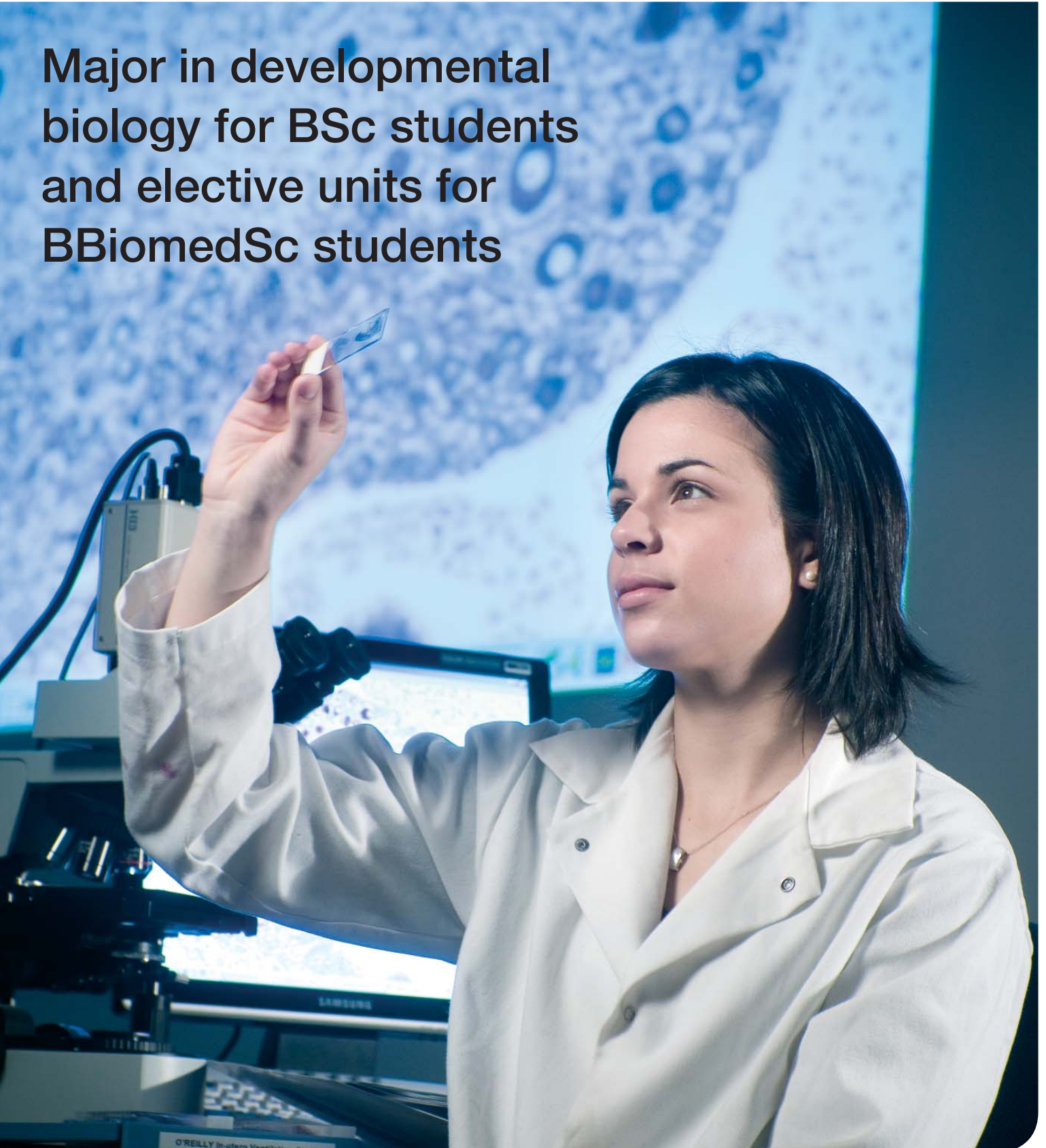




Anatomy and Developmental Biology

School of Biomedical Sciences

**Major in developmental
biology for BSc students
and elective units for
BBiomedSc students**



Anatomy and developmental biology

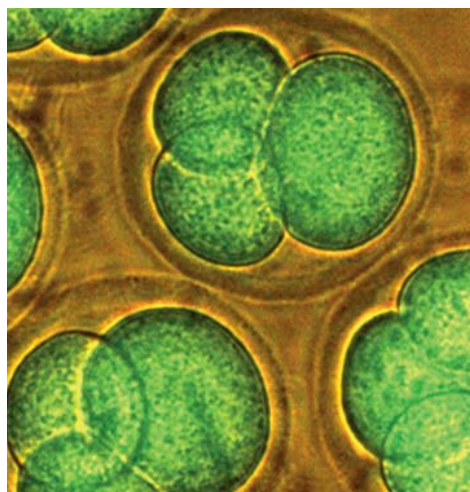
The Bachelor of Science major in developmental biology, and elective units for Bachelor of Biomedical Science students.

What is developmental biology?

Developmental biology covers a range of disciplines. Built upon a foundation in embryology, anatomy, molecular biology and genetics, modern developmental biology also covers such topics as stem cell science, regenerative biology and medicine, and tissue engineering.

Second year units commenced in 2007.

Third year units commence in 2008.



Unit summaries

Second year

Semester 1

DEV2011 Early human development from cells to tissues

Introduces the structure and function of eukaryotic cells, including the diversity of cell structure and function. The concept that the many specialised cell types in the adult human body are derived from a single fertilised egg is emphasised, laying the foundations for future studies of cell differentiation, embryogenesis and stem cell science. The four primary tissues (epithelium, connective tissue, muscle tissue, nervous tissue) are described, together with gametogenesis, fertilisation, blastocyst formation and implantation, formation of stem cell lineages, germ layers and early derivatives.

Semester 2

DEV2022 Principles of organ and body design

Provides students with basic knowledge of human anatomy. Describes how tissues are combined to form organs, and how organs and organ systems are organised to form the adult body structure. The microscopic and macroscopic structure of the major human organs and organ systems are covered, including the cardiovascular, respiratory, gastrointestinal, urinary, reproductive and nervous systems. Imaging modalities for examining the body are described including X-ray, CT, and MRI. How the general body plan is established during embryogenesis is discussed. The development of the skeleton is described, together with current understanding of limb formation and regeneration.

Third year

Semester 1

DEV3011 Fundamentals of developmental processes

Considers the mechanisms involved in developing a single fertilized egg into a complex 3-dimensional adult organism. Details of how undifferentiated cells, differentiate into the specialised cells of the body and experimental models used to study these processes are explored. Upon completion of this unit students will comprehend the molecular and cellular events that regulate the development of differentiated cells, tissues and organs during embryonic development.

DEV3990 Action in developmental biology research project (offered semester 1 and 2)

This unit provides a laboratory research experience in developmental biology for high-achieving students. Students undertake a research project in developmental biology under the close supervision of an academic staff member. The research project is chosen from a list of projects available at the beginning of the semester.

Semester 2

DEV3022 Developmental pathways to health and disease

Covers the morphogenesis and regulation of development of the major organs and organ systems. Common human birth defects are described, detailing the morphological and functional aspects of the defects, as well as current understanding of the causes of defects and treatment options.

DEV3032 Stem cells and regeneration

Introduces the exciting topic of stem cell biology and tissue regeneration. The characteristics of embryonic and adult stem cells are described. Methods for deriving, analysing, detecting, isolating and manipulating stem cells are covered. The use of stem cells, novel factors and tissue engineering to regenerate diseased tissues and organs is considered.

Bachelor of Science (Honours) and Bachelor of Biomedical Science (Honours)

The department provides research training to students doing the BSc (Hons) and BBiomedSc (Hons) degree. Students undertake a research project under the close supervision of an academic staff member, and at the end of the year write a thesis. Students can also undertake projects with our honorary staff located in the Australian Stem Cell Centre.

The department has active research programs in:

- Adult consequences of premature birth and suboptimal fetal development
- Cardiovascular cell biology
- Development of the ovary
- Developmental neuropharmacology
- Effects of low birthweight on lung development
- Functional characterisation of the epithelial ETS transcription factors
- Heart and blood vessel development
- Intestinal stem cells – development and regeneration
- Kidney development and disease
- Kidney disease in Aborigines, African Americans and whites
- Kidney stem cells and regeneration

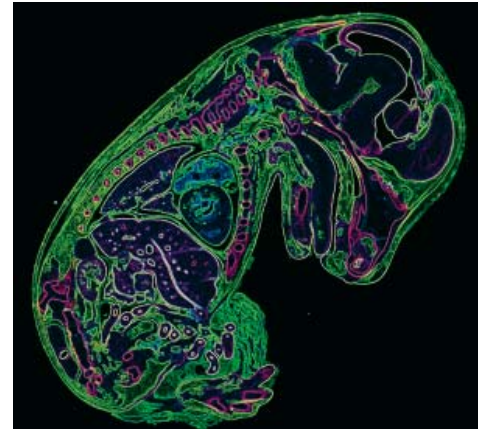
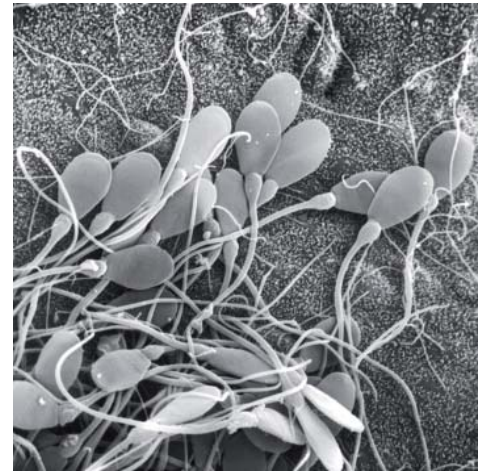


- Mechanisms of fetal brain injury; prenatal neuroprotective strategies
- Neurodevelopment and neuroplasticity
- Skin development and disease
- The early developmental origins of respiratory diseases
- The molecular genetics of Down syndrome/Alzheimer's disease
- The role of maternal diet in the developmental programming of adult metabolic syndrome
- Ventilating the preterm lung; how can it be improved?

For more information see www.med.monash.edu.au/anatomy/research

Master of Biomedical Science and PhD

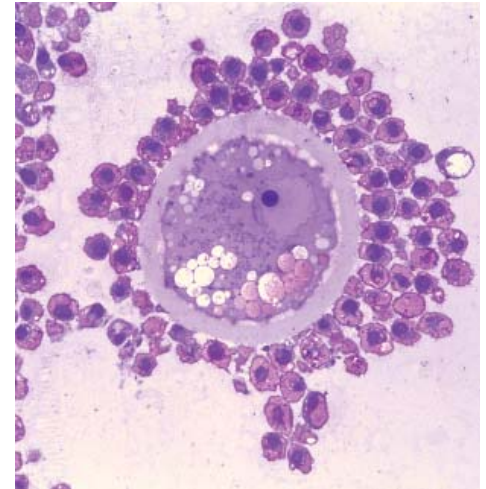
Students who perform well in the BSc (Hons) or BBiomedSc (Hons) year are eligible to enrol in a higher research degree (MBS or PhD). These typically take two years and three to four years of full-time research, respectively. For more information about BSc (Hons), BBiomedSc (Hons), MBS and PhD visit www.med.monash.edu.au/anatomy



Major unit sequence in developmental biology for Bachelor of Science students

Level 1	Level 2	Level 3	
BIO1011 BIO1022	DEV2011 DEV2022	DEV3011 DEV3022	And any two of DEV3032 DEV3990 BCH3021 GEN3030 PHY3082

For entry into level 2 units	
	Prerequisites
DEV2011	BIO1011, BIO1022 or BMS1021
DEV2022	DEV2011
For entry into level 3 units	
	Prerequisites
DEV3011	DEV2011 and DEV2022 and MOL2011 or BMS1062 and BMS2011 and BMS2021 and BMS2031
DEV3022	DEV3011
DEV3032	DEV2011 and DEV2022 and MOL2011 or BMS1062 and BMS2011 and BMS2021 and BMS2031
DEV3990	12 points of study in the discipline area at second-year-level and a distinction over 24 points at second-year-level or by permission of the Unit Convenor or Head of Department



Enrolment

For entry into second year units in semester one a satisfactory record in first year is normally required, ie a pass grade or better in a majority of first year units.

For further details consult any one of our academic staff.

Further information

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Clayton, Victoria 3800

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Fax: + 61 3 99052766

Email:
www.med.monash.edu.au/anatomy

Career opportunities

- Technical/research assistant
- Research scientist
- Stem cell scientist
- Embryologist
- IVF technician
- Biotechnology research
- Hospital scientist
- Medical research
- Secondary school science teacher
- University lecturer
- Science journalism

Other opportunities

Students who have completed second and third year units will have an excellent foundation for further studies in:

- Medicine (graduate entry)
- Dentistry
- Veterinary science
- Pharmacy
- Physiotherapy and chiropractic
- Occupational therapy
- Speech pathology
- Osteopathy
- Other health professions



Disclaimer: The information in this brochure was correct at the time of publication. Monash University reserves the right to alter fees, regulations and procedures should the need arise.

The inclusion of course details in this brochure in no way creates an obligation on the part of the university to teach it in any given year, or in the manner described. The university reserves the right to discontinue or vary courses at any time without notice. Students should always check with the relevant faculty officers when planning their courses and consult other information such as handbooks and websites for the most current information. July 2006

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