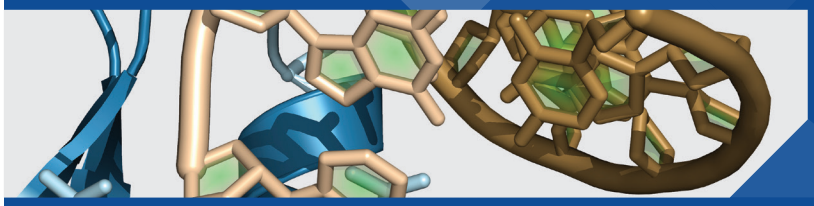

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE

Biochemistry

The molecular basis of life

"My skills in genomic and molecular biology are very transportable and have allowed me the freedom to choose from work in a variety of exciting fields."

Richard Hall
PhD Graduate

If you've ever wondered how living things work, where they get their energy from, how they make the components they need or what it is that your genes do, then Biochemistry is for you.

Biochemists apply molecular approaches to understand life and death, how cells can be turned into bio-factories, how to make improved crops, how trillions of cells assemble to form you, why you get old, and what causes diseases like cancer.

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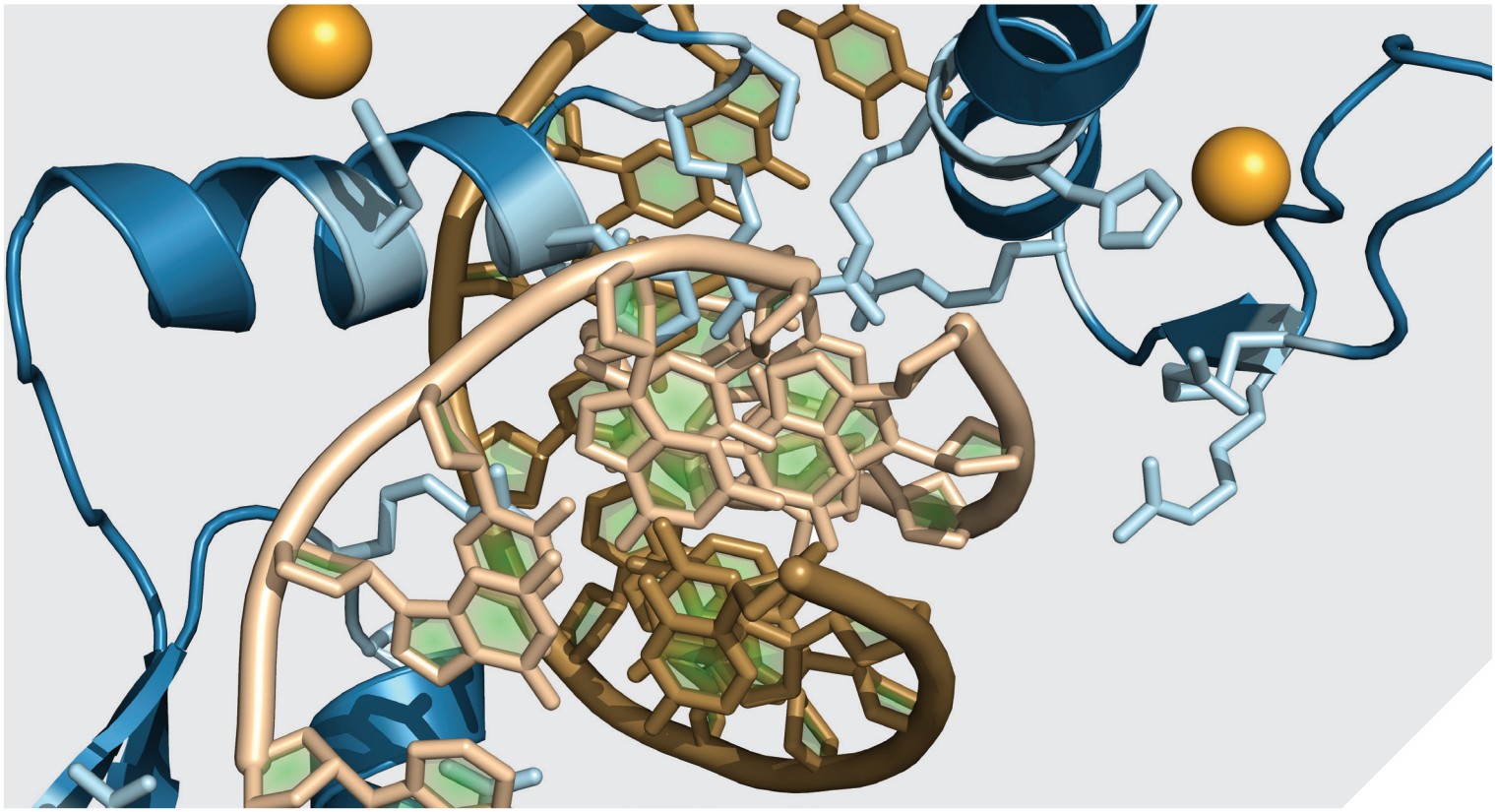

Biochemistry at Otago

Biochemistry is a rapidly-developing molecular science that studies living processes by considering an organism's biological molecules: their functions, their interactions (both amongst themselves and with molecules in the environment), and how they can be affected by the environment itself.

Biochemistry is at the heart of cutting-edge developments in molecular medicine and the biotechnology industry. Molecular medicine is poised to revolutionise human health. Better methods for diagnosis, drug design, and therapeutic treatment at the molecular level will improve health outcomes for society. Biotechonology will bring us more and better foods, new sources of energy and new materials for engineering.

Why study Biochemistry?

Biochemistry occupies a central place in the life sciences. It is fundamental to our understanding of the structure, function, and development of all life. It doesn't matter which area of biology you are interested in, biochemistry will enhance your understanding of life.

A biochemistry degree from Otago is an internationally-recognised qualification in one of the key life sciences. You will learn practical, analytical, and critical thinking skills that are highly valued in New Zealand's knowledge-based economy.

Biochemists are experimental scientists, as a result the study of Biochemistry at Otago has a large hands-on component, involving practical skills and sophisticated instrumentation, all of which help prepare you for career opportunities following graduation.

Background required

There are no school subjects you have to do to study Biochemistry. However you will need to pass a first-year Chemistry paper before doing Biochemistry, so NCEA Level 2 and/or Level 3 Chemistry will be helpful.

What papers do I take for a Bachelor of Science (BSc)?

Each year you will take seven or eight papers, three or four of which will be compulsory.

As part of your first-year course, you must pass three compulsory papers:

- CELS 191 Cell and Molecular Biology
- CHEM 191 The Chemical Basis of Biology and Human Health
- BIOC 192 Foundations of Biochemistry

In second year you will have another three compulsory Biochemistry papers to complete, along with your other second-year work. They compulsory papers are:

- BIOC 221 Molecular Biology
- BIOC 222 Proteins and Biotechnology
- BIOC 223 Cellular Biochemistry and Metabolism

In second year, *GENE 221 Molecular and Microbial Genetics* is also recommended, and you will have the opportunity to take three or four additional papers.

In third year, there are four compulsory papers:

- BIOC 351 Advanced Protein Biochemistry
- BIOC 352 Advanced Molecular Biology and Bioinformatics
- BIOC 353 Molecular Basis of Health and Disease
- BIOC 360 Research Perspectives in Biochemistry

Is Biochemistry a part of any other degrees?

Biochemistry has an important role in several other degree programmes including Genetics, Biomedical Sciences, Plant Biotechnology, Human Nutrition, and Molecular Biotechnology. Biochemistry can also be taken as a minor subject option with any other major, or included in any degree programme.

Biochemistry forms part of the core syllabus for all health sciences professional programmes (eg Dentistry and Medicine).

Postgraduate study options

Following on from a BSc in Biochemistry there are a number of postgraduate options, including a Bachelor of Science with Honours (BSc(Hons)), a Postgraduate Diploma in Science (PGDipSci), Master of Science (MSc), and doctoral (PhD) degree.

Careers in Biochemistry

Biochemists can choose from a diverse array of job opportunities, and Otago Biochemistry graduates can be found all over the world. Careers in research, product development, forensics, public health, bioinformatics, agribusiness, patent law, science policy, publishing, teaching and science communication, commerce, and marketing are all avenues available to biochemists.

The New Zealand biotechnology industry has opportunities for biochemists in livestock improvement, the development of food crops, winemaking, the protection of native flora and fauna, pharmaceuticals, and industrial and household products.

With a degree in Biochemistry you can pursue your passion in any area of biology, anywhere in the world.

PROFILE Jessica Craig Biochemistry Graduate

Jessica Craig enjoyed Biology and Chemistry at secondary school, and wanted to study something similar. Coming to Otago for its "world-class reputation" and the "scarfie experience," she chose to study a wide range of science papers in her first year and go from there.

After initially struggling with the subject, she was drawn to protein biochemistry.

"Proteins are essentially molecular machines," she says. "I enjoyed learning about how their composition, structure, movements, and interactions work to carry out a particular function.

"We can utilise this knowledge of structure and function in areas from drug development to crop improvement, and more. Studying the happenings inside our cells, and seeing how the smallest irregularity can have vast and devastating consequences, really shows us how amazing life is."

Jessica says she especially liked the practical laboratory side of studying Biochemistry, particularly during her honours (fourth) year, when she worked on her own research project. She says, "although it was challenging and took a lot of time, being able to produce original results was extremely rewarding."

Jessica graduated with a First-Class Bachelor of Science with Honours (BSc(Hons)), and initially worked as a laboratory technician at a winery in Marlborough, before moving to her current job as a chemistry laboratory technician at Fonterra, in Taranaki.

She says her Biochemistry studies taught her to look critically at both her own and others' results, and to think both logically and creatively to find ways around problems.

"The laboratory-based skills and knowledge I gained throughout my degree were also vital to pursuing a career in science," she explains.

About to head to the UK for her OE, Jessica says research is her passion. She plans to return to New Zealand to gain more experience in a research-based lab, before beginning a PhD "sometime in the not-too-distant future."

For questions about Biochemistry

otago.ac.nz/biochemistry

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