Endocrinologia 2012/2013

Codi: 100860
Crèdits ECTS: 6

Titulació	Pla	Tipus	Curs	Semestre
2500252 Graduat en Bioquímica	814 Graduat en Bioquímica	OT	0	0

Professor de contacte

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Utilització d´idiomes

Llengua vehicular majoritària: espanyol (spa)
Algun grup íntegre en anglès: No
Algun grup íntegre en català: No
Algun grup íntegre en espanyol: No

Prerequisits

Haber superado la asignatura de Fisiología Animal, así como de Biología Celular y Bioquímica.

Objectius

La asignatura de "Endocrinología" es una optativa del último curso, por lo que el alumno tiene ya un gran nivel de conocimientos, incluidos los derivados de las asignaturas obligatorias de Fisiología Animal, que permitirá profundizar en esta materia.

Se usará fundamentalmente publicaciones científicas (Nature, Science, Cell, etc.) como fuente bibliográfica, lo que redundará en beneficio del alumno también desde el punto de vista del dominio del inglés.

Se analizará las funciones de los diversos ejes neuroendocrinos, dando mucho énfasis a las interacciones entre los mismos y con el sistema nervioso central. Además de los ejes endocrinos básicos, también se prestará atención a hormonas no glandulares.

La endocrinología de mamíferos será la parte fundamental de esta asignatura. En la medida de lo posible se analizarán las consecuencias prácticas de estudios en modelos animales para el ser humano.

Competències

- Aplicar els recursos informàtics per a la comunicació, la recerca d'informació, el tractament de dades i el càlcul.
- Col·laborar amb altres companys de treball.
- Demostrar que té una visió integrada de la funció d'hormones, neurotransmissors i factors de creixement en el control de l'expressió gènica i del metabolisme.
- Descriure els sistemes de comunicació intercel·lular i intracel·lular que regulen la proliferació, diferenciació, desenvolupament i funció de teixits i òrgans d'animals i plantes.
- Entendre el llenguatge i propostes d'altres especialistes.
- Gestionar la informació, organització i planificació del treball.
- Llegir textos especialitzats tant a llengua anglesa com a les llengües pròpies.
- Pensar d'una forma integrada i abordar els problemes des de diferents perspectives.

Resultats d´aprenentatge

1. Aplicar els recursos informàtics per a la comunicació, la recerca d'informació, el tractament de dades i el càlcul.
2. Col·laborar amb altres companys de treball.
3. Comparar la neuroendocrinologia dels eixos hipotàlem-hipofisarioadrenal, hipotàlem-hipofisario-tiroide i hipotàlem-hipofisario-gonadal i hipotàlem-hipofisario-somàtic.
4. Descriure el control neuroendocrinològic de la prolactina.
5. Descriure els mecanismes implicats en el manteniment dels fluids corporals.
6. Descriure la funció endocrina del pàncrees.
7. Descriure la superfamília de receptors nuclears: Estructura general, elements de resposta. El seu control de l'expressió gènica i efectes no genòmics de les hormones hidrofòbiques.
8. Distingir les diferents famílies generals de receptors endocrí i les seves característiques.
9. Entendre el llenguatge i propostes d'altres especialistes
10. Explicar el control del pes corporal i la regulació hormonal de la diferenciació sexual.
11. Explicar el control del sistema endocrí per l'hipotàlem.
12. Explicar el control endocrí del creixement.
13. Explicar la naturalesa de les hormones, l'origen evolutiu del sistema endocrí i la coevolució amb els seus receptors.
14. Explicar la relació entre creixement i aportament calòric.
15. Gestionar la informació, organització i planificació del treball.
16. Llegir textos especialitzats tant a llengua anglesa com a les llengües pròpies.
17. Pensar d'una forma integrada i abordar els problemes des de diferents perspectives.

Continguts

TEORÍA:

1. Introducción. Hormonas: moléculas difusibles de señalización. Origen evolutivo del sistema endocrino. Coevolución de hormonas y sus receptores. Familias generales de receptores endocrinos y sus principales características.

2. Control del sistema endocrino por el hipotálamo. Unidad hipotálamo-pituitaria. Nociones sobre el desarrollo del hipotálamo y la hipófisis; bolsa de Rathke. Factores críticos.

3. Control del peso corporal: ingesta y gasto energético. Mecanismos centrales y periféricos. NPY/AGRP, POMC-aMSH /CART, GABA, leptina, insulina. Otros factores orexigénicos/anorexigénicos.

4. Ritmos biológicos. Uso de la luz y de la alimentación como mecanismos sincronizadores. Núcleo supraquiasmático: divisiones, conexiones y principales factores implicados.

5. Neuroendocrinología del eje hipotálamo-hipofisario-adrenal (HPA): CRH-ACTH-GC. Familia CRH/urocortina. Distribución de las neuronas de CRH. Núcleo paraventricular: divisiones, conexiones y principales factores implicados. Receptores CRH1, CRH2, GR, MR. Eje HPA y malnutrición. Funciones centrales del CRH. Respuesta al estrés. Estrés, eje HPA & ansiedad, depresión. Interacciones con el sistema inmunitario.

6. Neuroendocrinología del eje hipotálamo-hipofisario-tiroideo (HPT): TRH-TSH-T3, T4. Distribución de las neuronas de TRH. Regulación de la síntesis y secreción de TRH: temperatura, malnutrición, estrés, interacción con el sistema inmunitario. Funciones centrales de TRH.

7. Crecimiento I. Heredabilidad & susceptibilidad. Aceleración & desaceleración. Catch-up. Senescencia. Crecimiento saltatorio. Crecimiento & desarrollo intrauterino: principales familias de factores de crecimiento (IGF, EGF-TGF-, FGF, PDGF, VEGF, TGF-b…). Crecimiento & gene imprinting.

8. Crecimiento II. Crecimiento postuterino. Gigantismo y enanismo GH-dependiente. Neuroendocrinología del eje hipotálamo-hipofisario-"somático": GHRH-GH-IGF-1. Familia GHRH/PACAP/glucagón... Distribución de las neuronas de GHRH y somatostatina que controlan la GH. Regulación eje HPS: integración con el sistema de control del peso, esteroides sexuales, tiroideas, glucocorticoides.

9. Crecimiento III: Unidad funcional GH-IGFs, efectos directos *vs* indirectos GH. IGFBPs. Papel de otras

hormonas: tiroideas (y TSH), esteroides sexuales (y FSH), leptina y simpático, glucocorticoides. RANK y RANKL. Malnutrición & obesidad exógena & insulina. Enanismo psicosocial.

10. Crecimiento y aporte calórico: relación aparente con el envejecimiento. Posible papel del eje GH-IGF-I/insulina. Sirtuinas. mTOR. Estrés oxidativo. ADN mitocondrial. p53. Telómeros.

11. Diferenciación sexual: sexo genético, gonadal y fenotípico. XIC: X inactivation center. SRY y otros factores críticos en el desarrollo & mantenimiento gonadal. Genitales internos y externos: principales hormonas implicadas. Estados intersexuales: clasificación de Prader.

12. Neuroendocrinología del eje hipotálamo-hipofisario-gonadal. Distribución de las neuronas de GnRH. Regulación de la síntesis y secreción de GnRH: generador de pulsos *versus* pico preovulatorio. Funciones centrales de GnRH. Pubertad: neuronas KiSS.

13. Diferenciación sexual de la conducta I. Psicoendocrinología. Información genética*versus* ambiente. Conducta sexual de modelos animales: Acción organizadora y activadora de las hormonas sexuales. Bases neurales de las diferencias sexuales en la conducta. SRY y cerebro. Genomic imprinting & cerebro.

14. Diferenciación sexual de la conducta II. Elección de pareja. Proceptividad, atractividad y receptividad: factores que parecen influir en primates/humanos. Olores, feromonas, y MHC. Sexo, recompensa y vínculos de pareja: vasopresina, oxitocina y dopamina. OT, VP & conductas sociales. Conducta maternal: OT, esteroides sexuales, prolactina. Neuronas PHDA, THDA, TIDA.

15. Diferenciación sexual de la conducta III. Identidad de género, transexualidad. Comportamiento de género. Diferencias sexuales cognitivas. Orientación de género.

16. a-MSH. Proopiomelanocortina (POMC). Distribución de las células de POMC: expresión central *versus* periférica. Función clásica de la a-MSH: control de los cromatóforos. Funciones no clásicas: melanocortinas.

PRACTICAS:

Estudio de la diabetes experimental inducida por estreptozotocina en rata

Metodologia

Las actividades formativas se componen (a) de clases teóricas, con el formato habitual de clase magistral apoyada por imágines obtenidas normalmente de artículos científicos. Mucho de este material estará a disposición del alumno en el campus virtual; (b) prácticas, en las que se analizará un modelo animal de diabetes experimental; y (c) seminarios, donde en la medida de lo posible se efectuarán pruebas funcionales con los alumnos. Estas actividades necesariamente se han de complementar con otras supervisadas y autónomas.

Activitats formatives

Títol	Hores	ECTS	Resultats d´aprenentatge
Tipus: Dirigides			
Clases teóricas	35	1,4	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
Prácticas	12	0,48	1, 2, 6, 9, 10, 12, 14, 15, 16, 17
Seminarios	4	0,16	1, 2, 3, 9, 10, 11, 15, 16, 17
Tipus: Supervisades			
Preparación de seminarios	6	0,24	1, 2, 3, 10, 11, 15, 16, 17
Tipus: Autònomes			

Elaboración de trabajos	14	0,56	1, 2, 3, 6, 9, 10, 11, 12, 14, 15, 16, 17
Estudio	65	2,6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Avaluació

Los conocimientos teóricos se valorarán mediante dos parciales; deberá superarse el 4.5 para poder hacer media de los dos parciales. Caso de que deba realizarse (al final del curso) el examen de recuperación, éste podrá ser del primer, segundo o ambos parciales en función de las notas obtenidas anteriormente. El examen será tipo test, de 4 posibles respuestas siendo cierta solo una, y usando la penalización blanda en la corrección.

Las prácticas se valorarán mediante la presentación de resultados y examen tipo test.

Los seminarios se valorarán mediante presentación y discusión de resultados y examen tipo test.

Se ha de superar el 5 en conjunto para aprobar la asignatura

Activitats d´avaluació

Títol	Pes	Hores	ECTS	Resultats d´aprenentatge
Examen de teoría	80%	6	0,24	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
Prácticas	10%	4	0,16	1, 2, 3, 6, 9, 10, 11, 12, 14, 15, 16, 17
Seminarios	10%	4	0,16	1, 2, 3, 6, 9, 11, 12, 14, 15, 16, 17

Bibliografia

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Títol Williams textbook of endocrinology [Recurs electrònic]
ISBN 9781416029113 (versió paper)
9780323045827
Edició 11th ed. / Henry M. Kronenberg ... [et al.]
Publicació Philadelphia : Saunders Elsevier, c2008

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INTRODUCCIÓN

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FACTORES HIPOTALÁMICOS: CRH

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