 1453
Hall, S.H., 1045
Ham, J., 627
Hamet, P., 185
Hamlin, G., 601
Hammond, G.L., 1305
Hammonds, R.G., 601
Handelsman, D.J., 267
Handwerger, S., 395
Hanzel, W.J., 601
Haraguchi, K., 35
Harris, B., 1453
Hattori, A., 1249
Haussler, C.A., 763
Haussler, M.R., 763
Hayashizaki, H., 545
He, L., 469
Hedger, M.P., 13
Hedin, L., 1039
Hedlin, C.-H., 503
Helqvist, S., 665
Henquin, J.C., 137
Hentz, E., 717
Hilf, G., 1003
Hinkle, P.M., 785
Hiraoa, Y., 545
Hofstetter, W., 915
Holland, F.J., 157
Höll, W., 165
Holzwarth, M., 841
Homo-Delarche, F., 349
Honda, S., 1363
Horiuchi, R., 779
Hoshijima, M., 995
Hoshino, M., 1545
Hoyt, E.C., 691
Hsu, A.J.W., 451
Hümmling, R., 819
Humphrys, J., 1177
Huttner, W.B., 325
Iguchi, K., 1545
Ikeda, K., 1357
Ikram, H., 1111
Illner, W.D., 671
Imanishi, K., 1363
Imura, H., 737, 1063
Inagaki, N., 81
Inagami, T., 1207
Ireland, J.J., 1201
Isaksen, O.G.P., 941
Isgaard, J., 941
Ishii, S., 233
Isogami, K.L., 1357
Itoh, H., 227
Ivell, R., 537
Iwashita, M., 401
Jackson, S., 241
Jakobs, K.H., 1003
Jard, S., 1183
Jin, J.-R., 751
Jingami, H., 737
Johnson, M.L., 433
Johnston, C., 1385
Jones, A., 525
Jones, C., 1201
Jorgensen, E.V., 395
Jørgensen, J., 1283
Joseph, D.R., 1045
Josso, N., 679
Joubert (Bression), D., 553
Ju, G., 1171
Jurutka, P.W., 763
Kahn, C.R., 371
Kaji, H., 785
Kalogeras, K., 897
Kangawa, K., 1495
Karande, A.A., 343
Karin, M., 639
Kato, K., 145, 279
Katzenellenbogen, B.S., 105
Kaufman, J.-M., 421
Kawata, M., 995
Kawaiuchi, H., 227
SUBJECT INDEX

Prepared by E.A. van der Veen, M.D., Amsterdam, The Netherlands

acetylcholine
GH secretion, 815
acromegaly
GRH, GH secretion, 9
medical treatment, 580
somatostatin, 581
somatostatin analog, 1369
somatostatin, treatment, 10
ACTH
adrenal cell form, 253
aldosterone synthesis, 249
angiotensin II, 249
blood pressure control, 1097
CRF, cortisol, test, 3
guinea pig, 247
phosphatidylinositol, 249
placenta, 408
pregnancy, 401
ACTH secretion
hypoglycemia, 5
regulation, 885
vasopressin, 5
activin
FSH secretion, 13
ovary, 453
adrenal adenoma
hypertension, 1105
adrenal androgen
aging, 279
adrenal cell
ACTH, cell form, 253
cholesterol transport, 256
cytoskeleton, 255
adrenal cortex
autonomic nervous system, 841
vasopressin, 831
VIP, 841
adrenal gland
aging, 279
pro-opiomelanocortin, growth, 241
renin, 837
vitamin E, 279
adrenal insufficiency
vasopressin, 1273
adrenal steroids
food intake, 714
adrenergic system
LHRH secretion, 436
adrenodoxin
cholesterol side chain cleavage, 477
aging
adrenal androgen, 279
adrenal gland, 279
estrogen, 273
estrous cycle, 273
GH secretion, 812
hypothalamic-pituitary-gonadal axis, 267
neuroendocrine function, 273
semen analysis, 268
testis size, 269
testosterone blood level, 271
aldosterone
sodium transport, 362
aldosterone production
renin, 837
vasopressin, 831
aldosterone synthesis
ACTH, 249
angiotensin II, 249
amidating enzyme
peptide hormone, 335
amiloride
sodium transport, 364
androgen
LH-RH secretion, 434
androgen binding protein
Sertoli cell, 1166
androgen metabolism
LH-RH analogue, 293
androgen receptor
mammary carcinoma, 95, 99
androgen receptor defect
hypogonadism, 1489
androgen response element
627
ANF
fetus, 685
hypertension, 1111
angiogenesis
ovary-renin-angiotensin system, 1205
angiotensin
central nervous system, 1091
Leydig cell, 1209
angiotensin II
ACTH, 249
aldosterone synthesis, 249
angiotensinogen
central nervous system, 1213
glycosylation, 1213
tissue distribution, 1216
anorexia nervosa
CRF, 6
ANP
cardiomyopathy, hamster, 188
digitalis-like substance, 1275
gene expression, 179
hypothesis, 189
immunohistochemistry, 174
pathophysiology, 185
precursor, 1496
vassopressin, 175
anti-Müllerian hormone
aromatase, 681
fetal ovary, 679
antiestrogen
MCF-7 breast cancer cells, 106
antiluteolysin 213
antiprogestrone
413
contraception, 416
progesterone receptor, 414
arginine vasopressin
see vasopressin
aromatase
anti-Müllerian hormone, 681
gene regulation 483
prostate, 294
aromatase inhibitor
4-OH-androstenedione, 295
arteriogenesis
prolactinoma, 559
atrial natriuretic peptide
see ANP
autoimmunity
beta cell destruction, 649
thyroid stimulator, 1327
autonomic nervous system
adrenal cortex, 841
basic fibroblast growth factor
MEN I, 1354
beta cell
autoimmune destruction, 649
beta cell destruction
interleukin I, 666
tumor necrosis factor, 666
bisphosphonate
bone resorption, 1463
hypercalcemia, 1465
osteoporosis, 1465
Paget’s disease, 1464
blood pressure
ACTH, 1097
CRF, 1097
bombesin
food intake, 706
bombesin-like peptide
gastrointestinal tract, 1233
gene expression, 1233
bone density
calcitriol, 1255
parathyroid hormone, 1255
bone resorption
bisphosphonate, 1463
transforming growth factor beta, 927
brain natriuretic peptide 173
identification, 1499
structure, 1497
Brattleboro rat
vasopressin deficiency, 537
vasopressin precursor, 1177
breast cancer
prognosis, 1415
steroid receptor, 1415
bromocriptine
amino acid metabolism, 572
PET-scan, 568
prolactin synthesis, 563
brown adipose tissue
human histology, 721
uncoupling protein, 717
busurellin
precocious puberty, 145
calcitonin
osteoclast, 934
osteoporosis, 1249
calcitonin gene 725
calcitonin gene related peptide
neuropeptide Y, 1289
calcitriol
bone density, 1255
calcium
insulin release, 131
calcium signalling system
IGF II, 973
calcium transport mechanism
phospholipase C, 977
cAMP
gene expression, 89
cAMP-dependent protein kinase 989
cancer
gut hormone, 1419
carbachol
insulin secretion, 131
carboxypeptidase E 329
carcinogenesis
see oncogenesis
carcinoid
somatostatin analog, 1371
cardiac output
vasopressin, 1270
cardiomyopathy
ANP, hamster, 188
castration
LH/HR secretion, 428
catecholamine
GH secretion, 813
cathepsin
estrogen, 111
mammary carcinoma, 111
central nervous system
angiotensinogen, 1213
corticosteroid receptor, 355
gluucorticoid receptor, rat, 875
stress, 355
cerebrospinal fluid
CRF-level, 5
cholecystokinin
food intake, 705
cholesterol
adrenal cell, transport, 256
cholesterol desmolase deficiency
60
cholesterol side chain cleavage
adrenodoxin, 477
chromogranin
326
neuroendocrine system, 1221
colon stimulating factor
bone cell, 918
congenital adrenal hyperplasia
epidemiology, 61
inheritance, 500
review, 55
treatment, 165
congenital hypothyroidism
TSH deficiency, 545
contraception
antiprogestrone, 416
contraception programmes
China, 1423
corpus luteum
inhibin, 210
interferon, 213
structure, function, 207
corticosteroid
CRF secretion, 893
corticosteroid binding protein
structure, 1305
corticosteroid receptor
central nervous system, 355
corticotrophin releasing hormone
see CRF
cortisol
CRF, ACTH, test, 3
CRF
ACTH, cortisol, test, 3
anorexia nervosa, 6
binding protein, 75, 403
blood pressure control, 1097
corticospinal fluid, 5
food intake, 706
pituitary adrenal axis, 899
placenta, 403
pregnancy, 401
psychiatric disorder, 901
review, 897
stress response, 904
CRF secretion
corticosteroid, 893
regulation, 891
CRF test
900
Cushing’s disease, 4, 906
depression, 906
Cushing’s disease
CRF-test, 4, 906
medical treatment, 582
review, 1405
cyclosporine
type I diabetes mellitus, 1527
cyproterone acetate
prostate cancer, 308
cytochrome P450 enzyme
steroidogenesis, 477
cytokine
osteoblast, 915
thyroid cell, 1329
cytoplasmatic islet cell antibody
651
cytoskeletal
35
adrenal cell, 255
deglycosylation
glucoprotein hormone, 1025
delayed puberty
hypergonadotropic hypogonadism, 1445, 1446
review, 1448
depression
CRF-test, 906
diabetes mellitus
beta cell destruction, 649
pathogenesis, review, 665
restriction fragment length polymorphism, 1460
diabetes mellitus I
China, 1459
cyclosporine, 1527
digalals-like substance
ANP, 1275
essential hypertension, 1277
dioxin receptor, 771
DNA binding protein
gene expression, 639
dopamine
LH/HR secretion, 437
dopamine receptor
1568

PET-scan, 568

elcatonin
osteoporosis, 1253
endemic goiter
malnutrition, 1336
superoxide dismutase, 1338
endocrine hypertension
steroid excess syndrome, 1477
endocrine pancreas tumor
somatostatin, 1371
endogenous opiate
LHRH secretion, 433
enkephalin
central nervous system, 1125
convertase, 329
gene expression, 1125
epidermal growth factor
gonads, 452
erection
VIP, 1286
essential hypertension
digalactis-like substance, 1277
estradiol clearance rate
free hormone level, 1299
estrogen
aging, 273
cathepsin, 111
LHRH secretion, 435
neuroendocrine function, 273
opioid receptor, 1132
osteoporosis, 1241
prolactinoma, 559
prostate, 289
retinol binding protein, 635
riboflavin carrier protein, 343
vitellogenin gene transcription, 633
estrogen receptor
621
activation domain, 751
hormone responsive element, 751
mammary carcinoma, 105
estrogen response element
621, 627
estrous cycle
aging, 273
LHRH secretion, 428
opioid receptor, 1131
exercise
LHRH secretion, 441
steroid binding protein, 1323
fertility control
antiprogesterone, 413
fibroblast growth factor
gonads, 454
oncogenesis, 517
signal peptide, 517
fluoride

osteoporosis, 1242, 1261
flutamide
LHRH secretion, 435
prostate cancer, 308
follicle fluid
angiotensin, 1201
renin, 1201
steroidogenic enzyme, 208
follistatin
FSH-secretion, 13
food intake
adrenal steroids, 714
bombesin, 706
cholecystokinin, 705
CRF, 706
glucagon, 707
insulin, 707
neuropeptide, 705
neurotensin, 706
neurotransmitter, 713
opioid peptides, 708
regulation, review, 711
free fatty acid metabolism
NIDDM, 389
FSH
LHRH secretion, 430
ovary follicle growth, 202
protein kinase, 1039
pulsatile administration, 201
receptor binding, 196
sugar chain structure, 747
FSH receptor
antibodies, 199
solubilization, 195
FSH-secretion
activin, 13
follistatin, 14
galanin
gastrointestinal hormone, 1545
insulin secretion, 1346
gastrin-releasing peptide
analogue, 1420
small cell lung carcinoma, 1363
structure, 1234
gastrin-releasing peptide receptor
blocking peptide, 1420
gene expression
neuroendocrine system, 725
POMC, pituitary, 737
regulation, cAMP, 89
GH
somatostatin, 811
GH binding protein
602, 965
GH deficiency
GRF therapy, 819
GRH treatment, 8
treatment, 1449
GH gene
expression, 640
GH secretion
acetylcholine, 815
cromegaly, GRH, 9
aging, 812
catecholamine, 813
GRF, 811
pirenzepine, 815
regulation, 811
GH treatment
pulsatile administration, 942
short stature, 825
Turner syndrome, 826
GH-cell
T3, 785
GHRH
see also GRF
prolactin secretion, 1395
GIP precursor
81
glucagon
food intake, 707
glucagon-like peptide I
insulin secretion, 1548
glucocorticoid
circulating cells, 350
gamma-interferon, 352
immune response, 349
interleukin, 351
lymphokine, 352
thymic hormone, 352
glucocorticoid receptor
771
central nervous system, rat, 875
hormone responsive element, 751
mammary carcinoma, 96
glucose intolerance
insulin resistance, 383
glycoprotein
sugar chain structure, 743
glycoprotein hormone
deglycosylation, 1025
GNRH
see also LHRRH
evolution, 221
goitre
thyroid growth, 1053
thyroid growth stimulating
gonadotroph
immunochemistry, 230
gonadotropin
amino acid composition, vertebrate, 235
fish, 227
mechanism of action, 1025
oocyte maturation, 1033
gonadotropin deficiency
hypogonadism, 1491
gonadotropin receptor
evolution, 233
Graves' disease
TSH-binding inhibitor, 1409
TSH-receptor antibody, 1410
GRF
fetal pituitary, 697
gene, promotor activity, 805
GH secretion, 811
GRF therapy
GH deficiency, 819
GH deficiency, treatment, 8
GH secretion, 6
growth
insulin-like growth factor, 947
growth factor
bone formation, 923
gonad, 451
hormone, 1419
mammary carcinoma, 99
osteoblast, 915
Sertoli cell, 1154
growth hormone
evolutionary origin, 1379
heterogeneity, 965
insulin-like growth factor, 941
growth hormone receptor
601
growth hormone releasing factor
see GRF
growth hormone releasing hormone
see GRH
growth hormone secretion
GRH, 6
GTP-binding protein
35
forms, 995
ionic channel regulation, 1009
opioid receptor, 1137
structure, function, 1003
hormone
cancer, 1419
growth factor, 1419
hCG
sugar chain structure, 743
hCG receptor
gonad, 587
helodermin
insulin secretion, 1549
high density lipoprotein
placental lactogen secretion, 395
hirsutism
polycystic ovary syndrome, 1467
HLA antigen
type IDDM, China, 1459
hormone responsive element
estrogen receptor, 751
glucocorticoid receptor, 751
4-hydroxy-androstenedione
aromatase inhibitor, 295
6 beta-hydroxycortisol
hypertension, 1478
21-hydroxylase
cytochrome P450 enzyme, 479
21-hydroxylase deficiency
55
restriction length polymorphism, 489
17-alpha hydroxylase
cytochrome P450 enzyme, 478
17 alpha-hydroxylase deficiency
60
11 beta-hydroxylase deficiency
59
3-beta-hydroxysteroid dehydrogenase
deficiency, 59, 495
hyperaldosteronism
hypertension, review, 259
hypercalcemia
bisphosphonate, 1465
cancer, 1357
PTH-like peptide, 1357
review, 1486
hyperparathyroidism
growth factor, 1351
hyperprolactinemia
dopaminergic drugs, 1444
review, 1441
hypertension
adrenal adenoma, 1105
ANF, 111
ANP, 189
corticosteroid induced form, 1103
hyperaldosteronism, review, 259
hyperprolactinemia
delayed puberty, 1445, 1446
hyperparathyroidism
growth factor, 1351
hypogonadotrophic hypogonadism
delayed puberty, 1445, 1446
hypertension
adrenal adenoma, 1105
ANF, 111
ANP, 189
corticosteroid induced form, 1103
hyperaldosteronism, review, 259
hyperparathyroidism
periodic paralysis, 1341
T-cell subset, 1328
hypogonadism
AGT secretion, 5
hypogonadism
androgen receptor defect, 1489
mouse model, 525, 531
seminiferous tubule failure, 1489
hypothalamus-pituitary-gonadal axis
aging, 267
puberty, duck, 849
puberty, rat, 855
hypothalamus-pituitary-adrenal axis
885
hypothyroidism
autoimmunity, 1551
TSH-gene, 545
TSH-receptor antibody, 1411
IGF-receptor
structure, function, 957
immune response
gluocorticoid, 349
in situ hybridization
renin-angiotensin system, 1197
inhibin
corpus luteum, 210
growth factor, 453
immunocytotochemistry, 461
infertility, 1491
isolation, 13
placenta, 409
prostate, 301
review, 13
inositol lipid metabolism
TRH, 1017
inositol phosphate production
979
insulin
food intake, 707
insulin autoantibody, 650
insulin-like growth factor II
adrenal cell, 481
insulin receptor
377
activation, synthesis, 371
insulin receptor gene
373, 378
insulin release
calcium, 131
insulin resistance
glucose intolerance, 383
non-insulin-dependent diabetes, 383
insulin secretion
carbachol, 131
electrophysiology, 137
first phase, 653
galadin, 1546
glucagon-like peptide, 1548
helodermin, 1549
neural control, 119
pulsatility, 125
somatostatin, 128
VIP, 120
insulin-like growth factor
fetus, 691
growth hormone, 941
growth, differentiation, 947
nutrition, 949
ovary, 452
Sertoli cell, 1164
testis, 452
insulin-like growth factor II
calcium signalling system, 973
interferon
corpus luteum, 213
pregnancy, 213
thyroid T-cell, 1554
interferon-(g)
antigen expression, 1328
gamma-interferon
gluocorticoid, 352
interleukin
<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>neuronal growth factor</td>
<td>25</td>
</tr>
<tr>
<td>LHRH neuron</td>
<td>858</td>
</tr>
<tr>
<td>neuropaathy</td>
<td>673</td>
</tr>
<tr>
<td>pancreas transplantation</td>
<td></td>
</tr>
<tr>
<td>neuropetide</td>
<td></td>
</tr>
<tr>
<td>autoradiography</td>
<td>1223</td>
</tr>
<tr>
<td>binding site</td>
<td>1223</td>
</tr>
<tr>
<td>food intake</td>
<td>705</td>
</tr>
<tr>
<td>localization technique</td>
<td>1221</td>
</tr>
<tr>
<td>neuropetide precursor</td>
<td>25</td>
</tr>
<tr>
<td>neuropetide receptor</td>
<td>25</td>
</tr>
<tr>
<td>neuropetide Y</td>
<td></td>
</tr>
<tr>
<td>calcitonin gene related peptide</td>
<td>1289</td>
</tr>
<tr>
<td>urogenital tract</td>
<td>1283</td>
</tr>
<tr>
<td>neurophysin</td>
<td></td>
</tr>
<tr>
<td>evolution</td>
<td>1514</td>
</tr>
<tr>
<td>review</td>
<td>1505</td>
</tr>
<tr>
<td>neurotensin</td>
<td></td>
</tr>
<tr>
<td>food intake</td>
<td>706</td>
</tr>
<tr>
<td>neurotransmitter</td>
<td></td>
</tr>
<tr>
<td>CRF secretion</td>
<td>892</td>
</tr>
<tr>
<td>food intake</td>
<td>713</td>
</tr>
<tr>
<td>non-insulin dependent diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>pathogenesis</td>
<td>1481</td>
</tr>
<tr>
<td>insulin resistance</td>
<td>383</td>
</tr>
<tr>
<td>non-toxic goiter</td>
<td></td>
</tr>
<tr>
<td>review</td>
<td>1433</td>
</tr>
<tr>
<td>norepinephrine</td>
<td></td>
</tr>
<tr>
<td>uncoupling protein</td>
<td>719</td>
</tr>
<tr>
<td>nutrition</td>
<td></td>
</tr>
<tr>
<td>insulin-like growth factor</td>
<td>949</td>
</tr>
<tr>
<td>obesity</td>
<td></td>
</tr>
<tr>
<td>energy expenditure</td>
<td>1437</td>
</tr>
<tr>
<td>uncoupling protein</td>
<td>719</td>
</tr>
<tr>
<td>18-OH-cortisol</td>
<td></td>
</tr>
<tr>
<td>hypertension</td>
<td>1477</td>
</tr>
<tr>
<td>oligospermia</td>
<td></td>
</tr>
<tr>
<td>LH pulsatility</td>
<td>1492</td>
</tr>
<tr>
<td>oncogenesis</td>
<td></td>
</tr>
<tr>
<td>fibroblast growth factor</td>
<td>517</td>
</tr>
<tr>
<td>oocyte</td>
<td></td>
</tr>
<tr>
<td>LH action</td>
<td>1033</td>
</tr>
<tr>
<td>opiate antagonist</td>
<td>466</td>
</tr>
<tr>
<td>testis</td>
<td></td>
</tr>
<tr>
<td>opioid peptides</td>
<td></td>
</tr>
<tr>
<td>food intake</td>
<td>708</td>
</tr>
<tr>
<td>opioid receptor</td>
<td></td>
</tr>
<tr>
<td>central nervous system</td>
<td>1125</td>
</tr>
<tr>
<td>estrous cycle</td>
<td>1131</td>
</tr>
<tr>
<td>GTP-binding protein</td>
<td>1137</td>
</tr>
<tr>
<td>osmoreceptor</td>
<td></td>
</tr>
<tr>
<td>vasopressin secretion</td>
<td>1189</td>
</tr>
<tr>
<td>osteoblast</td>
<td></td>
</tr>
<tr>
<td>cytokine</td>
<td>915</td>
</tr>
<tr>
<td>growth factor, regulation</td>
<td>933</td>
</tr>
<tr>
<td>transforming growth factor beta</td>
<td>928</td>
</tr>
<tr>
<td>osteoclast</td>
<td></td>
</tr>
<tr>
<td>activation</td>
<td>921</td>
</tr>
<tr>
<td>calcitonin</td>
<td>934</td>
</tr>
<tr>
<td>osteoclast activating factor</td>
<td>918</td>
</tr>
<tr>
<td>osteoporosis</td>
<td></td>
</tr>
<tr>
<td>bisphosphonate</td>
<td>1465</td>
</tr>
<tr>
<td>calcitonin</td>
<td>1249</td>
</tr>
<tr>
<td>elcatonin</td>
<td>1253</td>
</tr>
<tr>
<td>estrogen</td>
<td>1241</td>
</tr>
<tr>
<td>fluoride</td>
<td>1242</td>
</tr>
<tr>
<td>histomorphometry</td>
<td>1262</td>
</tr>
<tr>
<td>vitamin D metabolite</td>
<td>1249</td>
</tr>
<tr>
<td>vitamin D3</td>
<td>1242</td>
</tr>
<tr>
<td>ovary</td>
<td></td>
</tr>
<tr>
<td>activin</td>
<td>453</td>
</tr>
<tr>
<td>epidermal growth factor</td>
<td>452</td>
</tr>
<tr>
<td>FSH action</td>
<td>1039</td>
</tr>
<tr>
<td>renin-angiotensin system</td>
<td>1201</td>
</tr>
<tr>
<td>ovary follicle</td>
<td></td>
</tr>
<tr>
<td>growth, FSH</td>
<td>202</td>
</tr>
<tr>
<td>ovulation</td>
<td></td>
</tr>
<tr>
<td>ovary-renin-angiotensin system</td>
<td>1204</td>
</tr>
<tr>
<td>oxytocin</td>
<td></td>
</tr>
<tr>
<td>central nervous system</td>
<td>1171</td>
</tr>
<tr>
<td>gonad</td>
<td>469</td>
</tr>
<tr>
<td>prolactin secretion</td>
<td></td>
</tr>
<tr>
<td>oxytocin receptor</td>
<td></td>
</tr>
<tr>
<td>review</td>
<td>1183</td>
</tr>
<tr>
<td>Paget’s disease</td>
<td></td>
</tr>
<tr>
<td>bisphosphonate</td>
<td>1464</td>
</tr>
<tr>
<td>pancreas transplantation</td>
<td></td>
</tr>
<tr>
<td>neuropathy</td>
<td>673</td>
</tr>
<tr>
<td>retinopathy</td>
<td>674</td>
</tr>
<tr>
<td>type I diabetes</td>
<td>671</td>
</tr>
<tr>
<td>pancreastatin</td>
<td>325</td>
</tr>
<tr>
<td>parathyroid cell mitogen</td>
<td></td>
</tr>
<tr>
<td>MEN I</td>
<td>1349</td>
</tr>
<tr>
<td>parathyroid hormone</td>
<td></td>
</tr>
<tr>
<td>bone density</td>
<td>1255</td>
</tr>
<tr>
<td>periodic paralysis</td>
<td></td>
</tr>
<tr>
<td>hyperthyroidism</td>
<td>1341</td>
</tr>
<tr>
<td>peritubular myoid cell</td>
<td></td>
</tr>
<tr>
<td>cell-cell-interaction</td>
<td>1145</td>
</tr>
<tr>
<td>pertussis toxin</td>
<td>39</td>
</tr>
<tr>
<td>phosphatidylinositol</td>
<td></td>
</tr>
<tr>
<td>ACTH, 249</td>
<td></td>
</tr>
<tr>
<td>phospholipase C</td>
<td></td>
</tr>
<tr>
<td>calcium transport</td>
<td>977</td>
</tr>
<tr>
<td>photoperiod</td>
<td></td>
</tr>
<tr>
<td>LH pulse frequency</td>
<td>864</td>
</tr>
<tr>
<td>phylloilitor</td>
<td></td>
</tr>
<tr>
<td>bombesin-like peptide</td>
<td>1233</td>
</tr>
</tbody>
</table>
puberty
bird, 849
hypothalamus-pituitary-gonadal axis, rat, 855
LH secretion, sheep, 861
LHRH secretion, 856
pulsatile secretion
insulin, 125
LHRH, 421
ranatensin
bombesin-like peptide, 1233
renin
adrenal gland, 837
aldosterone production, 837
follicle fluid, 1201
Leydig cell, 1208
renin-angiotensin system
hypertension, 1089
immunocytochemistry, 1197
in situ hybridization, 1197
ovary, 1201
testis, 1207
restriction fragment length polymorphism
diabetes mellitus, 1460
restriction length polymorphism
21-hydroxylase deficiency, 489
retinol binding protein
estrogen, 635
retinopathy
pancreas transplantation, 674
rhodopsin receptor
37
riboflavin carrier protein
estrogen, 343
secretogranin
326
semen
aging, 268
serotonin
LHRH secretion, 437
Sertoli cell
androgen binding protein, 1166
calcium phospholipid pathway, 1045
CaMP, 1045
cell-cell interaction, 1145
growth factor, 1154
IGF-I, 1164
Leydig cell interaction, 1151
second messenger, 1045
testibumin, 459
testin, 1157
transferrin, 1164
sex hormone binding globulin
structure, 1308
sexual arousal
VIP, 1286
sexual differentiation
LHRH deficiency, 525
short stature
GH treatment, 825
treatment, 1449
signal peptide
fibroblast growth factor, 517
sodium transport
aldosterone, 362
amiloride, 364
ouabain, 365
somatostatin C
bone formation, 916
somatostatin
acromegaly, 581
acromegaly, treatment, 10
fetal pituitary, 697
GH-secretion, 6, 811
insulin secretion, 128
somatostatin analog
acromegaly, 1369
carcinoid, 1371
diabetes mellitus, 1371
diabetes mellitus, 1371
somatostatin gene
90
somatostatin secretion
somatotropic adenoma, 556
somatotropic adenoma
immunocytochemistry, 554
somatostatin secretion, 556
steroid binding protein
exercise, 1323
general diseases, 1322
malnutrition, 1323
molecular characteristic, 1305
ontogeny, 1319
review, 1297
steroid hormone binding protein
tissue difference, 1313
steroid receptor
breast cancer, 1415
steroid response element
619
steroidogenesis
cytochrome P450 enzyme, 477
deglycosylated LH, 1027
ovary-renin-angiotensin, 1204
steroidogenic enzyme
ovarian cells, 208
stress
central nervous system, 355
corticosteroid receptor, 355
stress response
CRF, 904
substance K
25
substance P
25
urogenital tract, 1283
sugar chain structure
glycoprotein hormone, 743
superoxide dismutase
endemic goiter, 1338
iodine deficiency, 1333

T-cell subset
thyroid gland, 1328, 1553
T3
binding protein, cell membrane, 779
GH-cell, 785
growth factor, 788
malic enzyme mRNA, 791
pituitary cell culture, 785
tachykinin
neuropeptide, gene organization, 25
taxoxifen
106
testibumin
Sertoli cell, 459
testis
aging, size, 269
ejdermal growth factor, 452
opiate antagonist, 466
POMC-derived peptides, 457
renin-angiotensin-system, 1207
Sertoli cell, 1157
testolactone
precocious puberty, 155
testosterone
aging, blood level, 271
prostate growth, 288
testosterone clearance rate
free hormone level, 1299
testotoxicosis
familial precocious puberty, 158
thymic hormone
glucocorticoid, 352
thyrocyte
DR antigen expression
thyroglobulin
iodine deficiency, 1333
thyroid autoimmunity
1409
thyroid cell
cytokine, 1329
thyroid cell culture
growth factors, 1063
thyroid function
pregnancy, 1453
thyroid growth
goiter, 1053
growth factor, 1063
immunoglobulins, 1077
iodine, 1071
review, 1055
thyroid growth stimulating globulin
1077
thyroid hormone resistance
797
thyroid microsomal-peroxidase
antigen, 1551
thyroid stimulator
autoimmunity, 1327
thyroid T-cell
interferon, 1554
tumor necrosis factor, 1554
thyroid-stimulating antibody
1410
thyrotoxic periodic paralysis
pathogenesis, 1342
thyrotropin releasing hormone
see TRH
transcortin
corticoid derivative binding, 1314
transducin
37
transferrin
Sertoli cell, 1164
transforming growth factor
gonads, 453
transforming growth factor betaonc bone resorption, 927
osteoblast, 928
review, 509
TRH
GH secretion, acromegaly, 9
inositol lipid metabolism, 1017
prolactin secretion, 1017, 1394
prolactinoma, 556
triiodothyronine
see T3
TSH
inappropriate secretion, 798
TSH blocking antibody
1552
TSH deficiency
congenital hypothyroidism, 545
TSH receptor
609
TSH receptor antibody
609
TSH-binding inhibitor
Graves' disease, 1409
TSH-gene
hypothyroidism, 545
TSH-receptor antibody
Graves' disease, 1410
hypothyroidism, 1411
tumor growth factor alpha
adenocarcinoma, 1363
tumor necrosis factor
beta cell destruction, 666
tumour growth factor
mammary carcinoma, 97
Turner syndrome
GH treatment, 826
tyrosine
sulfation, 325
uncoupling protein
brown fat, 717
norepinephrine, 719
obesity, 719
urogenital tract
vasoactive peptide, 1283
vascular smooth muscle
neuropeptide Y, 1291
vasoactive intestinal polypeptide
gut receptor, 1227
see also VIP
vasoactive peptide
urogenital tract, 1283
vasopressin
ACTH-secretion, 5
adrenal cortex, 831
adrenal insufficiency, 1273
aldosterone production, 831
ANP innervation, 175
Brattleboro rat, 537
cardiac output, 1270
cardiotoxic effects, 1269
central nervous system, 1171
fetus, 685
gonad, 469
Leydig cell, 1180
vasopressin gene
537
vasopressin precursor
Brattleboro rat, 1177
vasopressin receptor
review, 1183
vasopressin secretion
hemorrhage, 1272
osmoreceptor, 1189
VIP
adrenal cortex, 841
errection, 1286
insulin secretion, 120
prolactin secretion, 1393
pulsatile prolactin secretion, 1387
sexual arousal, 1286
VIP receptor
functional property, 1227
vitamin D metabolite
osteoporosis, 1249
vitamin D receptor
regulation, 766
review, 763
structure, 765
vitamin D3
osteoporosis, 1242
vitamin E
adrenal gland, 279
vitellogenin
estrogen, 633
gene transcription, 633