Faculty of Medicine
School of Medical Sciences

PHSL3321

Endocrine, Reproductive and Developmental Physiology

COURSE OUTLINE and PRACTICAL MANUAL

SEMESTER 2, 2017

CRICOS Provider Code 00098G

CONTENTS

Please read this manual/outline in conjunction with the following pages on the School of Medical Sciences website:

- Advice for Students
- Learning Resources

(or see "STUDENTS" tab at medicalsciences.med.unsw.edu.au)

1. COURSE STAFF

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* consultation times by arrangement with specific staff member

The Department of Physiology in the School of Medical Sciences is located primarily on the 3rd floor of the Wallace Wurth building and is within the School of Medical Sciences, Faculty of Medicine.

Professor Gary Housley is Head of Department and appointments may be made directly with him (g.housley@unsw.edu.au or phone 9385 1057).

2. COURSE INFORMATION

a) General Introduction

Endocrine, Reproductive and Developmental Physiology is a 3rd year Science Course / Level III Physiology course usually undertaken upon successful completion of Physiology 1A (PHSL2101/2121/2501) and 1B (PHSL2201/2221/2502). It is worth six units of credit (6 UOC). The course usually forms part of a major in Physiology and/or Pharmacology in a Bachelor of Science or Bachelor of Medical Sciences degree.

This course has been developed with the aim of stimulating your interest and expanding your knowledge in the areas of endocrinology, reproduction, fertility and fetal development. The endocrine and reproductive physiology component builds on areas covered in Physiology 1B. The study of developmental physiology examines a wide range of organ systems and endocrine functions in the fetus, newborn and pregnant woman, and in this part of the course you will draw on your knowledge of these systems and processes from the relevant parts of Physiology 1A and 1B, and also your understanding of basic anatomy and biochemistry. The Level III Physiology subject most closely related to this course is Cardiovascular Physiology and Pathophysiology (PHSL3211).

The learning and teaching philosophy that underpins this course is our firm belief that a subject offered in the final session of your degree should not only develop a deeper understanding of physiology, but also foster the development of skills useful for your future career. All learning activities in the course are designed with this in mind.

b) Aims

This course aims to:

1. develop your understanding of the structure, function, control and pathophysiology of endocrine systems;
2. develop your understanding of the mechanisms associated with male and female reproduction and fertility;
3. provide you with an understanding of normal fetal growth and development, post-natal adaptation and survival, and maternal physiology;
4. develop your skills in teamwork, problem solving, communicating with peers, making presentations, independent learning, data analysis and report writing; and
5. stimulate an interest in and appreciation of biomedical research.

c) Science Graduate Attributes, UNSW

UNSW aims to provide an environment that fosters in you the following qualities, skills and attributes during your time here as a Science student:

Science Graduate Attributes, UNSW

1. **Research, inquiry and analytical thinking abilities.**
   Technical competence and discipline specific knowledge. Ability to construct new concepts or create new understanding through the process of enquiry, critical analysis, problem solving, research and inquiry.
2. **Capability and motivation for intellectual development.**
   Capacity for creativity, critical evaluation and entrepreneurship. Ability to take responsibility for and demonstrate commitment to their own learning, motivated by curiosity and an appreciation of the value of learning.
3. **Ethical, Social and Professional Understanding.**
   Ability to critically reflect upon broad ethical principles and codes of conduct in order to behave consistently with a personal respect and commitment to ethical practice and social responsibility. Understanding of responsibility to contribute to the community. Respect and value social, multicultural, cultural and personal diversity.
4. **Communication.**
   Effective and appropriate communication in both professional (intra and inter disciplinary) and social (local and international) contexts.
5. **Teamwork, collaborative and management skills.**
   Ability to recognise opportunities and contribute positively to collaborative scientific research, and to perceive the potential value of ideas towards practical applications. Demonstrate a capacity for self- management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.
6. **Information literacy.**
   Ability to make appropriate and effective use of information and information technology relevant to their discipline.

The generic UNSW Graduate Attributes can also be found at https://teaching.unsw.edu.au/graduate-outcomes

Endocrine, Reproductive and Developmental Physiology addresses each of these Science Graduate Attributes. Specific learning outcomes for the course, and the manner in which the course addresses the attributes, are outlined below.

d) Specific Learning Outcomes

1. On completion of this course you should be able to demonstrate your knowledge and understanding of each of the three course themes outlined below [this relates to Science Graduate Attribute (SGA) 1]. You should be able to:

   1a) better understand the structure, function and control of endocrine systems (weeks 1-5), including:
   - thyroid physiology and pathophysiology
   - insulin physiology; type 2 diabetes mellitus
   - endocrine control of body weight; endocrine functions of white adipose tissue
   - biosynthesis and actions of adrenal corticosteroids

- the adrenal medulla and pathophysiology
- the endocrine and renal response to water immersion
- calcium metabolism and its hormonal control
- the renin-angiotensin system

1b) better understand the science underlying male and female reproduction and fertility (weeks 4-7), including:
- changes with puberty, menopause and andropause
- hormonal contraception
- fertility and assisted reproductive techniques

1c) describe the main features of fetal growth, development and adaptation to life after birth (Weeks 7-13), including:
- cardiovascular development and the unique structural and functional aspects of the fetal cardiovascular system
- fetal fluid regulation and renal function
- fetal endocrinology
- structure and functions of the placenta
- lung development and fetal breathing movements
- maternal adaptations to pregnancy
- the transition from fetal to neonatal life, lactation and early infant nutrition

In addition, after you have completed this course you should be able to:

2. Use your knowledge of developmental physiology to develop an understanding of major areas of current interest in developmental research [SGAs 1 & 6], including:
   - developmental origins of health and adult disease
   - imprinting/epigenetics
   - the physiological basis of neonatal intensive care
3. Demonstrate an ability to contribute effectively in a group to solve a scientific problem. An effective contribution includes critical enquiry i.e. asking questions to clarify points/prompt scientific discussion [SGAs 1, 3, 4, 5].
4. Identify areas in your knowledge of physiology that could be improved, and carry out the self-directed learning necessary to “fill the gaps” [SGAs 1, 2, 6].
5. Research scientific information and communicate it to your colleagues and academic staff in written and oral format [SGAs 1, 4, 6].
6. Critically analyse and report on experimental data in the light of current information within the literature [SGAs 1, 2, 4, 6].
7. Conduct a focused literature search on a topic related to reproduction and developmental physiology and succinctly present this synopsis to your colleagues and academic staff [SGAs 1, 2, 4, 6].
8. Demonstrate some familiarity with examples of research in areas related to fetal physiology and development [SGAs 1, 6].

e) Teaching Strategies

A variety of teaching strategies are used in this course:

Lectures introduce aspects of core material and insights into recent research and current practice. The course convenor conducts research in fetal and developmental physiology. We are also fortunate to have a large number of guest lecturers who are expert in their particular area of research or clinical practice. This means that you will gain an insight into both the basics and the latest issues relating to each of the course themes [specific learning outcomes 1 and 2].

The ***problem based learning tutorials*** (PBLs) will form a large part of your study of endocrinology. These are designed not only to develop your knowledge of endocrine physiology [specific learning outcome 1a], but also to encourage the development of self-directed learning, teamwork, and communication and presentation skills [specific learning outcomes 3, 4, 5]. More information about PBL tutorials is given later in these notes.

Practical sessions and discussion classes are designed to give you a deeper understanding of particular aspects of the course. The practical class '*Gestational diabetes and screening in pregnancy'* enables you to carry out a glucose tolerance test, to learn more about gestational diabetes (a condition affecting 3-8% of pregnant women in Australia) and to examine screening principles including sensitivity, specificity, positive predictive value and negative predictive value [learning outcome 6]. You will consider the endocrine and renal control of circulating volume in the discussion class on *'Hormonal effects of water immersion'* [learning outcome 1a]. In *'Cross-dressing or crossing over'* you will consider sex determination in humans and the issue of intersex [learning outcomes 1b/c and 3]. During a ***visit to the neonatal intensive care unit*** at the Royal Hospital for Women, Randwick you will have a 'once in a lifetime' opportunity to see how our understanding of fetal and neonatal physiology is applied to treating preterm infants [learning outcome 2]. You will also critically analyse and present a research topic related to reproduction, developmental or fetal physiology in the form of an ***oral presentation*** [learning outcomes 7 & 8].

3. ASSESSMENT

Component	Mark allocation
Case based learning	20%
Oral presentation	10%
Exam 1 (Endocrine & Reproduction)	35%
Exam 2 (Developmental physiology)	35%
Total	**100%**

Details of assessment components and their rationale

The assessment components in this course are designed to help you to develop the skills outlined in the specific learning outcomes, as well as assessing your knowledge.

Case-Based Learning.
There are two parts to this

(1) Problem Based Learning Classes. Your participation and presentations in three of the four problem based learning (PBL) classes contributes 10% to your final mark. A description of problem based learning and its assessment is included on the following pages.

(2) Endocrinology Assignment. This written report based on a case study in endocrinology will contribute to 10% of your final mark and should be submitted via Moodle by **10 am Monday of Week 9 (18/9/17)**. Details about this assignment are on pp.17-19. This exercise addresses the specific learning outcomes 1b, 4 and 5 (above). Please note that late submission of this assignment will incur a penalty.

Group Oral Presentation. In week 12 or week 13, you will give an oral presentation in which you provide your colleagues with up to date information on a topic relating to reproduction, fetal or developmental physiology, which will constitute 10% of your final mark. You will work in small groups to prepare and present your talks, and you will be assessed both by your peers and by members of the academic staff. Each member of the group is expected to participate in the presentation and be able to answer questions on the topic. Attendance is required for all presentations (ie not just your own presentation). Topics and further details will be provided later in the session. The oral presentation session helps to achieve specific learning outcomes 1c, 2, 4, 5, 7 and 8.

Examinations. Two examinations of equal weighting are given in this subject. Both exams are of 2h duration. The midsession exam will be held on **Thursday 7th September (Week 7) at 9:30 am,** and covers all material presented in the course relating to the Endocrinology and Reproductive Physiology components, including all the PBLs. The final exam will be held in the official examination period and assesses the Fetal and Developmental Physiology component of the course including the *Gestational diabetes and screening in pregnancy* practical class. All course material presented prior to and including the 10 am Discussion Class on 4th September is examinable in the midsession exam. All course material presented after and including the 5 pm lecture on 5th September is examinable in the final exam. Each of these examinations will consist of multiple choice questions and short answer (5, 10 or 15 minutes) questions and are designed to help you achieve specific learning outcomes 1, 2 and 8.

Online formative assessment

Formative assessment questions are available online (via Moodle). These questions are multiple choice and are of a similar nature to those that will be in the summative exams. We strongly recommend that you use these as a guide when studying for these exams and to provide feedback to help you learn.

What other feedback can I get to help my learning and to get the most out of this course?

This is a challenging course and the course convenor is very willing to help make this an interesting, satisfying way to end your 3rd year of studies. ***Past exam questions*** are given at the end of this outline, and you are encouraged to work through them to provide yourself with feedback on your progress. There will be a ***practice exam questions and feedback session*** before both the midsession and final exams.

Participation in the **Reading Game** is a good way to increase your familiarity with the course content and assessment performance. Prizes are also awarded.

You are encouraged to ***ask questions during lectures, tutorials and discussion classes***. You will receive ***feedback on your PBL participation and presentations*** in the form of emailed comments and marks after both sessions of the first PBL, and you can also ***ask your PBL facilitator for feedback*** regarding your presentations and participation in discussions. You will receive feedback as well as marks for your assignment and presentations.

If you plan your oral presentation early you can ***ask the course convenor for feedback*** on your design/planned content. If there are any other ways in which you think that you can obtain useful feedback, please contact the course convenor.

4. PROBLEM BASED LEARNING

a) Introduction

Problem based learning provides an opportunity for you, working in a group with others, to determine what you need to know in order to solve a given problem. A facilitator/tutor is present in the class and you are provided with information relating to a clinical problem. The role of the facilitator is to maintain and/or provide direction for the group discussion, but not to lead the discussion. Each group will have approximately 10-12 students. Guidelines for how individuals within the group should interact will be discussed and determined by group members with guidance from the facilitator. Each group will have a Discussion Forum on Moodle which only members of their group and their tutor can access.

Throughout the group discussions a scribe lists relevant information extracted from the information provided, and from the group discussion, under the following three headings:

i. **Known Information:** A summary of the important facts related to the case.

ii. **Hypotheses:** Possible hypotheses generated from the summarised information and the group discussion.

iii. **Learning Objectives:** During the group discussion you set Learning Objectives, a list of topics/questions, which will require further investigation and later reporting to the group. This is the most important part of the exercise. At the end of the first session for each PBL case the facilitator divides the list of topics/questions among the group. Each student researches a learning topic and the following week presents the information they have researched to their group.

This entire process aims to help you not only improve your understanding of endocrine and reproductive physiology (Specific Learning Outcomes 1 and 2, above) but also addresses outcomes 5, 6 and 7.

b) PBL presentations – how to minimise your group's workload!

These PBL presentations will probably occupy the majority of the time away from class that you allocate to the first part of the course. You must keep in mind that you will come away from each PBL session with information from at least 9 other students. PBL content is assessed in the exam and so you need to make sure that you are providing each other with effective study materials. A big part of what makes a good presentation in this context (and this is included in the marking scheme, below) is conciseness. Think about how effective your handout will be as a study guide for the rest of the group. Once it is written, read it through and take out any unnecessary information. At the first PBL session, discuss with your group what rules you want to establish for giving presentations. These rules should be revised after the first round of presentations if necessary. Start with the following basics:

Basic rules for PBL presentations

A strict five-minute time limit (shorter if possible – remember that questions take extra time and that you need to get through ~10 presentations in 90 minutes).

1. Limit each presentation to 4 slides.
2. Limit handouts to a maximum of one page of text (diagrams can be extra if necessary).
3. Handouts should be posted to your group's PBL discussion forum prior to the relevant session.
4. A brief reference list is compulsory. Highlight any references you found particularly informative and which would be useful for the rest of the group to study from.

c) Assessment Criteria for Problem Based Learning Classes

There are two major components in the assessment of the PBL classes:

1) ***Class interaction.*** For these sessions to work well, all members of the group need to participate in the discussion ***to the best of their ability***. The facilitator will assess individuals on their ***participation*** in the group discussion of the topic. This assessment will take into consideration the contribution of the individual to group dynamics e.g. politeness, fairness, respect for the opinions of others, genuine interest in the learning process. If you are not used to working in a group and find this process intimidating, remember that making an effective contribution to the group can be something as simple as taking the initiative to read the information sheet aloud for the rest of the group, or asking somebody to repeat something that you did not understand. This would be regarded as "participated in discussion voluntarily" (see marking scheme below).

2) ***Reporting.*** The second part of the assessment involves the reporting back and discussion of the Learning Objectives, which were allocated in the previous session. The emphasis of the assessment of this component is on how you present the information, and your ability to answer questions on your topic.

d) Are all four PBLs assessed? How will feedback be given?

We want you to use the first PBL to become familiar with the process of problem based learning and to get to know your group. After this PBL, your tutor will send you your assessment via email along with feedback regarding your participation and presentation. **This mark will not contribute to your final assessment**. The remaining 3 PBLs will be formally assessed and we encourage you to use the feedback from your tutor after the first PBL to improve your participation and presentation skills.

e) How is problem-based learning assessed in the exam?

You are not expected to have an intricate knowledge of all of the material covered during each PBL class for the midsession exam. However, you should be able to demonstrate a broad understanding of the learning objectives outlined in each PBL, and be able to describe the physiology underlying each PBL case. In keeping with this, assessment of problem based learning in the exam will be largely by short answer questions, allowing you to demonstrate a broad understanding of the area, rather than by MCQs, which tend to assess specific aspects of your knowledge. Examples of questions relating to PBL classes in past exams are given at the end of this guide. MCQ questions in the formative assessment and practice exam on topics covered by the PBLs should also guide your learning.

Marking scheme:

Class Interaction – Assessed by facilitator during session 1 of PBLs 1-4

Standard	**Mark (out of 5)**	**Required Performance**
Very Poor	0-1	- no participation in class discussion; not obviously listening to other group members
Poor	2	- minimal participation; only participated in response to direct questioning
Adequate	3	- participated in discussion voluntarily;
Good	4	- voluntarily contributed to the group discussion; provided insightful comments or questions
Very Good	5	- major role in group discussion without dominating the group and still allowing other members of the group to contribute

Reporting – Presentation assessed by facilitator during session 2 of PBLs 1-4

Standard	**Mark (out of 10)**	**Required Performance**
Very Poor	0-2	- no research or preparation on allocated topic
Poor	3-4	- inadequate research on the allocated topic - explanation unclear or contains major errors
Adequate	5-7	- adequate research on the topic - mainly accurate information provided, although some errors noted - failure to comply with time limit, slide or handout requirements eg provided too much information
Good	8-9	- topic researched thoroughly - information explained clearly, accurately and concisely - complied with time limit, slide and handout requirements - good understanding of topic and able to answer questions - able to relate their topic to the whole PBL
Very Good	10	- topic researched thoroughly - information explained clearly, accurately and concisely - information presented in an interesting or novel way - complied with time limit, slide and handout requirements - thorough understanding of topic and able to answer questions - able to relate their topic to the whole PBL

5. COURSE SCHEDULE AND ATTENDANCE REQUIREMENTS

The course timetable is attached at the end of these notes and can also be found on Moodle. You are expected to attend all rostered activities for their full duration.

Several attendance requirements warrant special mention:

Problem based learning tutorials. PBLs form a major part of your learning for the Endocrinology and Reproductive components of this course. You are relying on other members of your group to attend all sessions, carry out the necessary research and report back to the group, and they are relying on you to do the same. For both of these reasons attendance at all PBL sessions is compulsory. Non-attendance for other than documented medical or other serious reasons, or unsatisfactory performance, will result in an additional assessment exam or in ineligibility to pass the course.

Practical class 'Gestational Diabetes and Screening in Pregnancy.' Attendance is compulsory at this class. The class involves the use of human subjects and has been considered and approved by the university's Committee on Experimental Procedures Involving Human Subjects. Each student must read the details of this experiment carefully before embarking on it, and is required to raise any matters of concern with the person in charge of the class before the experiment has begun. You are expected to behave in a professional manner in this class and demonstrate respect for your colleagues during any experiment involving human subjects. Students volunteering to act as subjects will be required to sign witnessed informed consent forms. These will be distributed and collected in the practical class.

The neonatal intensive care visit. Some students will have the opportunity to visit the Newborn Care Centre at the Royal Hospital for Women, Randwick. These sessions will be held in practical class slots on Thursday mornings in weeks 8, 9 and 11. Students will sign up to attend these sessions on Moodle. Unfortunately, places are limited so not all students will be able to attend. Students who sign up must appreciate that this is a tremendous privilege, and that there may be family members there for whom this is a very stressful time. Please dress appropriately, behave in a professional, respectful manner at all times, and follow any instructions given to you by hospital staff. It is essential that you wear closed in shoes or you will not be permitted into Newborn Care Unit. The hospital staff are spending considerable time and effort to offer you this opportunity and if you volunteer to attend this class your attendance is compulsory.

Two peas in a pod. Your attendance and participation at your scheduled class (either week 8 or week 9) is essential.

Presentation preparation time. Time has been allocated during at least one of the practical class sessions in weeks 8,9 and 11 to allow you to work on your presentation. You are encouraged to use this time to get together with other group members to ensure that your presentation forms a cohesive whole.

6. RESOURCES FOR STUDENTS

a) Textbooks

There are no prescribed texts for this course. Ganong's '*Review of Medical Physiology'* provides a very good coverage for the endocrine component of the course, while Harding & Bocking '*Fetal Growth and Development'* is an excellent reference for developmental physiology. Blackburn's *Maternal, Fetal & Neonatal Physiology'* is useful for the reproduction and developmental components of the course. The others are more specialist textbooks which are held in print in the UNSW library or can be accessed online through the UNSW library catalogue or the links below and could be consulted as a reference if necessary. (***You may need to log in with your zpass**.)*

- Barrett KE, Barman SM, Boitano S & Brooks HL. *Review of Medical Physiology*. 25th edition, 2016. Lange. (Note: it is fine to use the 24th or 23rd Edition). http://accessmedicine.mhmedical.com/book.aspx?bookid=1587
- Blackburn ST. *Maternal, Fetal & Neonatal Physiology.* 4th Edition, 2013. Elsevier. https://ebookcentral-proquest-com.wwwproxy1.library.unsw.edu.au/lib/unsw/detail.action?docID=2072142
- Gardner DG & Shoback D. *Greenspan's Basic & Clinical Endocrinology*. 9th edition. 2011, Lange. http://accessmedicine.mhmedical.com/book.aspx?bookid=380
- Harding, R and Bocking, AD (eds). *Fetal Growth and Development.* Cambridge UP.
- Holt RIG & Hanley, NA. *Essential Endocrinology and Diabetes.* 6th Edition. Wiley-Blackwell, 2012. https://ebookcentral-proquest-com.wwwproxy1.library.unsw.edu.au/lib/unsw/detail.action?docID=822511
- Kovacs WJ & Ojeda, SR. *Textbook of Endocrine Physiology.* 6th Edition, Oxford UP, 2012. https://ebookcentral-proquest-com.wwwproxy1.library.unsw.edu.au/lib/unsw/detail.action?docID=845972

b) Other Resources

- The learning activities may involve supplementary reference articles and printed lecture notes.
- For the PBLs you may find Harrison's online (a medical database, the online version of Harrison's Principles of Internal Medicine) and the Oxford Textbook of Medicine (electronic resource) useful resources. These can be accessed via the UNSW library catalogue.
- McPhee, SJ & Hammer GD. Pathophysiology of Disease: An Introduction to Clinical Medicine. 6th Edition. Lange. Available as an online text accessed via the UNSW library catalogue. This is likely to be helpful for the PBLs and the Endocrinology Assignment.
- Moodle: Lecture notes, course-related material such as timetables and outlines, as well as supplementary articles may be placed on Moodle. Marks for assessment tasks will also be posted here. Announcements will be made via Moodle and it is your responsibility to regularly check this site.
- All lectures taped by UNSW Lecture Recordings + and can be accessed via UNSW Moodle.

See also: Learning Resources on the SoMS website.

7. CONTINUAL COURSE IMPROVEMENT

a) MyExperience

Changes are continuously being made to this course to keep it current and to make it a worthwhile experience for you. This year, MyExperience will be used for student feedback. This evaluation tool replaces the Course and Teaching Evaluation and Improvement (CATEI) Process. Your feedback is taken seriously, and the improvements that are made to the course are based in part on such feedback. In recent years many students made the comment that although they very much enjoyed and valued the PBL classes, they felt that the workload involved was too large compared with what was expected from other courses. We reduced the number of PBL classes from 5 to 4, partly in light of this feedback. In response to students' requests for more feedback to help with their learning, PBL facilitators email students individually to provide feedback on their presentations and class participation and two formative assessment tools have been produced. This feedback has been positively received by students and will continue. In 2011, the practical class component of the course was changed and a new class (*Gestational diabetes and screening in pregnancy)* was introduced. As well, an oral presentation was substituted for the previous poster presentation in the Assessment Tasks. In 2014 instead of submitting a hard copy of the assignment, submission occurred via Moodle which made it easier for students to access their feedback once the assignment was marked. These changes will be maintained in 2017.

b) Student panel

While individual students are welcome to provide feedback to the course convenor, your views regarding the course can also be put forward by a small panel of student representatives. These representatives will have the opportunity to meet with the course convenor during session to provide feedback on the course structure, learning activities and staff. This will enable you to make your views known while the course is running, as opposed to at the end of the course (which is a disadvantage of MyExperience evaluation).

8. GENERAL INFORMATION

Note: further advice on SoMS website:
https://medicalsciences.med.unsw.edu.au/students/undergraduate/advice-students

SCHOOL OF MEDICAL SCIENCES HONOURS PROGRAM

There is an Honours program conducted by the School. This program is coordinated by Dr Greg Smith (g.smith@unsw.edu.au ph: 9385 8075). Any students considering an Honours year should discuss the requirements with Dr Smith. Outstanding students may be considered for scholarships offered annually by the University and School.

POSTGRADUATE RESEARCH DEGREES

The Department offers students the opportunity to enter into the following graduate programs:
Doctorate (PhD): For further information contact the coordinators, A/Prof Pascal Carrive (p.carrive@unsw.edu.au) or Dr Nicole Jones (n.jones@unsw.edu.au).

HANDWRITING

Students whose writing is difficult to understand will disadvantage themselves in their written assessment. Make every effort to write clearly and legibly. Do not use your own abbreviations.

SUPPLEMENTARY EXAMS

If you miss an exam for medical reasons you must supply adequate documentation (including a medical certificate) to UNSW Student Central within 3 working days of the date of the exam. Your request for consideration will then be assessed and a deferred exam may be granted. It is intended that supplementary exams for the School of Medical Sciences in Semester 2 2017 will be held between Monday 4th December and Friday 8th December inclusive. **Further assessment will NOT be offered on any alternative dates and failure to sit for the appropriate exam may result in an overall failure for the course.** Supplementary exams may include a significant oral element.

MEDICAL CERTIFICATES

Students who miss classes due to illness or for other reasons must submit a copy of medical certificates or other acceptable documentation to Dr Gibson. **Certificates should be lodged no more than 7 days after an absence**. **Certificates lodged after 7 days will not be accepted**.
The following details must be attached:
Name, Student number, Course number, Date of the class, Name of class/es missed.

9. ENDOCRINOLOGY ASSIGNMENT

Task Description

Each of the 3 cases below describes a patient with an endocrine disorder. Choose **one** case and write a report about the patient's endocrine disorder.

In your report you should include:

(1) a description of the biosynthesis of the main hormone(s) involved (4 marks)
(2) a description of the normal mechanisms which control secretion of the main hormone(s) involved (4 marks)
(3) an explanation of the mechanisms underlying the patient's symptoms, signs and test results (8 marks)
(4) a brief explanation of possible causes/etiology of the disease (3 marks)
(5) a brief explanation of possible treatments (3 marks).

Your report should be 2000 words (excluding references, figures and tables), and be properly referenced with in text references and a reference list. Guidelines for referencing are provided on p.20.

You must submit your assignment electronically via Turnitin Moodle by the due date and time. Please include in the file name of your assignment which case (1, 2 or 3) you have chosen. As well you must include the word count on the front cover sheet.

Due date: 10 am Monday 19th September (Week 9).
A penalty will be applied for late submission.

Assessment Criteria

You will be assessed on:

- the scientific content of your report
- how well you have communicated your ideas (use of clear, simple, grammatical language; clear explanations; logical structure; appropriate language; effective use of illustrations where appropriate)
- evidence of critical thinking (discussion of inconsistencies in the literature; use of logical argument)
- whether your report is appropriately referenced
- your choice of sources (range, quality, relevance).

Your assignment will be marked out of 25. In addition to the 22 marks which are allocated as described above, 3 marks are allocated for communication and referencing. Marks will be deducted for exceeding the word limit.

CASE 1

A 20-year-old woman presents to her doctor with increased urine production. Beginning about a month previously she had noticed that she was waking up a couple of times a night to pass urine. More recently she noticed that she was also passing urine more frequently during the day, sometimes as often as once an hour.

Her mother had suggested that this increased urine production might have been due to her high caffeine consumption. However, for the past week she had limited herself to one cup of coffee per day, but still found that her urinary frequency continued. In addition, she found that she was always thirsty. She had started carrying a large water bottle with her and re-filling it several times a day. She had also noticed that the urine she passed was almost colourless, rather than yellow.

On physical examination, the doctor found no abnormalities.

Blood and urine tests were ordered which showed:

Plasma sodium concentration 149 mmol/L (reference range 136-145 mmol/l)
Plasma osmolality 308 mOsm/kg (reference range 285-295 mOsm/kg)
Fasting plasma glucose 5 mmol/l (reference range 4.2-6.4 mmol/l)
Urinary osmolality 200 mOsm/kg.
Urinary glucose - negative.

Further questioning revealed that no other family members had ever displayed these symptoms. There was no history of traumatic head injury. An MRI of her brain was normal.

A two-hour water deprivation test was performed. After two hours of not being able to drink water, the osmolality of her plasma and urine were measured a second time. Her urinary osmolality remained at ~ 200 mOsm/kg, but her plasma osmolality increased to 315 mOsm/kg. She was then injected with a drug called DDAVP. One hour after the injection, the osmolality of her plasma decreased to 290 mOsm/kg and the osmolality of her urine increased to 425 mOsm/kg.

The diagnosis of idiopathic pituitary diabetes insipidus was made.

CASE 2

A 60-year-old man with a history of hypertension and non-insulin dependent diabetes mellitus, presented to his doctor because, although normally an active man, he was finding that his muscles were weak and he was tiring more easily. On examination, his diastolic pressure was more elevated than usual but no other abnormalities were detected. A blood test was ordered which indicated that his potassium level was 2.8 mmol/l (reference range 3.3-4.7 mmol/l).

As the man was taking frusemide (a potassium-wasting diuretic drug) to treat his hypertension, it was initially considered that this drug was the likely cause of the hypokalaemia. Consequently, frusemide was discontinued, and the man was commenced on oral potassium supplementation.

A week later, the man had further blood tests which showed:

Plasma potassium 2.7 mmol/l (reference range 3.3-4.7 mmol/l)
Plasma sodium 144 mmol/l (reference range 137-145 mmol/l)
Plasma chloride, magnesium, bicarbonate and pH were all within normal limits.
Red blood cell and white cell counts were normal.

In view of the persistent hypokalaemia, several hormone assays were performed with blood sampled at 9.30 am, after he had been seated for one hour.

Upright plasma aldosterone concentration 38 ng/dl (reference range 4-31 ng/dl)
Upright plasma renin activity - 0.4 ng/ml/h
Plasma aldosterone concentration to plasma renin activity ratio – 95 ng/dl per ng/ml/h (a ratio > 30 is strongly suggestive of autonomy of aldosterone secretion).

Primary hyperaldosteronism was confirmed by an acute intravenous isotonic saline load test. Pre- and post- infusion aldosterone levels were 35 and 17 ng/dl, respectively (maximum acceptable level after infusion = 5 ng/dl).

A high resolution abdominal CT scan was performed which demonstrated enlargement of the left adrenal gland and one cortical nodule approximately 1.5 cm in diameter. A diagnosis of Conn's syndrome was made and the patient was scheduled for surgery.

CASE 3

A 37-year-old man presented to the emergency department with a five-week history of nausea, vomiting and weakness. He said that he did not weigh himself routinely, but he felt that he had lost weight because his clothes were looser and he had needed to get an extra hole in his belt so that his jeans did not fall down. He had seen his general practitioner on a couple of occasions for symptoms of fatigue, nausea and anorexia. Because of the gastrointestinal nature of his symptoms, he had been treated with cimetidine and antacids, without improvement. More recently he found he was craving salt.

On physical examination, the man looked unwell. His blood pressure was 100/47 mmHg while he was lying down but fell to 70/30 mmHg when he stood up. There were areas of blue/black discolouration on his gums, and he appeared to be tanned in patches over pressure areas on his knees and elbows. Physical examination was otherwise normal.

Laboratory results were as follows:

Plasma potassium 5.8 mmol/l (reference range 3.3-4.7 mmol/l)
Plasma sodium 127 mmol/l (reference range (136-145 mmol/l)
Morning cortisol level 69 nmol/L (reference range 138 to 635 nmol/L).
Plasma ACTH level was 54.8 pmol/L (reference range 2.0 to 11.5 pmol/L).

A screening test for adrenal function was performed.

Plasma cortisol levels at 30, 60 and 90 minutes after injection of cosyntropin (250 μg) were 72 nmol/L, 74 nmol/L and 55 nmol/ L respectively.

At 90 minutes, the plasma aldosterone level was less than 28 pmol/L (the normal incremental increase is >111 pmol/L).

A CT scan showed a severe reduction in the size of the adrenal glands bilaterally. His chest X ray was normal, except that the heart size seemed rather small. The tuberculin skin test was negative. His blood contained autoantibodies against 21 hydroxylase.

A diagnosis of Addison's disease was made and steroid replacement therapy with hydrocortisone and fludrocortisone acetate was begun.

Guidelines for referencing

These guidelines have been adapted from the School of Medical Sciences Honours Manuscript – Instructions to Authors. Note: for this assignment, it is not a requirement to use original research sources, although you should ensure that you choose reliable resources.

In the text, references to other work should take the form: (Bolton and Kitamura, 1983) or 'Bolton and Kitamura (1983) showed that…' When a paper written by two authors is cited, both names are given; for three or more authors only the first name is given, followed by 'et al.' References to unpublished observations or personal communications should be mentioned in the text only, and not included in the list of references. Direct reference to original research sources should be used whenever possible.

The reference list at the end of the manuscript must be arranged alphabetically according to the surname of the first author. When the names of first authors are identical, the alphabetical order of the surnames of subsequent authors takes precedence over the year of publication. The authors' names are followed by the year of publication in brackets. If more than one paper by the same authors in one year is cited, a, b, c, etc. are placed after the year of publication, both in the text and in the list of references. All authors should be quoted for papers with up to seven authors; for papers with more than seven authors, the first six should be quoted followed by *et al*.

The format for references to papers and books, and to chapters in books, is as follows:

Lipp P, Egger M & Niggli E (2002). Spatial characteristics of sarcoplasmic reticulum Ca^{2+} release events triggered by L-type Ca^{2+} current and Na^{+} current in guinea-pig cardiac myocytes. *J Physiol* 542, 383-393.

Adrian ED (1932). *The Mechanism of Nervous Action.* Humphrey Milford, London.

Buchan AMJ, Bryant MG, Polak JM, Gregor M, Ghatei MA & Bloom SR (1981). Development of regulatory peptides in the human fetal intestine. In *Gut Hormones*, 2nd edn, ed. Bloom SR & Polak JM, pp. 119-124. Churchill Livingstone, Edinburgh.

For those articles published on online ahead of print, that have not been assigned full publication details the DOI (digital object identifier) should be used. See example below:

Lipp P, Egger M & Niggli E (2002). Spatial characteristics of sarcoplasmic reticulum Ca^{2+} release events triggered by L-type Ca^{2+} current and Na^{+} current in guinea-pig cardiac myocytes. *J Physiol*; DOI: 10.1113/jphysiol.2001.013382.

10. PRACTICAL CLASS NOTES

GESTATIONAL DIABETES MELLITUS AND SCREENING IN PREGNANCY

Physiology Teaching Laboratory Student Risk Assessment	UNSW THE UNIVERSITY OF NEW SOUTH WALES	PHSL 3221 Endocrine, Reproductive & Developmental Physiology: Gestational Diabetes Mellitus and Screening in Pregnancy DOC:PHSLSRA-29

Hazards	Risks	Controls
Biohazard: Blood	Infection	Students are informed of the risks. Students must wear lab coats and gloves. All students acting as subjects must be able to satisfy the list of exclusions from donating blood similar to that used by the Red Cross Blood Transfusion Service (listed on the Participant Information Statement and Consent Form, attached). Participants are required to sign a consent form. Subjects are to collect and analyse their own blood, and to cover the blood sample site with a Band Aid once each blood has been taken. All contaminated tissues, swabs, Band Aids and test strips go into the biohazard bins provided on each bench. In case of spills, notify a demonstrator who will wipe it with 1% Virkon. (MED-SOMS-SWP-800).
Sharps hazard: lancets	Cuts and infection	Sterile disposable lancets are provided. Students are instructed to dispose of the lancets immediately after use into the sharps containers provided. Under no circumstances are lancets to be re-sheathed or re-used.
Drink: 75g glucose solution	High blood sugar levels (Hyperglycaemia)	If the student is feeling unwell, or the fasting blood glucose level is 7.0 mmol/l or above, the student is not allowed to be a subject in this class. A registered medical practitioner is available throughout the duration of the practical class.

Personal Protective Equipment

Emergency Procedures

In the event that the emergency alarm sounds, stop the experiment.
Remove your lab coat and wash your hands
Pack up your bags.
Follow the instructions of the demonstrators.
If blood comes into contact with the body use the emergency shower/eye wash.
In case of all other injuries, alert a demonstrator who will call a first aider.

Clean up and waste disposal

Dispose of the lancets IMMEDIATELY after use, into the sharps container.
Dispose of all contaminated plastic swabs and test strips into the biological waste bins. NEVER THROW THESE INTO THE GENERAL WASTE BINS.
Place all gloves in the biological waste bags.
Remove your lab coat and wash your hands thoroughly.

Ethics Approval
This practical has been approved by the School of Medical Sciences Teaching Ethics Committee (Approval No: SOMSTEC 090916).

Declaration
I have read and understand the safety requirements for this practical class and I will observe these requirements. Signature:……Date:……

This practical relates to the Risk assessment MED-SOMS-RMF-3558. Related SWP is MED-SOMS-SWP-4470 (AccuChek Performa Blood Glucose meter).

GESTATIONAL DIABETES MELLITUS AND SCREENING IN PREGNANCY

Learning Objectives

- To introduce the concept of glucose tolerance testing and demonstrate the changes in blood glucose levels that occur following consumption of an oral glucose load.
- To examine how and why glycaemic control changes in pregnancy, and how this predisposes pregnant women to gestational diabetes.
- To explore the general principles of screening, and how screening is used in pregnancy.

INTRODUCTION

Gestational diabetes mellitus affects at least 1 in 20 pregnant women in Australia, and is a serious condition with consequences both for the mother and her developing fetus. Many countries including Australia have routine screening for gestational diabetes, followed by aggressive management once it is diagnosed. In this class you will learn about this screening program, and undergo the final diagnostic test for gestational diabetes, the oral glucose tolerance test.

We will also discuss the general principles of screening and screening tests. There are many conditions screened for in pregnancy; we will look at what conditions are screened for in pregnancy and consider the general principles underlying screening for these conditions.

1. 75g ORAL GLUCOSE TOLERANCE TEST (75 g OGTT)

Detecting diabetes
The 75g oral glucose tolerance test is a standard test used in the diagnosis of gestational diabetes, and also Type 2 diabetes mellitus in nonpregnant individuals. A morning fasting blood sample is taken, and then a standard solution containing 75g glucose is consumed over no more than 5 minutes. Blood samples are taken 1h and 2h after the glucose load is administered, and analysed for glucose concentration. In some clinical situations insulin levels are also measured.

In **nonpregnant individuals**, type 2 diabetes is diagnosed if the fasting plasma glucose level is ≥ 7.0 mmol/L, or if the level at 2 hours post glucose load is ≥ 11.1 mmol/L. Impaired glucose tolerance is indicated by a 2 hour level of 7.8-11 mmol/L. (Note that for proper diagnostic purposes the blood samples need to be venous; in today's class we will be using finger prick samples which are not as reliable but simpler to perform.) Type 2 diabetes may also be diagnosed if a random (i.e. any time of day, subject not fasted) glucose level is ≥ 11.1 mmol/L.

In **pregnant women**, the diagnostic criteria for gestational diabetes recommended by the Australasian Diabetes in Pregnancy Society are: elevation of one of more of the following glucose levels - fasting glucose ≥ 5.1 mmol/L, 1 hour level ≥ 10.0 mmol/L, 2 hour level is ≥ 8.5 mmol/L. ***Note the much stricter cutoffs for a 75g OGTT in pregnancy – by the end of the class you should understand why this is the case.***

Safety in Class

To ensure a safe working environment for yourself and others, you must observe the following safety rules:

- Wear a lab coat and closed shoes (subjects are to remove their lab coats and wash their hands before drinking the glucose load).
- The glucose load should be drunk at the table set up for this purpose. Subjects are then to return to and remain at their bench for the remainder of the class.
- Students are to collect and analyse their own blood. All blood work must be done over the bench roll.
- Avoid contact with blood; open cuts or unhealed wounds must be covered. Remember all blood should be regarded as potentially infectious at all times. Wear disposable gloves if handling blood other than your own. If there is contact with blood wash the hands and other bodily parts in contact with or splashed by blood. Thorough washing with soap and water is adequate.
- Wipe down benches, equipment or other bloodied areas with cold tap water and then with 0.05% sodium hypochlorite.
- Lancets used in this class for finger prick samples are single use only. They must be placed into a sharps container as soon as they have been used. Never attempt to use a disposable lancet that has had the tip removed or the button depressed. This lancet will not work, and if it has been used already by another person it could be contaminated.
- Subjects must cover the puncture site with a Band Aid following each blood sample.
- All used test strips, swabs, tissues, bench roll, used Band Aids, gloves and any other non-sharp contaminated waste material are disposed into biohazard plastic bags.

Subjects

Volunteer subjects in this class will drink a 75g glucose solution and will sample their blood by finger prick (single use lancet) and analyse it for glucose concentration. Before agreeing to be a subject, students must read the Participant Information Statement and sign the consent form. You can only be a subject if you can answer **'no'** to all of the exclusion criteria listed in the Participant Information Statement, a copy of which is provided in the appendix. As well, on the day of the class, if you are feeling unwell, or have a fasting glucose level of 7.0 mM or higher, you **cannot** be a subject.

Note: you will need to decide if you are going to be a subject by at least the day before the class. This is because the **subjects need to be fasted**.

IMPORTANT:

1. **Subjects need to fast prior to the test:**
   - **Fast after midnight for a morning class.**
   - **Fast after 9.00 am for an afternoon class.**

If the class is in the morning, do not eat anything after midnight of the night before the class. Do not eat breakfast. Drink as much water as you wish.

If the class is in the afternoon, eat a light breakfast that is low in fat. Do not eat anything after 9.00 am. Drink as much water as you wish.

2. **Subjects need to minimise activity on the day of the class.**

Experimental Protocol
Three capillary blood samples will be taken by finger prick during this class in order to measure blood glucose concentrations: a fasting blood sample, and samples 60 min and 120 min after drinking a solution containing 75g glucose.

Ensure that the glucose meter and test strip are ready for use before preparing to take each blood sample.

To obtain a capillary blood sample by finger prick:
Your results will only be as good as the quality of your samples. For accurate results, it is important to follow these steps:

Use a different finger for each of your blood samples. Increase blood flow to the fingers (e.g. by putting the hand in warm water, massaging fingers, rubbing hands together). Thoroughly clean the skin on your hands by washing with warm water and soap. Dry hands thoroughly, then swab the end of a finger with an ethanol swab and allow it to dry. You can sample from the side of the finger (see Figure 1), or from the pulp. Don't sample from the very tips of the fingers as they are very sensitive and it will hurt!

Remove the end-tip from the single use lancet by twisting and pulling, place end firmly against the skin, and press the release button to pierce the skin. Allow a large droplet of blood to accumulate. It may be necessary to massage the finger gently towards the finger to get an adequate sample, but avoid squeezing the finger too hard.

Transfer the droplet of blood onto the test strip, and record the glucose concentration shown on the glucose meter in Table 1. Cover the sampling site with a tissue or swab and apply pressure to stop any further bleeding. Cover the site with a Band Aid.

Figure 1. From Canterbury Health Laboratories. http://www.cdhb.govt.nz/ch_labs/cap_collects_how_to.htm. Downloaded 9 April 2007.

Glucose load
As soon as the fasting blood glucose concentration has been determined, subjects should wash their hands, then drink the 75g glucose test solution provided. Do this evenly over a 5 min period, and record the time at the end of this period as 'time 0'. Wash hands thoroughly after the glucose load to remove any glucose that may be on the skin and would contaminate any further measurements.

Important: For the following 2 hours, subjects cannot eat, drink or smoke, and must remain at their bench, keeping their activity levels to a minimum.

Take and analyse blood samples at 60 and 120 minutes after the glucose load was consumed.

Record your results in the table provided and in the central class data sheet. Make sure that you have a record of all class results before leaving the practical class.

Use the time available during this 2 hour test to complete the following activities:

Table 1. Blood glucose concentrations during baseline and following a 75g glucose load.

SUBJECT	BLOOD GLUCOSE CONCENTRATION (mmol/L)		
	Fasting	1 hour	2 hour
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

SUBJECT	BLOOD GLUCOSE CONCENTRATION (mmol/L)		
	Fasting	1 hour	2 hour
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

2. GESTATIONAL DIABETES MELLITUS RESEARCH AND DISCUSSION

This part of the class will provide you with an understanding of gestational diabetes mellitus. In small groups, you will research one of the questions below and then present your findings to the rest of the class. Keep your answers very brief (5 minutes maximum) – a general overview is all that is required here.

Research questions

1. What are the mechanisms underlying gestational diabetes (i.e. what happens to glucose homeostasis during normal pregnancy and how does this go wrong in GDM?)?
2. Why are there different cutoffs for a 75g OGTT in pregnant and nonpregnant people? Why wait until more than half way through the pregnancy to screen for GDM?
3. Does anything predispose a woman to GDM?
4. How is GDM treated?
5. What are the consequences of gestational diabetes in the short term (for mother and fetus/newborn)?
6. Are there any long-term consequences for the offspring of a diabetic pregnancy?
7. Are there any long-term implications for the mother (will she remain diabetic after the pregnancy? Does she have a greater chance of developing diabetes later in life? etc).

3. SCREENING IN PREGNANCY

Gestational diabetes is just one of many conditions and abnormalities that are screened for during pregnancy. In this part of the class we will examine the concept of screening in general, look at the antenatal screening program commonly followed in Australia and use a worked example of the screening program for gestational diabetes to illustrate the compromises that must be made when designing a screening test.

Discussion Questions

1. What is screening?
2. What are the basic principles underlying an effective screening program and some important features of a good screening test?
3. What other routine screening tests are carried out in pregnancy?
4. What are some of the advantages and disadvantages of screening in pregnancy?

Sensitivity and specificity

Most screening and diagnostic tests are not perfect. They can wrongly designate a healthy person as having a disease (this is called a false positive), and can miss some cases who actually do have the condition (false negatives; Table 2).

Table 2.

	Has the disease	**Does not have the disease**
Positive test	True positive	False positive
Negative test	False negative	True negative

The following test characteristics look at various aspects of this problem.

Sensitivity measures the proportion of actual positive cases (i.e. people who have the disease) who are correctly identified as such. In this case, the sensitivity of a glucose challenge test is the percentage of all women who have GDM who are correctly identified as having GDM.

Sensitivity = true positives / all who have the condition x 100%
= TP / (TP+FN) x 100%

Specificity measures the proportion of people who don't have the disease that are correctly identified as negative. In this case, the specificity of the glucose challenge test is the percentage of all women who do not have GDM that are correctly identified as not having the condition.

Specificity = true negatives / all who don't have the condition x 100%
= TN / (TN+FP) x 100%

Positive and Negative predictive value

Both sensitivity and specificity refer to people with or without the disease, however in the real world the clinician caring for the patient doesn't know if the person has the disease or not. In this case, more meaningful measures are the positive predictive value (PPV) and Negative predictive value (NPV).

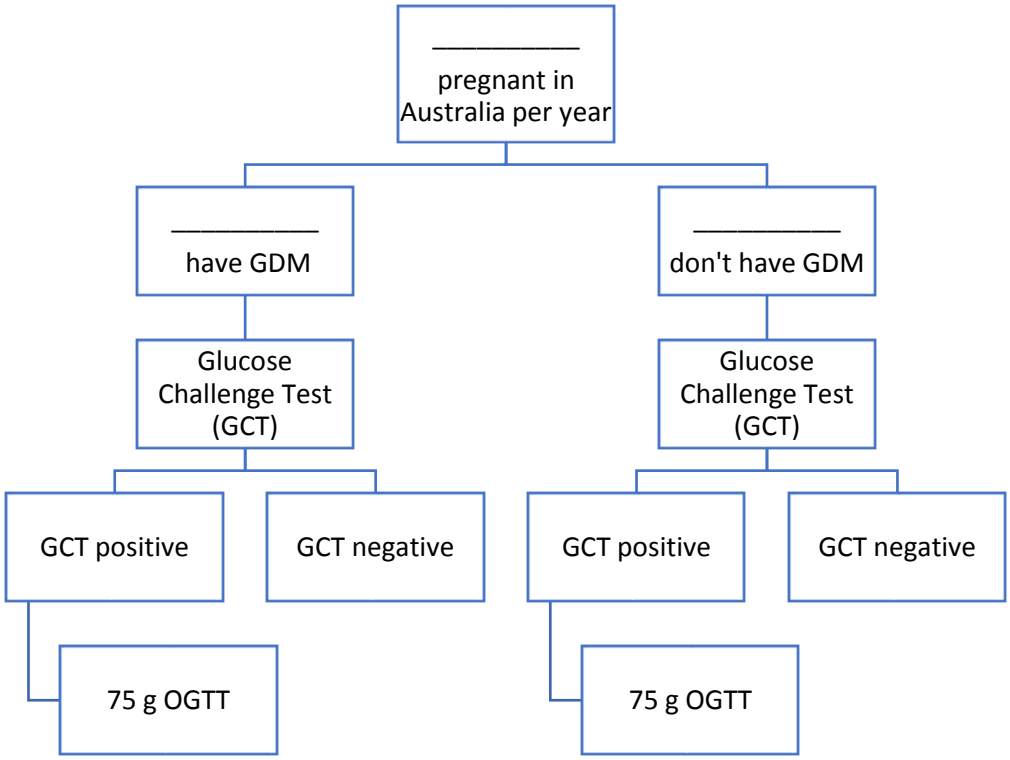
Positive predictive value (PPV) indicates the proportion of those with a positive test result who actually have the disease.
PPV = TP/(TP+FP) x 100%

Negative predictive value (NPV) indicates the proportion of those with a negative test who are actually disease free.
NPV = TN/(TN+FN) x 100%

Screening for gestational diabetes – a worked example

Until recently, except in high risk cases (who received an OGTT), most pregnant women in Australia underwent a screening test for gestational diabetes mellitus between 26-28 weeks LMP using an **oral glucose challenge test (GCT).** For this screening test a 50g oral glucose load was given and a single blood sample was taken one hour later. The patient was not fasted. If the glucose levels were ≥ 7.8 mmol/L, the woman was referred for a 75 g OGTT as a diagnostic step. The Glucose Challenge Test is not a diagnostic test but is used to raise the suspicion that abnormal glucose levels may be present. Note: there is no recent universally accepted position paper or guideline in Australia for GDM, although it is expected that one will be released soon. Thus some clinicians still use this two step procedure, although the lack of sensitivity and specificity has caused the ADIPS (Australasian Diabetes in Pregnancy Society) to recommend that an OGTT should be used in all women, not just those at high risk. Here we will consider the implications of using the Glucose Challenge Test as a screening test for GDM.

There are roughly 300 000 births in Australia each year. Approximately 4.6% of these pregnancies will be complicated with gestational diabetes mellitus (GDM) (Templeton & Pieris-Caldwell 2008. *Gestational diabetes mellitus in Australia, 2005-06.* Cat. no. CVD 44. Canberra: AIHW). Assuming that the screening test for GDM (the 50g oral glucose challenge test, GCT) has a sensitivity of 83% and a specificity of 75%, answer the questions below.



1. Where do the true and false positives and negatives sit on this chart? Calculate the number of women that fall into each of these 4 categories.
2. What is the likelihood that a woman has gestational diabetes if she tests positive on a glucose challenge test?
3. What is the likelihood that a negative result for the glucose challenge test will be correct?
4. How many pregnant women will be unnecessarily subjected to a 75g OGTT each year?
5. How many women who have gestational diabetes will be missed by the screen?
6. How would the sensitivity and specificity of the glucose challenge test change if a higher glucose cutoff were used?

Approval No: SOMSTEC 090916

THE UNIVERSITY OF NEW SOUTH WALES

PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM

Practical class – Gestational Diabetes Mellitus and Screening in Pregnancy

As an enrolled student, you are invited to participate in a practical class that investigates the screening and diagnosis of gestational diabetes mellitus. If you decide to participate, you will undergo an oral 75g glucose tolerance test, which is a standard diagnostic test for both gestational diabetes and for type 2 diabetes mellitus. You will measure your blood glucose levels before and after you have consumed a glucose drink (75g glucose in 300 ml of carbonated water. Glucose levels will be analysed in droplets of your blood obtained by finger prick. Three samples of blood will be taken in total. The duration of the class is 3 hours.

You will need to fast before the class. For a morning class, this involves not eating anything after midnight. If the class is in the afternoon, you should eat a light, low-fat breakfast and then not eat anything after 9.00 am. You may drink as much water as you wish while you are fasting. You are also asked to minimise activity on the day of the class.

Participation in this class will involve the following discomforts: hunger due to fasting, transient stinging associated with finger prick.

This class involves limited risks, and the following precautions must be taken to prevent the spread of infection:

- Wear a lab coat, closed shoes and disposable gloves.
- Avoid contact with blood; open cuts or unhealed wounds must be covered. Remember all blood should be regarded as potentially infectious at all times. If there is contact with blood wash the hands and other bodily parts in contact with or splashed by blood. Thorough washing with soap and water is adequate.
- After ingestion of the glucose load, subjects are to remain at their bench for the remainder of the class.
- Subjects are to collect and analyse their own blood, and must cover the puncture site with a Band Aid following each blood sample.
- Lancets used for finger prick samples are single use only and must be placed into a sharps container as soon as they have been used; never attempt to use a disposable lancet that has had the tip removed or the button depressed.
- All non-sharp waste material is placed into biohazard plastic bags which are sealed carefully by laboratory staff for disposal and incineration.
- Wipe down benches, equipment or other bloodied areas with cold tap water and then with 0.05% sodium hypochlorite.
- The exclusion criteria for subjects donating blood are similar to that of the Red Cross Blood Transfusion Service and are given below.

You may only be a volunteer for this class if you can answer "NO" to all of the following:

To the best of your knowledge, have you:

1. In the last 6 months, had an illness with swollen glands and a rash, with or without a fever?
2. Ever thought you could be infected with HIV or have AIDS?
3. Ever "used drugs" by injection or been injected, even once, with drugs not prescribed by a doctor or dentist?
4. Ever had treatment with clotting factors such as Factor VIII or Factor IX?
5. Ever had a test which showed you had hepatitis, HIV or human T cell lymphotropic virus (HTLV)?
6. In the last 12 months, engaged in sexual activity with someone you might think would answer "yes" to any of the questions above?

THE UNIVERSITY OF NEW SOUTH WALES

PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM (continued)
Practical class – Gestational Diabetes Mellitus and Screening in Pregnancy

Have you ever:

7. Had male to male sex?
8. Had sexual activity with a male who you think might be bisexual?
9. Been a male or female sex worker?
10. Engaged in sexual activity with a male or female sex worker?
11. Been injured with a used needle (needlestick)?
12. Had a blood/body fluid splash to eyes, mouth, nose, or broken skin?
13. Had a tattoo (including cosmetic tattooing), skin piercing, electrolysis or acupuncture?
14. Been imprisoned in a prison or lock-up?
15. Had a blood transfusion?
16. Had (yellow) jaundice or hepatitis or been in contact with someone who has?
17. Had a sexually transmitted disease e.g. syphilis, gonorrhea or herpes?.
18. Received a tissue transplant or graft (organ, cornea etc.)?
19. Had malaria, Ross River fever, Q fever, leptospirosis or Chagas' Disease?
20. Received a transfusion or injection of blood or blood products while in England, Scotland, Wales, Northern Island, the Channel Islands or the Isle of Man from 1 January 1980 to 31st December 1996, or lived there for a total time which adds up to 6 months of more?

Other questions:

21. Are you prone to fainting?
22. Are you diabetic, or do you have a history of impaired glucose tolerance?
23. Are you pregnant?

On the day of the class, if you are feeling unwell, or have a fasting glucose level of 7.0 mM or higher, you should **not** be a subject.

The purpose of the above questions is for you to determine whether it is safe, for others and for yourself, for your blood to be donated in this class. You do not have to reveal your answers to these questions to any of your classmates or to the teaching staff. If you wish to ask about any of these questions please contact Dr Karen Gibson on 9385 3650. Any such consultation will be treated in confidence.

De-identified group data from this class will be shared with the rest of the class. These data, along with attendance sheets, consent forms and incident reports will be kept for a period of 7 years.

Your decision whether or not to participate will not prejudice your future relations with the University of New South Wales. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice.

If you have any questions, please feel free to ask any demonstrator on this class. If you have any additional questions later, Dr Karen Gibson, 9385 3650, will be happy to answer them.

Complaints may be directed to Dr Peter Gunning, Professor and Head of SOMS, by emailing p.gunning@unsw.edu.au. Any complaint you make will be investigated promptly and you will be informed out the outcome.

You will be given a copy of this form to keep.

THE UNIVERSITY OF NEW SOUTH WALES
PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM (continued)
Practical class – Gestational Diabetes Mellitus and Screening in Pregnancy

I understand that I am making a decision as to whether or not to participate as a subject for the above practical class. My signature indicates that, having read the Participant Information Statement, and the practical notes which explain the full procedure, I have decided to take part in the study.

I understand that if I have any questions relating to my participation as an experimental subject in this practical class I may ask the demonstrator in charge of the class who will be happy to answer them. I understand that my participation as a subject is voluntary and that I can withdraw from being a subject at any time without prejudice to my relationship with the University of New South Wales.

Subject's Name	**Signature**

……..…….. …….....
Witnessed by Date

……
Please PRINT Name of witness

11. PAST EXAMINATION SHORT ANSWER QUESTIONS

MIDSESSION EXAMINATION, SEPTEMBER 2012

Question 1. (10 minutes)

The following test results were taken from a 5 year old child with a history of precocious sexual development:

	Patient level	**Normal level**
Plasma:		
11-deoxycortisol	10-30 μg/100 mL	<0.1 μg/100 mL
ACTH	500 pg/mL	30-120 pg/mL
Aldosterone	3 ng/100 mL	5-20 ng/100 mL
Urine:		
17-ketosteroids	15-20 mg/24h	<0.5 mg/24h
Tetrahydrocompound S	1 mg/h	<0.5 mg/h

a) Briefly explain why each of these results might be abnormal.
b) Why might there be ambiguous genitalia?
c) This child is hypertensive. What is the most likely reason for this?
d) Why might this child be treated with daily cortisone?

Question 2 (10 minutes)

An 18 year old apprentice plumber, Bob, has been brought unconscious into the emergency department by his concerned boss. He says that Bob had been complaining of feeling unwell for the past few days. He had been drinking "stacks of water" and kept having to urinate. Blood tests, renal function tests and a physical examination are carried out.

Provide a **very brief** explanation for each of the results below, using only the space provided. The table continues over the page.

	Patient result	**Normal result**	**Brief explanation**
Blood glucose concentration	70 mmol/L	<8 mmol/L	
Glucosuria	++++	-	
Urine flow rate	30 mL/min	0.3 – 15 mL/min	
Ketonuria	++++	-	
Arterial pH	6.95	7.35-7.45	

**********The remainder of this question has not been released **********

Question 3. (5 minutes)
Clomiphene is used in the treatment of infertility. Describe the mechanism of action and adverse effects of this treatment.

Question 4. (5 minutes)
An athlete self-injects synthetic testosterone daily for two months prior to competition, and is asked to provide a urine sample for testing. Describe the two methods which could be used to detect this use of performance enhancing steroid, providing an explanation of the underlying mechanisms where necessary.

Question 5. (5 minutes)
Describe the incretin effect.

Question 6. (5 minutes)
Chloe, a 14½-year-old girl, presents to her GP concerned that she has not yet had her first menstrual period. To her knowledge all her friends have started menstruating, some while still in primary school. She is an active teenager, and otherwise well.

i) Briefly describe the typical changes that occur with puberty in females and how the GP could assess whether pubertal development had commenced in Chloe.
ii) Chloe's current height is 168 cm, and she weighs 58kg. Plot her height on the chart on the following page. Chloe's mother is 171 cm tall and her father is 186 cm tall. How would you interpret this data?

FINAL EXAMINATION, NOVEMBER 2012

Question 1. (15 minutes)
"The fetus is a miniature adult." Discuss, with reference to the cardiovascular system and the respiratory system.

Question 2. (15 minutes)
Describe the maternal changes that occur during pregnancy in
(a) blood volume and composition
(b) the cardiovascular system.

Question 3. (5 minutes)
What is gestational diabetes and why are pregnant women screened for this condition? Which women are most at risk for developing gestational diabetes?

Question 4. (5 minutes)
Why would removal of the maternal ovaries cause abortion of a human pregnancy at 5 weeks LMP but not at 12 weeks LMP?

Question 5. (5 minutes)
Why does the human newborn, especially the premature human newborn, have difficulty maintaining its body temperature?

Question 6. (5 minutes)
(a) How long is gestation in humans and what is meant by the terms "preterm" and "post-term"?
(b) A woman with a regular 28 day menstrual cycle has recently discovered she is pregnant. If her last menstrual period commenced on the 10th of October 2012, what is her estimated date of delivery?
(c) List 6 important risk factors for premature labour.

Question 7. (5 minutes)
Life expectancy for Indigenous Australians is up to 17 years less than for non-Indigenous Australians. Discuss how epigenetic factors could contribute to this.

Question 8. (5minutes)
Describe the fluid fluxes into and out of the amniotic cavity in the second half of gestation.

MIDSESSION EXAMINATION, SEPTEMBER 2013
Question 1. (15 minutes)
The following test results were taken from a 5 year old child with a history of precocious sexual development:

	Patient level	**Normal level**
Plasma:		
11-deoxycortisol	10-30 μg/100 mL	<0.1 μg/100 mL
ACTH	500 pg/mL	30-120 pg/mL
Aldosterone	3 ng/100 mL	5-20 ng/100 mL
Urine:		
17-ketosteroids	15-20 mg/24h	<0.5 mg/24h
Tetrahydrocompound S	1 mg/h	<0.5 mg/h

a) Briefly explain why each of these results might be abnormal.
b) Why might there be ambiguous genitalia?
c) This child is hypertensive. What is the most likely reason for this?
d) Why might this child be treated with daily cortisone?

Question 2.(15 minutes) – see 2012.

Question 3. (5 minutes)
Describe (i) the role of the hypothalamic-pituitary-gonadal axis in the control of male fertility,
(ii) how this system can be modulated to achieve contraception.

Question 4. (5 minutes)
Describe the role of secretin in the control of digestion, including the regulation of its secretion and its effects.

Question 5. (5 minutes)
Compare and contrast andropause and menopause.

Question 6. (5 minutes)
Why does head out water immersion cause an increase in urine flow rate? List two other manoeuvres which have a similar effect.

Question 7. (5 minutes)
(i) How is growth hormone secretion from the anterior pituitary regulated?
(ii) What condition results when there is excessive growth hormone secretion (a) during childhood and (b) during adult life?

Question 8. (5 minutes)
Describe the production and actions of vitamin D.

FINAL EXAMINATION, NOVEMBER 2013
Question 1. (15 minutes)
Compare and contrast the fetal cardiovascular system with that of the adult.

Question 2. (15 minutes)
Use your knowledge of maternal physiology to explain the mechanisms underlying each of the following conditions which may occur in pregnant women:
(a) supine hypotension
(b) deep vein thrombosis
(c) glucosuria
(d) anaemia (e) ankle swelling

Question 3. (5 minutes)
What is an oral glucose tolerance test and how is it carried out? Why are the diagnostic criteria altered if the subject is pregnant?

Question 4. (5 minutes)
Write notes on one peptide hormone produced by the placenta.

Question 5. (5 minutes)
Briefly describe the composition, formation and importance of lung liquid.

Question 6. (5 minutes)
What factors affect the transfer of substances across the placenta? Illustrate your answer with specific examples.

Question 7. (5 minutes)
What is the evidence that renal development can be programmed? Give specific examples in your answer.

Question 8. (5minutes)
Describe the importance of the prepartum cortisol surge in fetal maturation.

MIDSESSION EXAMINATION, SEPTEMBER 2014

Question 1. (15 minutes)
There are many variants of congenital adrenal hyperplasia (CAH). Cameron Jones had 11β-hydroxylase deficiency and was hypertensive. On the other hand, 21β-hydroxylase deficiency is associated with excessive loss of salt in the urine ('salt wasting').

(i) Explain the mechanism underlying hypertension in 11β-hydroxylase deficiency.
(ii) Explain why salt wasting occurs with 21β-hydroxylase deficiency.
(iii) Why might babies born with CAH have ambiguous genitalia?
(iv) What would you expect a blood test for ACTH to show in untreated CAH? Why?
(v) Cameron Jones was treated with cortisone. Explain the underlying basis for this treatment.

Question 2.(15 minutes).
A 12 year old girl, Elise, has been brought unconscious into the emergency department by her concerned mother. She says that Elise had been complaining of feeling unwell for the past few days. She had been drinking lots of water and kept having to urinate. Blood tests, renal function tests and a physical examination are carried out.
Provide a **very brief** explanation for each of the results below, using only the space provided. The table continues over the page. See Table 2012.

Question 3. (5 minutes)
Norethindrone and norgestrel are used in progestin-only oral contraceptives.
Describe (1) how these compounds alter hypothalamic-pituitary function to prevent ovulation
(ii) other mechanisms by which they prevent conception.

Question 4. (5 minutes)
Matthew is 8 years old and is the shortest child in his class at school. He is concerned that he will always be short. Describe the factors which determine final adult height.

Question 5. (5 minutes)
Explain what is meant by the incretin effect. Give an example of two forms of incretin-based treatment for Type 2 diabetes.

Question 6. (5 minutes)
A 52 year old woman who is otherwise healthy, presents to her GP suffering from hot flushes, night sweats and insomnia.
a) What changes occur in the hypothalamic-pituitary-ovarian axis as women age?
b) What other signs and symptoms are likely to occur around menopause and why?

Question 7. (5 minutes)
Describe the renal effects of head-out water immersion. What are the hormonal mechanisms underlying these effects?

Question 8. (5 minutes)
Briefly describe how plasma calcium levels are regulated.

FINAL EXAMINATION, NOVEMBER 2014
Question 1. (15 minutes)
"The fetus is a miniature adult." Discuss with reference to two organ systems.

Question 2. (15 minutes)
(a) Suckling by the infant causes elevation of maternal plasma levels of two hormones important in lactation. Complete the following table for these two hormones.

Hormone Name		
Site of synthesis		
Site of release		
Chemical structure		
Role in lactation		
Other function		

(b) Why do breastfeeding women experience amenorrhea of a longer duration after delivery than women who formula-feed their infant?
(c) Briefly discuss the reliability of lactation as a method of contraception.

Question 3. (5 minutes)
Describe the maternal changes that occur during pregnancy in blood volume and composition.

Question 4. (5 minutes)
Describe the human placenta. In what ways does the sheep placenta differ from the human placenta?

Question 5. (5 minutes)
(a) How long is gestation in humans and how are "preterm" and "post-term" defined?
(b) A woman with a regular 28 day menstrual cycle has recently discovered she is pregnant. If her last menstrual period commenced on the 28th of August 2014, what is her estimated date of delivery?
(c) List 6 **important** risk factors for premature labour.

Question 6. (5 minutes)
Describe how the fetus responds to an acute reduction in oxygen supply.

Question 7. (5 minutes)

(a) List the functions of amniotic fluid.
(b) What problems result from oligohydramnios and polyhydramnios.

Question 8. (5minutes)

Why does the human newborn, especially the premature human newborn, have difficulty maintaining its body temperature?

MIDSESSION EXAMINATION, SEPTEMBER 2015

Question 1. (15 minutes)

The following test results were taken from a 5 year old child with a history of precocious sexual development:

	Patient level	Normal level
Plasma:		
Cortisol	30 nmol/L	280-550 (morning)
11-deoxycortisol	20 μg/100 mL	<0.1 μg/100 mL
ACTH	500 pg/mL	30-120 pg/mL (morning)
Aldosterone	3 ng/100 mL	5-20 ng/100 mL
Urine:		
17-ketosteroids	15-20 mg/24h	<0.5 mg/24h
Tetrahydrocompound S	1 mg/h	<0.5 mg/h

(i) What is the likely diagnosis?
(ii) Explain why each of the above test results might be abnormal.
(iii) Why does this child have precocious sexual development?
(iv) What treatment would you recommend and why?

Question 2 .(15 minutes).

A 12 year old girl, Elise, has been brought unconscious into the emergency department by her concerned mother. She says that Elise had been complaining of feeling unwell for the past few days. She had been drinking lots of water and kept having to urinate. Blood tests, renal function tests and a physical examination are carried out.

Provide a **very brief** explanation for each of the results below, using only the space provided. The table continues over the page. See Table 2012.

Question 3. (5 minutes)

Clomiphene is used in the treatment of infertility. Describe the mechanism of action of this drug and what type of infertility can be treated with it.

Question 4. (5 minutes)

Explain how it is possible for an individual to have 46XY karyotype but not be phenotypically male.

Question 5. (5 minutes)

Write notes on ONE anorexigenic and ONE orexigenic gut hormone.
In your answer include (i) the site of their synthesis, (ii) the stimulation for their release and, (ii) the signaling mechanism through which these hormones act on hypothalamic pathways for appetite control.

Question 6. (5 minutes)

What is a pheochromocytoma? Why is a 24 h urine collection used to make the diagnosis? What is measured in this collection?

Question 7. (5 minutes)
Paul, 26 years old, undergoes fertility assessment with the following results:

Gynaecomastia
Testicular volume: 11 mL (reference range: 15-30mL)
Semen analysis: Azoospermia (i.e. no sperm detected)
Urinary Testosterone:Epitestosterone ratio: 10.1 (normal range: 0.1-3.99)

Subsequent discussions with the doctor revealed that Paul, an amateur athlete, had been self-administering synthetic testosterone esters for the past two years. Briefly explain why the abnormal findings described above could be caused by his testosterone use.

Question 8. (5 minutes)
Describe the production, regulation and effects of parathyroid hormone.

FINAL EXAMINATION, NOVEMBER 2015
Question 1. (15 minutes)
(a) Name three shunts present in the fetal circulation. For each shunt indicate where it is located and describe its function.
(b) Describe other ways in which the fetal cardiovascular system (both the heart and the circulation) differ from that of the adult.

Question 2. (15 minutes)
Jenny is a 30 year-old woman who is 8 weeks pregnant with her first child. At her first antenatal visit she expresses concern that her friend had gestational diabetes during her pregnancy and needed to have insulin injections. Jenny doesn't like needles and hopes she won't need injections as well.

(a) What is gestational diabetes and why does it develop during pregnancy?
(b) How is gestational diabetes usually diagnosed, and at what stage of gestation?
(c) Why is it important to treat gestational diabetes?
(d) Indicate 6 risk factors which increase the likelihood of women developing gestational diabetes.
(e) What are the long-term consequences for a mother with gestational diabetes?

Question 3. (5 minutes)
Compare and contrast andropause and menopause.

Question 4. (5 minutes)
Describe the fluid fluxes into and out of the amniotic cavity in the second half of gestation.

Question 5. (5 minutes)
"Human chorionic gonadotropin is the most important hormone in early pregnancy." Discuss.

Question 6. (5 minutes)
What are fetal breathing movements? Briefly describe the major factors that control them.

Question 7. (5 minutes)
Describe the production of oxytocin and its role in human labour.

Question 8. (5 minutes)
What is epigenetics? Describe how epigenetics relates to the "Barker hypothesis".

MIDSESSION EXAMINATION, SEPTEMBER 2016

Question 1. (15 minutes)
There are many variants of congenital adrenal hyperplasia (CAH). Cameron Jones had 11β-hydroxylase deficiency and was hypertensive. On the other hand, 21β-hydroxylase deficiency is associated with excessive loss of salt in the urine ('salt wasting').

(i) Explain the mechanism underlying hypertension in 11β-hydroxylase deficiency.
(ii) Explain why salt wasting occurs with 21β-hydroxylase deficiency.
(iii) Cameron Jones was treated with cortisone. Explain the underlying basis for this treatment.
(iv) Why might an infant born with CAH have ambiguous genitalia?

Question 2. (15 minutes).
A 12 year old girl, Elise, has been brought unconscious into the emergency department by her concerned mother. She says that Elise had been complaining of feeling unwell for the past few days. She had been drinking lots of water and kept having to urinate. Blood tests, renal function tests and a physical examination are carried out.
Provide a **very brief** explanation for each of the results below, using only the space provided. The table continues over the page. See Table 2012.

Question 3. (5 minutes)
Describe (i) how the hormones found in combination oral contraceptives alter hypothalamic-pituitary function, and
(ii) how this prevents conception.

Question 4. (5 minutes)
(i) What are Tanner stages? Which features are examined (a) in boys and (b) in girls to assess Tanner stages? What range of values can be assigned to these features?
(ii) What are the normal age ranges for the onset of puberty (a) in boys and (b) in girls?
(iii) List two differences in body composition between boys and girls which become apparent by the end of puberty.

Question 5. (5 minutes)
Explain what is meant by the incretin effect. Give an example of two forms of incretin-based treatment for Type 2 diabetes.

Question 6. (5 minutes)
Describe the hormonal effects of head-out water immersion. What are the mechanisms that underlie these hormonal changes?

Question 7. (5 minutes)
Describe the production and actions of vitamin D.

Question 8. (5 minutes)
Describe the hormonal changes that occur in the hypothalamic-pituitary-ovarian axis as a result of menopause. Your answer should indicate why these changes occur.

FINAL EXAMINATION, NOVEMBER 2016

Question 1. (15 minutes)
(a) Describe the fetal response to an acute fall in oxygen availability.
(b) List and briefly describe 4 methods that have been used in animal studies to induce fetal hypoxia.

Question 2. (15 minutes)
Describe the maternal changes that occur during pregnancy in
(a) blood volume and composition
(b) the cardiovascular system

Question 3. (5 minutes)
Describe the role of the prepartum cortisol surge in fetal maturation.

Question 4. (5 minutes)
Describe the human placenta. Explain how placental transfer increases in late gestation even though placental weight remains fairly constant.

Hormone Name		
Chemical structure		
Site of synthesis		
Site of release		
Role in lactation		
Other function		

Question 5. (5 minutes)
"It doesn't matter if the fetal kidneys don't function *in utero*, so long as they function after birth". Discuss.

Question 6. (5 minutes)
Suckling by the infant causes elevation of maternal plasma levels of two hormones important in lactation. Complete the following table for these two hormones.

Question 7. (5 minutes)
Briefly describe the changes that occur in the neonate's cardiovascular system after birth.

Question 8. (5 minutes)
What do you understand by the term "fetal programming"? Include examples in your answer.

TIMETABLE – 2017

PHSL3221 Endocrine, Reproductive and Developmental Physiology

Lectures: Monday 10 am-12 pm (MatD), Tuesday 5 pm (Mat310).
Pracs/PBLs: Thursday 9 am-12 pm (location indicated below).

WEEK 1			
Monday 24/7	10 am	Introduction and course information	Dr K Gibson
Monday 24/7	11 am	Concepts in endocrinology	Dr K Gibson
Tuesday 25/7	5 pm	Insulin physiology	Dr B Osborne
WEEK 2			
Monday 31/7	10 am	Diabetes and islet B cells	Dr R Laybutt
Monday 31/7	11 am	Growth	Dr K Gibson
Tuesday 1/8	5 pm	Endocrine functions of white adipose tissue	Dr M Swarbrick
Thursday 3/8	9 am	PBL 1.1 WW116/AGSM LG06/Mat 303/Lib176A/Lib176B	PBL tutors
WEEK 3			
Monday 7/8	10 am	Regulation of fertility	Dr A Finch
Monday 7/8	11 am	Update on the renin angiotensin system	Dr K Gibson
Tuesday 8/8	5 pm	Hypothalamic regulation of body weight	Dr L Zhang
Thursday 10/8	9 am	PBL 1.2: PBL 2.1 WW116/AGSM LG06/Mat 303/Lib176A/Lib176B	Dr K Gibson PBL tutors
WEEK 4			
Monday 14/8	10 am	Gut hormones	Dr L Liu
Monday 14/8	11 am	Calcium metabolism	Dr K Gibson
Tuesday 15/8	5 pm	Oversecretion: catecholamines and serotonin	Dr K Gibson
Thursday 17/8	9 am	PBL 2.2; PBL 3.1 WW116/AGSM LG06/Mat 303/Lib176A/Lib176B	PBL tutors
WEEK 5			
Monday 21/8	10 am	Puberty	Dr K Gibson
Monday 21/8	11 am	Oocyte development and Maturation	Dr M Bertoldo
Tuesday 22/8	5 pm	Discussion class: hormonal effects of water immersion	Dr K Gibson
Thursday 24/8	9 am	PBL 3.2; PBL 4.1 WW116/AGSM LG06/Mat 303/Lib176A/Lib176B	PBL tutors
WEEK 6			
Monday 28/8	10 am	Androgens and anabolic steroids	Dr K Gibson
Monday 28/8	11 am	Fertility and assisted reproductive technology	Dr A Clark
Tuesday 29/8	5 pm	Menopause and andropause	Dr K Gibson
Thursday 31/8	9 am	PBL 4.2 WW116/AGSM LG06/Mat 303/Lib176A/Lib176B	PBL tutors
WEEK 7			
Monday 4/9	10 am	Discussion class: Cross-dressing or crossing over?	Dr K Gibson
Monday 4/9	11 am	Practice exam questions and feedback	Dr K Gibson
Tuesday 5/9	5 pm	Introduction to Fetal Physiology	Dr K Gibson
Thursday 7/9	**9:30 am**	**Midsession Exam (WW116)**	

WEEK 8			
Monday 11/9	10 am	Fetal circulation	Dr K Gibson
Monday 11/9	11 am	Neonatal Intensive Care	Dr K Lui
Tuesday 12/9	5 pm	Fetal responses to hypoxia	Dr K. Gibson
Thursday 14/9	9 am	Group A - Neonatal nursery (Royal Hospital for Women)	Dr K Lui
		Group B & C – Two peas in a pod (WW116)	Dr K Gibson
		Group D – Free time/presentation preparation	
WEEK 9			
Monday 18/9	***10 am***	***Endocrine assignment due***	***Moodle***
Monday 18/9	10 am	Placenta A	Dr K Gibson
Monday 18/9	11 am	Placenta B	Dr K Gibson
Tuesday 19/9	5 pm	Maternal Physiology	Dr K Gibson
Thursday 21/9	9 am	Group B - Neonatal Nursery (Royal Hospital for Women)	Dr K Lui
		Groups A & D –Two peas in a pod (WW116)	Dr K Gibson
		Groups B & C – Free time/presentation preparation	
RECESS:		**25th September – 2nd October**	
WEEK 10			
Monday 2/10	10 am	NO LECTURE – PUBLIC HOLIDAY	
Monday 2/10	11 am	NO LECTURE – PUBLIC HOLIDAY	
Tuesday 3/10	5 pm	Regulation of fetal fluids	Dr K Gibson
Thursday 5/10	9 am	Practical Class – Gestational diabetes and screening in pregnancy (WW 116)	Dr K Gibson + staff
WEEK 11			
Monday 9/10	10 am	Fetal breathing	Dr K Gibson
Monday 9/10	11 am	Epigenetics	Dr C Maloney
Tuesday 10/10	5 pm	Fetal endocrinology	Dr K Gibson
Thursday 12/10	9 am	Group C - Neonatal Nursery (Royal Hospital for Women)	Dr Kei Lui
		Groups A, B & D –free time/presentation preparation	
WEEK 12			
Monday 16/10	10 am	Parturition	Dr K Gibson
Monday 16/10	11 am	Developmental Origins of Health and Disease	Dr C Maloney
Tuesday 17/10	5 pm	Adaptation to life after birth	Dr K Gibson
Thursday 19/10	9 am	Group oral presentations – all students (WW116)	Dr K Gibson + staff
WEEK 13			
Monday 23/10	10 am	Lactation and early infant nutrition	Dr K Gibson
Monday 23/10	11 am	Practice exam questions	Dr K Gibson
Tuesday 24/10	5pm	No lecture	
Thursday 26/10	9 am	Group oral presentations – all students (WW116)	Dr K Gibson + staff