

PRACTICAL CLASS PROGRAM:

- Weekly Quiz + revision (15 minutes)
- Practical class activities (45 minutes)
- Guest Lecture by Professor Robert Gilchrist (45 minutes)
- Practical Class Revision (15 minutes)

PRACTICAL CLASS ACTIVITIES (45 minutes):

1. Virtual human embryo dissections and histology
2. Guest Lecture by [Professor Robert Gilchrist](#)
3. Embryo models and specimens of human developmental abnormalities (optional)

LEARNING OBJECTIVES:

- Understanding of reproductive technologies
- Understanding of events during early ectoderm and mesoderm development
- Understanding of the process of neurulation and neural crest formation
- Understanding of the adult components derived from ectoderm and mesoderm
- Understanding the process of body cavity formation
- Brief understanding of early heart formation
- Brief understanding of abnormalities associated with early ectoderm and mesoderm development

Activity 1: Virtual human embryo dissections and histology:

In this activity we will be using two fantastic online resources that will give you improved insights into early ectoderm and mesoderm development in 3 dimensions.

[3D Atlas of Human Development:](#)

This atlas consists of 14 3D-PDF files representing 3D reconstructions of Carnegie stage 7 through to 23 human embryos. The atlas was created by students and embryologists of the Department of Anatomy, Embryology & Physiology of the Academic Medical Center (AMC) in Amsterdam, the Netherlands, and it has been made freely available to the scientific community to facilitate veracious embryology education and research.

[The Virtual Human Embryo:](#)

The Virtual Human Embryo Project encompasses all 23 stages of the human embryo. This 11-year initiative tapped the world's largest collection of human embryos to identify, digitize, and catalogue serial sections of normal human embryos. These images were labelled and are now available to researchers and educators everywhere.

Annemiek will first show how to use the 3D PDFs and the Virtual Human Embryo Atlas (VHE). Subsequently you will work with your groups to identify the following features in Carnegie stage 9, 12 and 16 embryos in the 3D PDFs and in the histology sections of the Virtual Human Embryo Atlas:

Stage 9: [3D PDF](#) and [VHE](#)

- Yolk sac
- Amniotic cavity
- Neural folds and groove
- Lateral (epidermal) ectoderm
- Mesoderm
- Somites
- Lateral plate mesoderm
- Intermediate mesoderm
- Intra-embryonic coelom
- Primary heart tube
- Paired dorsal aorta

Stage 12: [3D-PDF](#) and [VHE](#)

- Embryonic epidermis
- Primary brain vesicles: prosencephalon, mesencephalon, rhombencephalon
- Notochord
- Somites
- Mesonephros
- Mesonephric duct
- Peritoneal cavity
- Pericardial cavity
- Heart tube
- Dorsal aorta

Stage 15: [3D PDF](#) and [VHE](#):

- Epidermis
- Secondary brain vesicles: telencephalon, diencephalon, mesencephalon, metencephalon, myelencephalon.
- Developing sclerotomes, mesonephros and mesonephric duct
- Notochord
- Somites
- Axial skeleton
- Pericardial cavity
- Coelom
- Ventricles and atria
- Peritoneal cavity

Activity 2: Guest Lecture by Professor Robert Gilchrist

Professor Gilchrist is head of the Oocyte Biology Research Unit (UNSW) at the School of Women's and Children's Health. His primary research interests are in the regulation of mammalian oocyte development and maturation, and the development of novel oocyte maturation techniques for infertility treatment.

Activity 3: Embryo models and specimens of human developmental abnormalities (optional)

The embryo models will be on display again, and there will also be specimens of human developmental abnormalities related to early ectoderm and mesoderm development. If you have a moment, please investigate them at your leisure.

REVISE PRACTICAL CLASS ACTIVITIES

In the last 15 minutes we will collectively revise the activities with the entire class to wrap up this prac.