

Recent progress in luteinizing hormone/human chorionic gonadotrophin hormone research

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ABSTRACT: The role of luteinizing hormone (LH) and human chorionic gonadotrophin hormone (hCG) in the regulation of normal reproductive functions in males and females is quite well established. Besides the use of hCG in the development of diagnostic immunoassays, it has been successfully used in the induction of final follicular maturation and ovulation in the assisted reproductive technologies. The basic and clinical research on the nongonadal actions of LH/hCG in the recent years has extended the potential of using these hormones in several clinical indications. Hereby we will analyze the advances in the LH/hCG research (briefly emphasizing the nongonadal research), which has the potential for multiple novel therapies in reproductive and the other areas of medicine.

Key words: luteinizing hormone / human chorionic gonadotrophin / luteinizing/human chorionic gonadotrophin receptor / gonadal and nongonadal effects

Introduction

Hypothalamic gonadotrophin-releasing hormone stimulated the secretion of luteinizing hormone (LH) by the anterior pituitary. Human chorionic gonadotrophin (hCG) is secreted by the placenta (Pierce and Parsons, 1981). Both LH and hCG are heterodimeric glycoprotein hormones belonging to cystine-knot growth factor families possessing the properties of cytokines and chemokines (Lapthorn et al., 1994). hCG is structurally related to LH and both hormones bind to the same LH/choriogonadotrophin receptor (LHCGR). LHCGR belongs to a family of seven-trans membrane spanning G-protein coupled receptors (McFarland et al., 1989; Ascoli et al., 2002). hCG is more potent than LH due to its higher receptor binding affinity and a longer circulatory half-life (Rao, 1979). Chorionic gonadotrophin is produced in primates, equines and in man, whereas LH is present in all species. hCG appears in the circulation around the time of implantation, increases to reach its peak about ninth week of pregnancy and then drops down to about one-tenth of the peak levels and remains there until the end of pregnancy. hCG is believed to be essential for the maintenance of the pregnancy by stimulating progesterone production by the corpus luteum gravidarum, although this concept was challenged by the discoveries of the multiple actions of hCG in nongonadal tissues throughout pregnancy and during labor (Lei and Rao, 2001a, b). hCG has been shown to

stimulate testosterone production of fetal Leydig cells (Huhtaniemi and Pelliniemi, 1992; Huhtaniemi et al., 1977; Apaja et al., 2005). This review will concentrate on the LH/hCG in reproductive biology and general medicine with particular emphasis on nongonadal research.

The majority of the studies on nongonadal LH/hCG receptors were done on human rather than on other species (Rao and Lei, 2007). Although the studies on nongonadal LH/hCG actions led to a greater potential for novel therapeutic uses of hCG/LH than from the studies on the gonadal actions of LH/hCG (for a review, see Rao and Lei, 2007), few studies have been done in transgenic murine models, where physiologic significances of nongonadal LHR expression in reproductive function is questioned (Ahtaiainen et al., 2007; Pakarinen et al., 2005, 2007). We will enclose a brief discussion on some recent studies based on transgenic murine models either overexpressing or showing disrupted genes, including analysis of the pros and cons of LH/hCG actions in nongonadal tissues.

The LH/hCG research on reproductive biology issues

Classical expression of the LHCGR has been well established in the testicular Leydig and ovarian theca, granulosa and luteal cells where

Recent Progrob In Hormone Research

Gregory Pincus



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Recent Progress in Hormone Research P. Michael Conn, 1999 **Recent Progress in Hormone Research** Astwood, E B, Ed, 1969 **Recent Progress in Hormone Research** Roy O. Greep, 2013-10-22

Recent Progress in Hormone Research Volume 32 covers the proceedings of the 1975 Laurentian Hormone Conference. The book discusses genetic approaches to steroid hormone action, the cytochemical bioassay of hormones, and the crystal structure of steroids. The text also describes the gonadotropin releasing hormone and thyrotropin releasing hormone, the ontogenesis of pituitary hormones, and hypothalamic factors in the human fetus and the etiologies of sexual maturation. The epidemiologic studies of diabetes in the Pima Indians and the adrenal cortex and essential hypertension are also considered. The book further tackles the testicular control of follicle stimulating hormone secretion and nuclear receptors, and the initiation of thyroid hormone action. The text then encompasses the receptor function and ion transport in turkey erythrocytes, the regulation of adenylate cyclase coupled beta adrenergic receptors, and the control of cyclic AMP metabolism in parental and hybrid somatic cells. The molecular mechanisms of cyclic AMP action are also looked into. Endocrinologists, physiologists, molecular biologists, and biochemists will find the book invaluable.

Recent Progress in Hormone Research Laurentian Hormone Conference, 1948 *Recent Progress in Hormone Research* E. B. Astwood, 2013-10-22

Recent Progress in Hormone Research Volume 25 presents the proceedings of the 26th meeting of the Laurentian Hormone Conference held in Mont Tremblant, Quebec, Canada, on August 23-29, 1968. The book presents papers on reproductive endocrinology, i.e., a model for the regulation of ovulation in the rat; comparative aspects of uterine luteal relationships; proinsulin, i.e., proinsulin and the biosynthesis of insulin; and the secretion of hormones by tumors of nonendocrine origin, i.e., clinical and laboratory studies of ectopic humoral syndromes. The text also includes papers on the ultrastructure of the endocrine glands, on the thyroid, i.e., studies of the thyroid iodide trap in human, on neuroendocrinology, i.e., the mammalian pineal as a neuroendocrine transducer, and on steroid hormones, i.e., metabolic events associated with steroid hydroxylation by the adrenal cortex and steroid dynamics under steady state conditions. Endocrinologists and people involved in hormone research will find the book invaluable.

Recent Progress in Hormone Research Roy O. Greep, 2013-10-22

Recent Progress in Hormone Research Volume 29 covers the proceedings of the 1972 Laurentian Hormone Conference held in Mont Tremblant, Province of Quebec, Canada, on August 27-September 1, 1972. The book discusses the studies on sex differentiation in mammals, male pseudohermaphroditism in the laboratory Norway rat, and androgen metabolism and mechanism of action in male pseudohermaphroditism. The text also describes the mechanism of initiation of parturition in the ewe, the neurovascular regulation of the anterior hypophysis, and microtubules and beta cell secretion. The role of microtubules and microfilaments in thyroid secretion, the functional and morphological alterations produced in target cells by anti-inflammatory steroids, and protein kinases are also considered. The book further tackles the role of phospholipids in hormone activation of adenylate cyclase, the chemistry of growth hormone, and the lactogenic

hormones and hormonal regulation of gene expression in mammary cells The text then encompasses the endocrine and metabolic effects of experimental obesity in human the studies on luteinizing hormone and its subunits and chemical studies of luteinizing hormone from human and ovine pituitaries The studies on the structure and function of interstitial cell stimulating hormone are also looked into *Recent Progress in Hormone Research* Gregory Pincus,2013-10-22 Recent Progress in Hormone Research Volume IV is a collection of papers delivered at the 1948 Laurentian Hormone Conference held at Franconia New Hampshire This volume is composed of four parts encompassing 16 chapters that cover experimental works on the role of hormones in metabolism and the thyroid physiology and function The opening part deals with some aspects of steroid hormone metabolism including progesterone estrogen and androgen This part emphasizes the clinical aspects of physiology and function of ovarian hormones The subsequent part is devoted to the role of hormones in tissue and body metabolism This part particularly describes the antihormone problem in endocrine therapy and the alterations in metabolism incident to administration of insulin adrenalin and thyroid substances The metabolic changes under adrenal and pituitary hormone administration are also examined These topics are followed by discussions on the neurohumoral hypothalamic relationships specifically the adrenal function in mental disease and effects of hypothalamic lesions on water and energy metabolism The final part covers the conditions influencing the production and release of thyroid stimulating hormone by the anterior pituitary the primary actions of the hormone on its target gland a possible mode of action and the factors that influence this hormone s action on the thyroid This book will prove useful to endocrinologists **Recent Progress in Hormone Research** Gregory Pincus,1949 **Recent Progress in Hormone Research** James H. Clark,2013-10-22 Recent Progress in Hormone Research Volume 45 covers the proceedings of the 1988 Laurentian Hormone Conference The book presents papers on the molecular characterization of the glucocorticoid receptor the estrogen regulation of gene transcription and mRNA stability and the molecular and cellular biology of mammalian progesterone receptors The text also includes papers on the molecular basis of regulation of ionic channels by G proteins the role of biologically active follicle stimulating hormone in reproduction and the role of glycosylphosphoinositides in signal transduction Papers on the mechanisms of growth control in normal and malignant breast epithelium the biochemical and structural analysis of the nerve growth factor receptor and the isolation molecular cloning and mechanism of action of parathyroid hormone related protein are also considered The book further tackles the regulation and dysregulation of adiponin in obesity and other metabolic states Endocrinologists physiologists biochemists and scientists involved in hormone research will find the book invaluable **Recent Progress in Hormone Research** C. Wayne Bardin,2014-05-10 Recent Progress in Hormone Research Volume 48 provides information pertinent to endocrine research dealing with all aspects of biological organization This book covers a variety of topics including differentiation of the embryo development and growth at puberty maintenance of adult well being and aging Organized into 29 chapters this volume begins with an overview of the role of

oncogenes in fetal development This text then compares the molecular descriptions of the genes for growth hormone and prolactin receptors to receptors for a variety of other hormones peptide and growth factors Other chapters consider the three dimensional structure of the growth hormone receptor This book discusses as well the conventional and nonconventional uses of human growth hormone with emphasis on the wide availability of protein that is possible only through molecular biology The final chapter deals with the effect of hormones on primate behavior This book is a valuable resource for geneticists and biologists

Recent Progress in Hormone Research Roy O. Greep, 2013-10-22 Recent Progress in Hormone Research Volume 31 covers the proceedings of the 1974 Laurentian Hormone Conference held in Mount Tremblant Quebec Canada on August 25-30 1974 The book discusses the relationship between catecholamines and other hormones the hormone receptor complexes and their modulation of membrane function and receptors for insulin NSILA s and growth hormone The text also describes the mechanism of action of pituitary growth hormone hormonal regulation of ovalbumin synthesis in the chick oviduct and studies on the hepatic glucocorticoid receptor and on the hormonal modulation of specific mRNA levels during enzyme induction The endocrine neurons the formation of estrogens by central neuroendocrine tissues and the operating characteristics of the hypothalamic pituitary system during the menstrual cycle and observations of biological action of somatostatin are also considered The book further tackles somatostatin the relationship of sleep and sleep stages to neuroendocrine secretion and biological rhythms in human and the genetic approaches to the study of the regulation and actions of vasopressin The identification and actions of gastric inhibitory polypeptide the studies on the pathogenesis of Graves ophthalmopathy and qualitative and quantitative gonad pituitary feedback is also looked into

Recent Progress in Hormone Research E. B. Astwood, 2013-10-22 Recent Progress in Hormone Research Volume 24 covers the proceedings of 25th meeting of the Laurentian Hormone Conference held in Mont Tremblant Quebec on August 2-September 1 1967 This book is organized into six parts encompassing 13 chapters and begins with reviews on the mechanism of action of various hormones The next parts deal with the activation by hormones of adenyl cyclase in various tissues and the intermediation of 3',5'-cyclic adenosine monophosphate These topics are followed by discussions on the functions of the gonadotropins and the control of the ovary and testis by the pituitary Other parts consider the progress in defining the nature and action of the hormone thyrocalcitonin The remaining parts examine the insect juvenile hormone of the complex vertebrate endocrinology This book is directed primarily toward endocrinologists and biologists

Recent Progress in Hormone Research - Volume 49 C. Wayne Bardin, 2013-10-22 Among the topics covered in Volume 49 are neurotransmitter transporters circadian rhythms transgenic model for studying islet development protein phosphatases the androgen receptor molecular genetics of steroid 5 α reductases and benign and malignant prostatic neoplasms

Recent Progress in Hormone Research - Volume 50 C. Wayne Bardin, 2013-10-22 Recent Progress in Hormone Research Volume 50 Proceedings of the 1993 Laurentian Hormone Conference focuses on the advancements of processes methodologies

techniques and approaches involved in hormone research The selection first offers information on the molecular design of the NMDA receptor channel synthesis and signaling of growth hormone releasing hormone and signaling mechanisms during the response of pituitary gonadotropes to GnRH The discussions focus on calcium economy of gonadotropes role of oscillations structure and expression of the GHRH gene transgenic animal models for GHRH action and functional determinants in NMDA receptors The text then elaborates on signaling mechanisms during the response of pituitary gonadotropes to GnRH molecular genetic analysis of cAMP and glucocorticoid signaling in development and activins and the receptor serine kinase superfamily The publication takes a look at MAP kinase cascade expression and signal transduction pathways of gonadotropin releasing hormone receptors ovarian cell differentiation and the role of oxytocin and its receptor in parturition The book also examines the role of prolactin in developmental differentiation of hypophysiotropic tuberoinfundibular dopaminergic neurons and calcitonin gene expression in rat uterus during pregnancy The selection is a valuable source of data for researchers interested in hormone research Neuroendocrinology Transmembrane signaling Reproduction Steroids and the steroid receptor family Hypertension

Recent Progress in Hormone Research Roy O. Greep, 2013-10-22

Recent Progress in Hormone Research Volume 41 covers the proceedings of a Laurentian Hormone Conference held in late August 1984 at the Homestead in Hot Springs Virginia The book presents papers on the hormone receptor interactions the biosynthesis secretion metabolism and mechanism of action of the steroid hormones and the mechanisms of action of thyroid stimulating hormone TSH and TRH The text also includes papers on the molecular characterization of a brain specific mRNA and the factors affecting changes in frequency and amplitude of GnRH pulses and the resulting functional consequences in various mammals including humans with disorders of fertility Papers on the biological heritage of mammalian endocrinology such as the actions of urotensin I in mammals and fishes and the clinical implications of the glycosylation and posttranslational processing of the TSH are also encompassed Endocrinologists neuroscientists biochemists biophysicists and scientists involved in hormone research will find the book invaluable

Recent progress in hormone research Gregory Pincus, 1960

Recent Progress in Hormone Research Laurentian Hormone Conferences Staff, 1970

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Recent Progress in Hormone Research Volume 22 is a collection of papers presented at the 1965 Laurentian Hormone Conference held at the Mont Tremblant Lodge in Mont Tremblant Quebec Canada This book is organized into five parts encompassing 14 chapters and begins with an introduction to the identification and chemical characterization of hormones such as parathyroid hormone the prostaglandins and ecdysone The next chapters deal with the physiological functions of known hormones based on papers concerned with insulin somatotropin the mechanisms regulating adrenocortical hormone secretion avian gonadal cycles and the initiation of reproductive processes in pubertal animals These topics are followed by discussions on the biochemical basis of steroid hormone metabolism some consequences of secretory dynamics and metabolic transformations This book also

surveys the biological effects of steroid analogs with a particular emphasis on the relation between hormone structure and function The remaining chapters consider the problem of aldosterone and ecdysone mode of action as well as hormones in fetal life Endocrinologists and biologists will find this book rewarding **Recent Progress in Hormone Research** Gregory Pincus,1954 Recent Progress in Hormone Research Gregory Pincus,1985

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sep 19 2023 njideka akunyili crosby s new print the beautiful ones may have arrived represents her first foray into an area of artistic production that she has been considering for some time it is both a statement of continuity with the subject matter

and style that has dominated her painted work for over a decade and a novel departure in terms

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njideka akunyili crosby b 1983 the beautiful ones signed and dated akunyili 2012 lower left acrylic pastel colour pencil and xerox transfer on paper 95 5 8 x 66 7 8in 243 x 170cm executed in 2012 provenance zidoun and bossuyt gallery luxembourg

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begun in 2014 njideka akunyili crosby s ongoing series the beautiful ones is comprised of portraits of nigerian children including members of the artist s family derived from personal photographs and more recently from images taken during her frequent visits to nigeria where akunyili crosby lived until the age of sixteen

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the title of the series the beautiful ones is borrowed from the 1968 novel the beautiful ones are not yet born by ghanaian writer ayi kwei armah the subject of this particular image is

the beautiful ones series 2 njideka akunyili crosby - Feb 21 2023

the beautiful ones series 2 2013 acrylic transfers colored pencil and pastel on paper 5 1 ft 3 5 ft

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web this animal research project lapbook and booklet is a great way for students to research an animal and showcase their findings students will have so much fun learning about different animals and making their lapbooks this animal research project is perfect for 1st 2nd or 3rd grade students there are two options to make it easy for you

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and rubrics thousands of teachers have used this 5 star resource to have students complete self guided animal research projects to learn about any animal they choose

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web irubric cx7b72x students will research an animal and create a model of the animal that moves within its rainforest ecosystem free rubric builder and assessment tools

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web students will be guided through a process to create a desert animal based on facts about the desert biome and adaptations that are appropriate for this habitat students will also create a common and scientific name based on scientific classification rubric included for ease of grading

irubric animal habitat diorama and research grade 2 rubric - Oct 21 2022

web irubric b3a45c students will create a diorama of the animal s habitat and write a short explanation about their diorama free rubric builder and assessment tools irubric animal habitat diorama and research grade 2 rubric b3a45c rcampus

irubric second grade animal project rubric rx98w39 - Jul 30 2023

web irubric rx98w39 students will research an animal and create a poster to illustrate important details in the life of the animal they must include a written component in the child s handwriting 2 3 pictures of the animal a reference list citing the book and website used a reference for the source of the images

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informational articles about oceans k w l vocabulary posters vocabulary flip flaps ocean animals

[irubric classification of animals project rubric rcampus](#) - May 16 2022

web classification of animals project classification of animals project students will research two specific animals for classification 1 one animal will be either a mammal reptile amphibian bird or fish 2 the other animal will be a mollusk insect arthropod or worm

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web animal research project dear parents beginning the week of may 5 2014 we will begin a unit on animals as part of our study each child will need to create a project about an animal the project will begin with each student choosing the animal they wish to research we will do this in class next they will use a research fact sheet to find specific

results for animal research project grade 2 rubric tpt - Apr 26 2023

web this animal diorama rubric makes it easy for teachers to score projects and presentations as they walk around the room even though this rubric was made specifically for grade 3 ckla unit 2 animal classification projects it can easily be used as a summative assessment for any animal unit or used as a research project

[irubric animal habitat diorama and research grade 2 rubric](#) - Jul 18 2022

web animal habitat diorama and research grade 2 students will create a diorama of a habitat or ecosystem such as tundra ocean pond rain forest forest or desert it should include the animals plant life and climate native to the habitat

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web this rubric is designed to grade a research project using standards based grading 1 4 rubric it is a great tool to quickly grade student work at the end of our adaptations unit each student chooses an animal to research and creates a powerpoint

presentation or google slide to demonstrate the knowledge that they learned

how to explode student engagement with this habitat research project - Mar 26 2023

web mar 2 2021 one huge 2nd grade standard is researching and learning about animals and their adaptations students love this unit but teachers can be intimidated by the overwhelming pressure involved in guiding student research at such a young age i love doing this 2nd grade animal research project with my students every march

grassland biome create an animal project teacher made - Sep 19 2022

web students will be guided through a process to create a grassland animal based on facts about the grassland biome and adaptations that are appropriate for this habitat students will also create a common and scientific name based on scientific classification this project includes a rubric for easy assessment