

K12 Professional Development 2014

From Embryology

Embryology - 16 Oct 2014    Translate [\[Expand\]](#)

Contents

Introduction

This page introduces K12 teaching resources related to embryology and development. The current page is designed to help teachers find useful curated online resources for use in biology classes related to embryology and development. The content and links on this current page are under ongoing development, I am happy to receive feedback and requests (mailto:m.hill@unsw.edu.au) for design of specific K12 content and exercises for your classes.

The initial resources I will be presenting relate to comparative embryology and comparative brain anatomy.

The section entitled Additional Useful Resources links directly to resources and currently there is no content designed for K12 student use, but content and resources on these pages may be useful in designing your own specific content around these topics.

Note that content on K12 pages has been simplified in both terminology and descriptions from that found on other embryology pages designed for university level students. That does not mean that other embryology pages are not useful for students, but may be too difficult to place in context given the advanced terminology and descriptions used on non-K12 pages.

[Content Reuse \[Expand\]](#)

Below are a list of the current K12 designed resources.

K12 Links: [Start Here](#) | [Week 1](#) | [Week 2](#) | [Week 3](#) | [Week 4](#) | [Week 5 to 8](#) | [Arms and Legs](#) | [Heart](#) | [Fetus](#) | [Brain Growth](#) | [Eyes and Ears](#) | [Animal Development Times](#) | [Comparative Embryology](#)

Links: [K12 Professional Development 2014 - Embryology for K12 Students](#) | [Museum of Human Disease - Professional Development Days](#) (<http://medicallsciences.med.unsw.edu.au/community/museum-human-disease/education/teacher-internship>)

Comparative Embryology

This page has been designed as an introduction to Comparative Embryology. The page has 4 student exercises contained within collapsible tables. These exercises have worksheets that can be printed out to be completed by students. Also look at the series of student designed projects on animal development.



Dr Mark Hill, School of Medical Sciences, UNSW



K12 Links: Comparative Embryology

Student Projects: Rabbit | Fly | Zebrafish | Mouse | Frog | Related page - Animal Development

Comparative Brain Anatomy



This page was designed originally as a presentation for brain awareness week. Students should understand that the description of early brain development is the same for most species. A more specific page on K12 Comparative Brain Anatomy is under development.

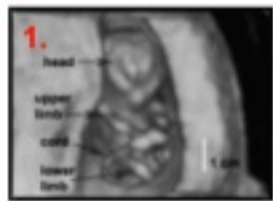
K12 Links: Comparative Brain Anatomy

Additional Useful Resources

The following pages are not designed for K12 students but may provide background information and resources for teachers in other Biology areas.

Movies

The movies page has many different animations showing developmental processes. Some of these movies are simplified cartoons, while others are derived from developmental research articles.



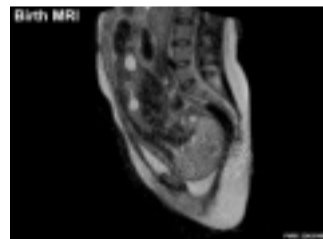
Ultrasound 12wk

1. Page | Play 2.

The moves can be:

1. Opened on a new page with a description and links to additional content, resources and references.
2. Played as a movie by itself, movie can be expanded to full screen, as well as stopped and started to allow discussion.

Links: Movies

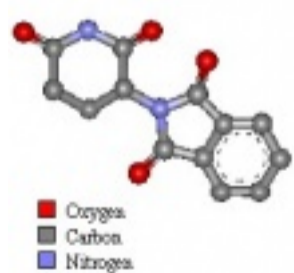


Human Birth MRI

Page | Play

This is the first MRI recording of childbirth.

Thalidomide



Thalidomide molecular structure

Thalidomide is a drug that was introduced on to the market on October 1, 1957 in West Germany. Thalidomide soon became a drug prescribed to pregnant women to combat symptoms associated with morning sickness.

When taken during the first trimester of pregnancy, thalidomide prevented the proper growth of the fetus resulting in horrific birth defects in thousands of children around the world. This is an example for students of inadequate drug testing and a lack of understanding of environmental effects on human development. This is often cited today as a reason to have significant testing of drugs before release and classification of drugs based upon their affects on development.

Links: Thalidomide | Australian Drug Categories

Cell Division

These pages are designed for university level students but also contain images and movies that can be used with students.

The page link opens a movie page with additional descriptions about what is being shown in the movie.

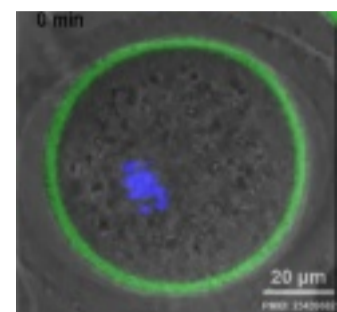


This movie shows chromosomes being segregated during mitosis, the last image is a normal microscopic view of the 2 daughter cells following cell division. Chromosomes have been labelled (white) and align at metaphase, then separate into the two daughter cells. Note the chromosomes unfold at the end of mitosis.

Exercise - Allow the students to see the unlabelled movie and then identify specific stages of mitosis by time. The labelled movie can be shown after the student have attempted the exercise.

Mitosis
Page | Play

Links: Mitosis



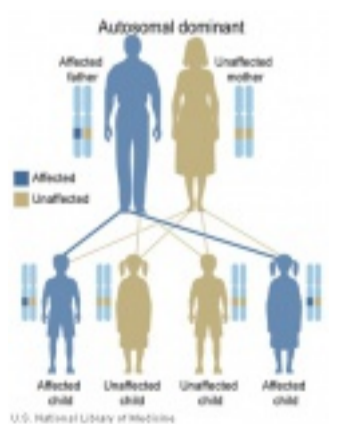
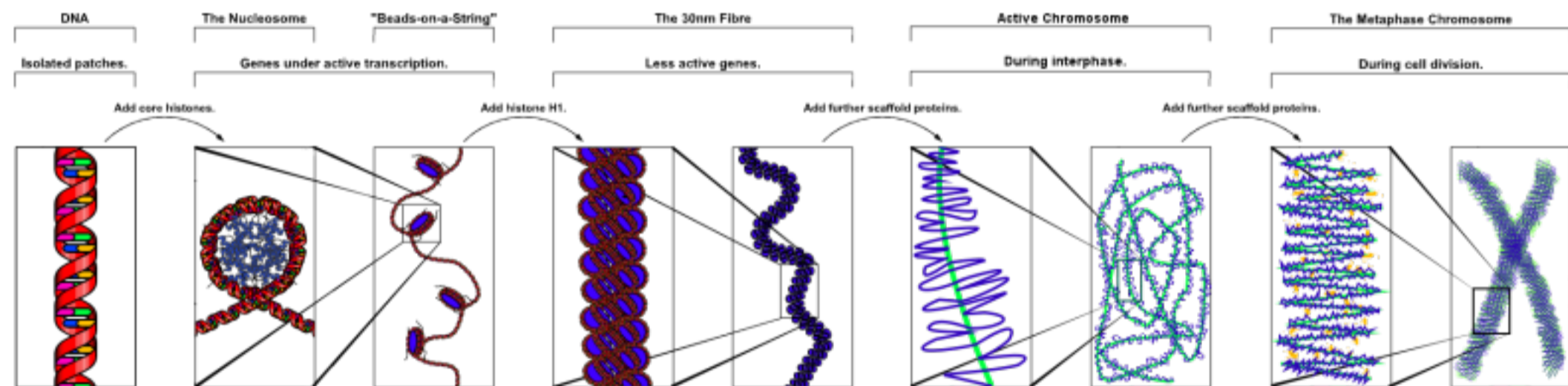
This movie shows how in the oocyte (egg) during meiosis 1 excess DNA is segregated into a specialised structure, the polar body. The polar body contains DNA in an exclusion body that does not contribute to the embryo. DNA is labelled blue and the same oocyte is shown in both bright field (left) and fluorescence (right). Note the remaining oocyte chromosomes arrest at metaphase 2.

Oocyte Meiosis
Page | Play

Links: Meiosis

Chromosomal Structure

This generally available cartoon image shows the major structures in DNA compaction from duplex to chromosome. Note that this process of compaction occurs only during preparation for cell division and that cells carrying out their normal function have uncompact DNA to allow gene transcription.



There are also a set of cartoon diagrams illustrating genetic mechanisms of inheritance.

Exercise - Print out these cartoons without the labelling shown for the students to identify the type of inheritance pattern shown by the cartoon.

Links: Genetics | Inheritance Genetics

Current Reproductive Technologies

The general public more commonly recognise the term In Vitro Fertilisation (IVF).

Note the Nobel Prize in Physiology or Medicine 2010 was awarded to Robert G. Edwards "for the development of in vitro fertilization" who battled societal and establishment resistance to his development of the in vitro fertilization procedure, which has so far led to the birth of around 4 million



people. (More? Assisted Reproductive Technology | Nobel Prize 2010 (http://nobelprize.org/nobel_prizes/medicine/laureates/2010/)) 10 April 2013 - Sir Robert Edwards has died aged 87. BBC News (<http://www.bbc.co.uk/news/health-22095512>)

Exercise - Students should identify the many different ways in which pregnancy can be now be achieved using ART.

Louise Brown, the first IVF baby as an adult.

Links: Assisted Reproductive Technology



Statistical data on assisted reproductive technology is released regularly in this publication. Student can download the full report and there is an overview executive summary available.

Anatomy and function of the Human Ear

These are notes pages designed to help university level students understand development of the sensory system of hearing and balance. While the text may be difficult for students to follow, there are a number of easily understood simplified cartoons and drawings of hearing structures.



Hearing Links: Introduction | Science Lecture | Medicine Lecture | Inner Ear | Middle Ear | Outer Ear | Balance | Hearing - Neural Pathway | Stage 22 | Abnormalities | Neonatal Diagnosis - Hearing | Hearing test | Sensory Introduction | Placodes | Student project | Category:Hearing

Historic Embryology [Expand]

Immune System



This is a university lecture on the immune system, but also contains easily understood simplified cartoons and electron micrographs of B and T cells.

Links: Lecture - Immune Structure and Organs

HSC NSW

Biology Syllabus [Expand]

External Links

External Links Notice - The dynamic nature of the internet may mean that some of these listed links may no longer function. If the link no longer works search the web with the link text or name.

- NSW HSC - Biology (http://www.boardofstudies.nsw.edu.au/syllabus_hsc/biology.html#syllabus) | Biology Syllabus PDF (http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/biology-st6-syl.pdf)

Glossary Links

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What Links Here? (http://php.med.unsw.edu.au/embryology/index.php?title=Special:WhatLinksHere/K12_Professional_Development_2014)

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Categories: [Hearing](#) | [Sensory](#) | [K12](#) | [Education](#)

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