



veski  
innovation  
fellow

Dr Ethan  
Goddard-Borger

#### research project

**Targeting Glycosphingolipid  
Biosynthesis to treat  
human diseases.**

#### project summary

Dr Goddard-Borger uses the power of chemistry to understand and explore biology with the ultimate goal of identifying and prosecuting new targets for therapeutic intervention.

He is particularly interested in infectious microorganisms – especially eukaryotes like the protists and fungi. This broad collection of diseases affects both humans and animals and presents an enormous global health and economic burden.

His research is focused on several groups of organisms including Plasmodium, which cause malaria and kill between one and three million people each year; Toxoplasma, which affect up to a third of the world's population and can cause serious problems for people with compromised immune systems including expectant mothers; and Cryptococcus, a fungus that kills more people in sub-Saharan Africa than tuberculosis.

The project focuses on a glycolipid called glucosylceramide. This common fatty molecule is found in the cell membranes of almost every animal, plant and fungus. It plays a key role in a diverse collection of diseases, including cancer, genetic disorders and infectious diseases. Recently, glucosylceramide was also identified as being essential to fungal pathogens like Cryptococcus.

Ethan's goal is to develop small molecules that inhibit the production of glucosylceramide in fungi. Such compounds will further our understanding of fungal biology and will eventually be developed into drugs to treat the aforementioned diseases.

His **veski** innovation fellowship will support this work and initiate a Melbourne-centric drug-discovery research program. The program will combine Dr Goddard-Borger's expertise in medicinal chemistry and chemical biology, with the talent and resources of his established, world-leading international collaborators in structural biology, cancer, lysosomal storage disorders and mycology. Together, they will pursue treatments for diseases in great need of improved therapies.

#### personal history

Dr Goddard-Borger has accepted a **veski** innovation fellowship worth \$150,000 over three years. The funding will be matched in cash and in-kind by his host organisation The Walter and Eliza Hall Institute of Medical Research.

Prior to arriving in Victoria, Dr Goddard-Borger was a Canadian Institute of Health Research postdoctoral fellow in the Chemistry Department at the University of British Columbia. During his postdoctoral studies in Canada, he was part of a group that developed pharmacological chaperones for the treatment of Gaucher's disease, a rare genetic disorder in which a fatty substance accumulates in cells and certain organs. He also played a key role in developing an enzyme that can break down algae into simple sugars, which can be used to produce biofuels.

As a relatively young researcher, and while completing his PhD in synthetic chemistry at the University of Western Australia, Dr Goddard-Borger developed an efficient, inexpensive and shelf-stable diazotransfer reagent. His paper on this topic has been cited more than 200 times and the reagent has been picked up by industry and is being sold around the world.

## Dr Ethan Goddard-Borger

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**“We’re really seeking to discover a new Achilles’ heal for a range of infectious microorganisms. The hope is that we can target these with new drugs to potentially cure a collection of diseases”**

He originally studied at the University of Western Australia where he completed a Bachelor of Science with Honours and a PhD with distinction.

Throughout his studies, Dr Goddard-Borger received a number of awards, including prestigious prizes in Chemistry.

He has continued to contribute to his profession through teaching and has considerable experience at the University of Western Australia and the University of British Columbia.

Ethan relocated to Victoria in July 2013 to become a laboratory head within the Chemical Biology division at the Walter and Eliza Hall Institute.

### other innovation fellowship recipients

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Professor Andrew Holmes AM FRS FAA FTSE  
Professor Marcus Pandy  
Dr Gareth Forde  
Dr Alyssa Barry  
Professor Michael Cowley FTSE  
Professor Sarah Hosking  
Professor Ygal Haupt  
Dr Ross Dickins  
Dr Mark Shackleton  
Professor Edwin van Leeuwen FTSE  
Dr Matthew Call  
Dr Christopher McNeill  
Dr Seth Masters  
Associate Professor Tiffany Walsh  
Professor Cameron Simmons  
Professor Colette McKay  
Dr Luke Connal

### fellows in an ambassadorial role include

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Professor Adrienne Clarke AC  
Professor Peter Doherty AC  
Professor Alan Trounson  
Mr Brian Jamieson  
Dr Janine Kirk AM  
Professor Christina Mitchell  
Professor John Denton

### further information

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### background information

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**veski** delivers three of Victoria’s most prestigious fellowship programs including the **veski** innovation fellowships which bring world-leading scientists and researchers back to Victoria.

Since 2004, **veski** has awarded 18 **veski** innovation fellowships worth more than \$3.7 million delivering a return on investment in excess of \$45 million of funds brought into Victoria for research and infrastructure and attracting a range of globally competitive individuals to Victoria to work on important research into areas such as dengue and malaria, cancer, inflammatory diseases, musculoskeletal health and obesity.

**veski** is supported by the State Government of Victoria.

