

# PHYSIOLOGY

your heart

your mind

your body

your health

your life



THE UNIVERSITY OF  
MELBOURNE

## DEPARTMENT OF PHYSIOLOGY

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## WHAT IS PHYSIOLOGY?

Physiology deals with the function of cells and the whole body. It begins with the inheritable material of our body and charts how this determines each individual characteristic.

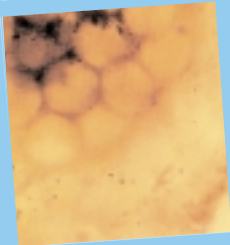
Together with biochemistry (an offshoot of physiology), physiology describes how the chemical processes are integrated to allow a cell to control its own composition and function.

Physiology describes, together with anatomy, how cells are linked together to form a functional organ and how cells communicate with each other.

From the organ, physiology leads to the whole body, discovering how the body functions as an integrated whole, linked by hormones and the nervous system.

At the centre of the nervous system is the enormous complexity of the brain. How the brain develops and its billions of nerves interact is largely mysterious, but one of the great challenges of physiology.

Finally, physiology describes what happens when control systems go awry and how drugs (pharmacology is another discipline that developed from physiology) may restore the balance and prevent the consequences of disease.



## WHY DO PHYSIOLOGY?

Physiology is crucial for medicine.

Even if you major in biochemistry, molecular genetics or pharmacology, you still need to understand how these integrate with the whole and relate to physiology.



## HOW TO DO PHYSIOLOGY

An understanding of some chemistry, physics and general biology is important for first year.

In second year, courses in general physiology and neuroscience exist. It is useful also to do anatomy and biochemistry subjects as these blend well with physiology.

In third year, specialised physiology subjects focus on specific organs and control systems.

An honours year allows in depth exploration of a particular topic and provides an introduction to scientific research.



## BIOMEDICAL SCIENCE AND MEDICINE



## DID YOU KNOW?

The **Nobel Prize** is awarded in the specific category Physiology and Medicine, emphasising the key importance of physiology in understanding the basis of disease and its treatment.

Drugs used to treat **high blood pressure and heart disease** have developed from understanding the physiology of blood pressure control and kidney function. An awareness of physiology has helped produce better and safer drugs.

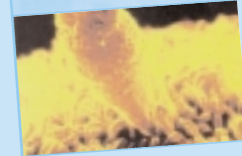
Understanding the physiology of how sodium and water is reabsorbed from the intestine has led to simpler treatments for **cholera** and diarrhoea that have saved millions of lives.

Training programs and diets for today's **elite athletes** have been designed to maximise physiological processes relevant to performance, fitness and endurance.



Physiology has revealed the mysterious function of novel genes such as those causing **cystic fibrosis**. Many patients are healthier as a result.

## WHAT WE STUDY IN THE DEPARTMENT OF PHYSIOLOGY AT THE UNIVERSITY OF MELBOURNE



How new genes or genetic mutations alter the function of living tissues. This new and exciting area is called **Physiological Genomics**.

How the hormones renin, angiotensin and aldosterone function in normal and disease states and how modification of this function may prevent complications of **diabetes** and **hypertension**.

How all the functions of the gut – absorption, secretion, digestion, propulsion – are integrated by the **enteric nervous system**.

How **muscles** function in health or disease and how damaged or diseased muscles may be improved. This extends into how muscles use this energy and develop strategies that may reduce fatigue.

What controls the life and death of **nerve cells**. How can we prevent the death of brain cells in diseases such as Alzheimer's and Parkinson's diseases and maintain normal function?



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