SPONSORSHIP PROSPECTUS

2020

UNIMELB
iGEM

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Team Message

Thank you for your interest in sponsoring the 2020 University of Melbourne International Genetically Engineered Machines (iGEM) team. We are an independent undergraduate research team composed of students from various disciplines across the university. Each year, we address problems perceived in the world and address contemporary global issues in the biomedical field through genetic engineering. Ultimately, we compete at the world's premier synthetic biology competition: the iGEM Giant Jamboree.

As a team, we have strong connections with the Walter and Eliza Hall Institute of Medical Research among other prominent biomedical research institutes. With the support of the University's Centre for Stem Cells Systems, our project aims to genetically engineer designer macrophages to express soluble ACE2 and selectively inhibit the SARS-CoV-2 virus via neutralisation of the spike protein. We are also passionate about community outreach and generating scientific conversation among the general public.

The University of Melbourne is the only Victorian team participating in iGEM this year and we, as a student-led team, independently fund our research, lab work, and essential costs due the non-for-profit nature of the competition. Our sponsors support the progression of our project while contributing to our engaging community presence. As a team, we are forever indebted to our sponsors who generously support our work. We look forward to discussing our project with you as well as sponsorship and partnership opportunities.

UniMelb iGEM Team

SUMMARY OF IGEM

The International Genetically Engineered Machine competition (iGEM) is the largest annual synthetic biology event in the world. Since its inaugural competition at the Massachusetts Institute of Technology (MIT) in 2004, the competition has expanded exponentially to include 300 teams and over 5000 students from leading universities around the world.

The competition allows iGEM teams globally to develop creative solutions to a variety of global issues, while encouraging public outreach and advancement in biosafety and security. Teams will showcase their work with community outreach events, websites, and a final presentation at the Giant Jamboree, iGEM's annual international conference. Successful teams have published scientific papers, filed patents, and the competition has seen the formation of over 16 start-up companies, such as Ginko Bioworks and Benchling.

SYNTHETIC BIOLOGY

Synthetic biology is a rapidly expanding, multidisciplinary field that is revolutionizing the way we view the biological sciences. It aims to engineer existing organisms develop new biological systems or devices that pose as viable solutions to address issues in medicine, agriculture and more. One of the cornerstones of the synthetic biology field is the concept of a standardized registry of modular DNA components called Biobricks. Each year, iGEM teams submit their components to this registry, allowing future teams and the general scientific community the ability to create highly customized, versatile organisms with countless potential functions.

ABOUT US

Summary of our past projects, achievements and alumni.

ACHIEVEMENTS

Awards earned at the International Genetically Engineered Machines Competition in Boston, Massachusetts

Silver medals for:

Validated part BBa_K214002, shown to have the correct sequence and produce a protein of correct size
Collaboration with NUS Singapore iGEM team, developing a molecular modelling algorithm
Public Engagement with highschool and university students, explaining and promoting synthetic biology

Bronze medals for:

Attendance and Presentation at the Giant Jamboree, iGEM competition
Complete deliverables, including forms, project and project parts descriptions , poster and presentation
Complete and thorough log of attributions
Contribution of registered parts: BBa_K2140003, BBa_K2140004, BBa_K2140005

PAST PROJECTS

2014-2016: Design of a novel 4-armed star-like peptide
2018-2019: Design of a Glutamate biosensor as a novel and cheaper method to identify stroke

PUBLIC ENGAGEMENT HIGHLIGHTS

North Carlton Railway Neighbourhood House

Two-day community engagement and education program of school age children fully organised and run by the Unimelb iGEM team

University of Melbourne Open Day

Conducted an Ethics poll of the general public on opinions of synthetic biology, and engaged in conversations with secondary students and parents

ALUMNI HIGHLIGHTS

A highlight of some of our past iGEM team members

SAMUEL MAWSON

Bachelor of Science University of Melbourne
BA Hons and MA in Philosophy Monash University

BEING A PART OF THE IGEM TEAM: Provided more 'real world' experience than any other content in my degree because we were responsible for every stage of our project from recruitment and securing funding through to the planning, execution and communication of our research
CURRENTLY: BSc Hons in Claudia Vickers' lab at the University of Queensland, conducting research in engineering yeast cells to convert them into microbial factories for product pharmaceuticals and other industrially useful compounds

LYDIA GANDHI

Bachelor of Biomedicine -Bioengineering Systems

BEING A PART OF THE IGEM TEAM: iGEM was an invaluable experience for me. Working in a student-lead team allowed me to explore and deepen my interest in Synthetic Biology through self-directed research and experimentation. The teamwork aspect was also critical to the development of my collaborative skills as a university student learning to communicate and work respectfully with others. iGEM also rewards highly motivated students with exposure to fantastic resources and facilities for learning outside of the classroom.
CURRENTLY: I am working in pharmaceuticals and biotechnology at CSL, a global company with a strong patient focus. I am part of the CSL Graduate program, which allows me to rotate across departments and experience different roles.

2020 PROJECT

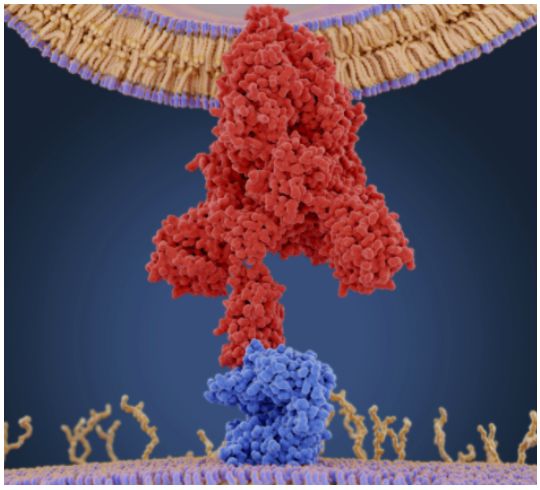
COVID-19 has affected each and every one of us as the reverberations of this global pandemic travel throughout all sectors of the community. There is a desperate need to develop therapeutic options. As a team, we were compelled to design and test a proof of concept cellular therapy to treat COVID-19. We will engineer macrophages to express soluble ACE2 that can bind to and neutralise the spike protein on SARS-CoV-2.

OUR FOCUS

Our focus will be on engineering macrophages to produce various ACE2 constructs and testing their ability to bind to the spike protein of SARS-CoV-2

SOLUBLE ACE2 A PROMISING BUT LIMITED COVID19 THERAPEUTIC

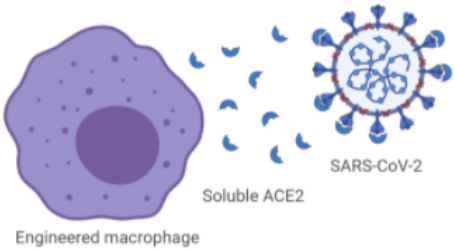
ACE2 is the receptor that spike protein on SARS-CoV-2 binds to gain entry to the cell. Delivering excessive soluble forms of ACE2 is currently in Phase II clinical trials as a COVID-19 therapeutic. It shows promise in slowing viral infection and protecting lungs and heart from injury. However, soluble ACE2 has a very short half life of 2-10 hours so it would need to be administered continuously, which is a problem when you have a lot of patients and limited resources. Macrophages can deliver the soluble ACE2 for all or part of their lifespan, allowing for longer delivery of ACE2 with a single administration.



CLINICALOMICS. (2020). MOLECULAR MODEL OF A CORONAVIRUS SPIKE (S) PROTEIN (RED) BOUND TO AN ANGIOTENSIN-CONVERTING ENZYME 2 (ACE2) RECEPTOR (BLUE) ON A HUMAN CELL [IMAGE]

THE BROADER POTENTIAL OF ENGINEERED MACROPHAGES

Macrophages have been investigated as a cellular therapy for diseases ranging from cancer to skeletal muscle injury and renal disease. They are extensively involved in inflammation, healing and general maintenance in virtually all tissues which could potentially be engineered to respond in a very nuanced way to their environment via genetic circuits. For example, these macrophages could be developed to protect susceptible individuals against a future infection by detecting the presence of SARS-CoV-2 and immediately delivering therapeutics. Then once infection has passed, an alternative pathway could be activated to help repair lung injury. Prophylactic cellular therapies like this have been shown to be effective against infections for which vaccines have not been successfully developed and may be a good alternative if a COVID-19 vaccine is not effective.



PROJECT FINANCE PORTFOLIO

COMPETITION EXPENSES

- Registration Fee $7 500

Total: $7 500

ENGAGEMENT EXPENSES

- Community Engagement $750
  - Community Outreach Events
  - Website
  - Logistics

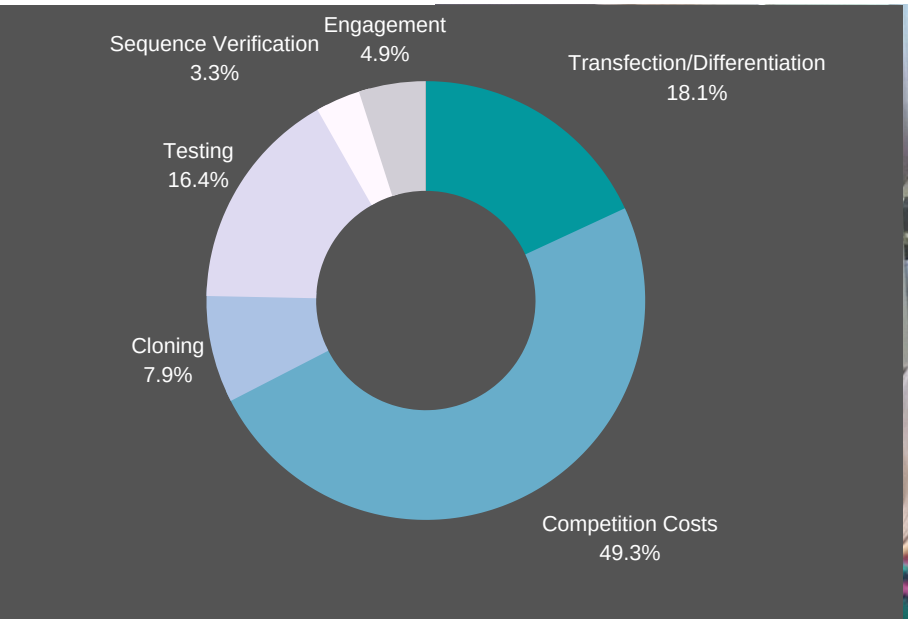
Total: $750

PROJECT EXPENSES

- Cloning $1 200
  - DNA synthesis
  - Reagents for restriction digests
  - Bacterial Transformation
- Sequence Verification $500
  - PCR
  - Sanger Sequencing
- iPSC Transfection and Differentiation $2 750
  - Electroporation
  - Cell Culture and Differentiation
- Testing $2 500
  - Anti-ACE 2 ELISA
  - Immunoprecipitation
  - Western Blot

Total: $6 950

Grand Total: $ 15 200



SPONSORING US

SPONSORSHIP LEVELS

	BRONZE ($250)	**SILVER** ($500)	**GOLD** ($1000)
Logo featured - Team Website	✓	✓	✓
Logo featured – All physical and online marketing material	✓	✓	✓
Recognition at the official Synthetic Biology Australia and international iGEM competition		✓	✓
Promotion of company on all iGEM social media (Facebook, Instagram)		✓	✓
Representative speaker presentation at our planned events			✓
Exclusive technical talks or workshops			✓
Exposure to our collaborators and alumni network	✓	✓	✓

GIFTS IN KIND

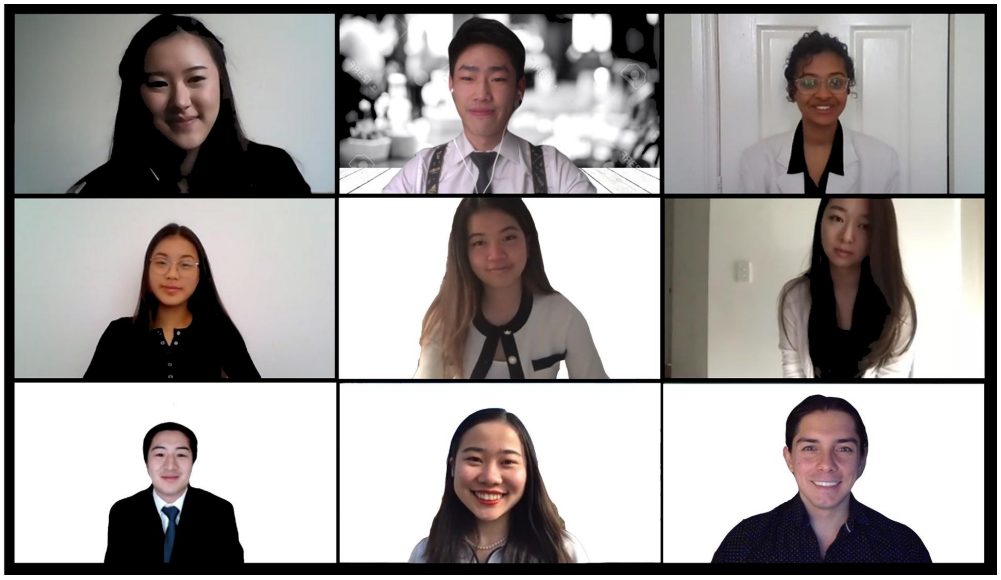
- Centrifuge tubes (2 mL, 15 mL, 50 mL) and micropipette tips
- PCR reagents (DNA polymerase, dNTPs, etc.)
- Cloning enzymes (Sfil, BamHI, DNA Ligase)
- Antibiotics (Chloramphenicol, Kanamycin, Ampicillin, Puromycin)
- Gel electrophoresis materials (Agarose, TAE Buffer, DNA Ladder)
- Molecular biology kits (Plasmid minipreparation, DNA clean and concentration)
- Electroporation cuvettes
- Media components (LB Broth, SOC media)

INTELLECTUAL PARTNERSHIP

In addition to receiving donations from sponsors, we have also formed partnerships with organisations in the past. In the past we have worked closely with researchers from the Murdoch Children's Research Institute, Peter MacCallum Cancer Centre and The University of Melbourne. Such partnerships depend greatly upon our project each year, and as a team we are open to working with businesses to solve problems with synthetic biology. Given the novelty of our current project, we are actively seeking guidance, collaborations and the expertise from organisations and research groups focusing on SARS-CoV-2.

TEAM PAGE

Meet our 2020 Team



TEAM MEMBERS

Alexandra Prasetya
Po-Chen Liu
Thanushi Peiris
Mona Zhao
Emily Chen
Catherine Chen
Kevin Mao
Betty Zhang
Antonio Vela

ACADEMIC ADVISORS

Primary Investigator

Prof. Christine Wells, Director of the University of Melbourne Centre for Stem Cell Systems

Advisors

Dr Matt Faria, Rejane Langlois Fellow Biomedical Engineering, The University of Melbourne

Prof. Ed Stanley, Head of Immune Development Lab, Murdoch Children's Research Institute

Amanda Chen, PhD Student (Cancer Immunology), Peter MacCallum Cancer Centre

Nadia Rajab, PhD Student, Well's Lab Centre for Stem Cell Systems

River Kano, Research Assistant, Well's Lab Centre for Stem Cell Systems

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PLEASE CONTACT US TO FURTHER DISCUSS SPONSORSHIP OPPORTUNITIES

PAST SPONSORS

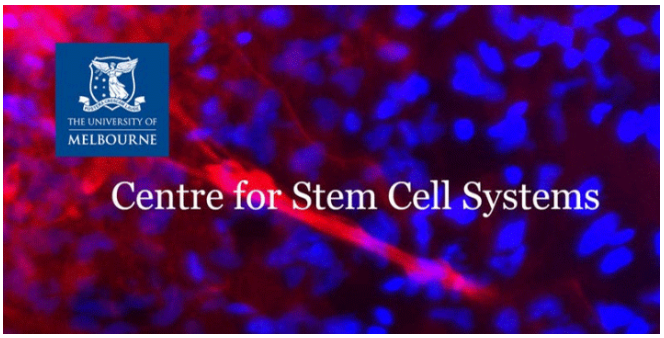
Thank you to our past sponsors

IDT INTEGRATED DNA TECHNOLOGIES

TWIST BIOSCIENCE

THE UNIVERSITY OF MELBOURNE

Supported by the Student Engagement Grants at University of Melbourne



Benchling

SnapGene®

NEW ENGLAND BioLabs® Inc.