



Pharmacology and Toxicology

The science behind drugs

"I realised that science including pharmacology wasn't just the study of how things work, but it can be used to help people significantly in everyday life."

Brad Sutherland BSc(Hons) PhD

Pharmacology is the science of the effects of drugs on biological systems, from the molecular and cellular levels through to patient studies. Toxicology is closely related to pharmacology and specialises in the analysis of the harmful effects of drugs and other chemicals on biological systems.

Pharmacology and toxicology are at the forefront of modern medicine, designing, developing and testing drugs that have the potential to alleviate, and in some cases cure the diseases that afflict humans and animals.

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Why study Pharmacology and Toxicology?

Most people are interested in pharmacology simply because drugs occupy such a prominent place in everyday life. Constant progress in medicine involves the design of new drugs that can cure cancer, cardiovascular disease, neurological disorders, and other medical conditions.

Pharmacology is a modern science that incorporates other biological sciences such as biochemistry, chemistry, physiology, microbiology, and genetics. Unlike pharmacy, which is the science of the preparation and dispensing of drugs, pharmacology is the science behind how drugs produce their effects on the body, and what the body does to the drugs we take.

Toxicologists are concerned with the safety of new drugs and chemicals that are a part of our everyday lives, as they have the potential to contaminate the environment and our food supply.

A good knowledge of pharmacology and toxicology is also an important part of the training of medical doctors, pharmacists, dentists, nurses, veterinarians, and toxicologists. Other scientists often find pharmacology useful in their own area of specialisation. For example, physiologists, biochemists, zoologists, and psychologists may use drugs to define the function of a biological system that they are studying.

Pharmacology and Toxicology at Otago

We offer two specialised undergraduate degrees: a Bachelor of Science (BSc) majoring in Pharmacology and Toxicology; and a Bachelor of Biomedical Science (BBIomedSc) majoring in Drugs and Human Health.

First year of study

Most students enrol in the Health Sciences First Year (HSFY) programme, which consists of seven papers in the Health Sciences. HSFY gives

you a solid foundation from which to pursue a BSc majoring in Pharmacology and Toxicology or a BBIomedSc majoring in Drugs and Human Health.

Alternatively, if you already know which major you'd like to pursue, you can undertake a more customised programme. This option is particularly useful for students undertaking a double degree, as it enables you to take up to four non-Health Sciences papers.

Second year

You will cover areas such as:

- Basic principles of pharmacology
- Cardiovascular, respiratory, and neurological diseases
- Introduction to toxicology
- Practical classes introducing traditional pharmacological methods

Third year

You will cover areas such as:

- Neuropharmacology
- Clinical pharmacology
- Molecular and immunopharmacology
- Mechanisms of toxicology

Background required

There are no subject requirements for entry to first year, except that students enrolling in Health Sciences First Year (HSFY) must not have previously undertaken university-level study. It is, however, recommended that you take chemistry and biology to Year 13 level.

Teaching style

As a small department, we have a friendly and helpful relationship with our students.

All pharmacology and toxicology papers are taught through a combination of lectures and practicals. The practical classes are varied and aim to instil important pharmacological laboratory skills in all students.

Research at Otago

We undertake integrative, cellular, and molecular investigations aimed at understanding animal and human pathophysiology, and isolating targets for new drugs. Our laboratory groups are engaged in high-quality internationally-recognised research focused on the following themes:

- Cancer and related drug treatments and prevention therapies
- Cardiovascular signalling and cardioprotection
- Inflammation and wound healing
- Neuropharmacology and neurotoxicology
- Toxicology and neuroprotection
- Vestibular and auditory pharmacology

Postgraduate opportunities

There are many postgraduate opportunities including an honours degree, a master's degree, and a PhD programme.

Postgraduate papers concentrate on modern research in pharmacology and toxicology, focusing on the various areas within neuropharmacology, mechanistic toxicology, and clinical pharmacology.

Careers

Opportunities for pharmacology and toxicology graduates are wide-ranging. They include biomedical research in university and private laboratories, and administration and drug regulation for government departments and other medical service professions. There are also multiple teaching opportunities in university, polytechnic, and hospital settings.

Pharmacology and toxicology also provides a strong basis for a career in the professional medical sciences (such as postgraduate entry into medical school), and is of great value for staff in the pharmaceutical industry. Additionally, there are career opportunities in drug information, publishing, and drug law.

PROFILE Brad Sutherland

Brad Sutherland's Otago degrees in pharmacology have landed him a very prestigious post-doctoral research fellowship at Oxford University, proving that an Otago degree can take you anywhere.

Brad's journey started at secondary school where he studied all the sciences. From school he enrolled in the Health Sciences First Year (HSFY) programme at Otago.

"It was this that sparked my interest in health sciences and using scientific progress to treat clinical disease," he explains.

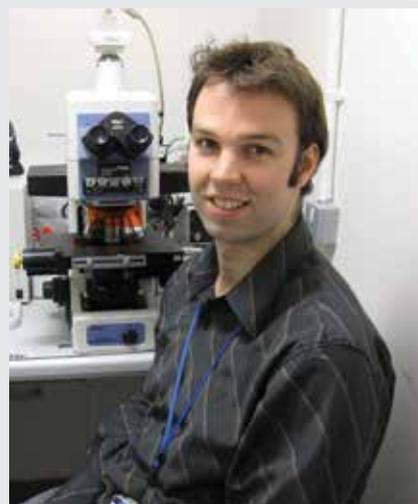
From HSFY Brad began his study in pharmacology, the study of how drugs work. "The pharmacology course was excellent, with excellent lecturers and lab demonstrators," says Brad.

Pharmacology has a wide range of appeal as it is a multi-disciplinary subject which covers anatomy, physiology, and biochemistry. Pharmacologists have the challenge of needing to understand all of these subjects, but this also means that they are able to approach scientific problems from a number of different angles.

However, it was not all a challenge Brad explains, "The most fun were the labs. There are not many places where you can do scientific experiments on yourself, but you can here."

For Brad, the fun and challenges continued as he went on to complete a BSc(Hons) and a PhD in Pharmacology. "The degrees that I obtained at Otago have given me the confidence and ability to transfer my research skills into one of the leading stroke research facilities in the world," he says.

The future for Brad is just as exciting with many options available to him in academia, research, drug regulation, policy making, or industrial science developing new drugs or strategies to treat disease.



For questions about
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otago.ac.nz/pharmacology

