ACT Government | ACT Health

ACT HEALTH VACATION STUDY PROGRAM

PROJECT SUMMARY FORM

Project Title	**Investigating Circulating Lymphocytes and Cytokines in Patients with immunodeficiency and autoimmunity**
Supervisor name	**A/Prof. Katrina Randall (CHS) & Dr Ainsley Davies (ANU)**
CHS/ACTHD position	**Director of Clinical Immunology**
Address	**131 Garran Rd, Acton 2601**
Telephone	**KR: 5124 8444; AD: 6125 1642**
Email	**Katrina.randall@act.gov.au; Ainsley.davies@anu.edu.au**

Lead discipline (please select one)	
☐ **Nursing and Midwifery**	☐ **Health Economics**
☐ **Allied Health**	☐ **Biostatistics**
☐ **Medicine**	☐ **Epidemiology**
☐ **Pre-clinical**	☐ **Health Policy**
X Other – Medical Science	

Does this project involve research led by, or relating to Aboriginal or Torres Strait Islanders?	
☐ **Yes**	**X No**

Outline of the project (250 words max)

The Canberra Clinical Phenomics Service (CCPS) extends an invitation to health/medical students to undertake a Medical Science 6-week research placement. This program will provide insight into the intricacies of immune system dynamics and their potential relevance to a range of diseases.

Utilizing spectral flow cytometry and multiplex immunoassay, CCPS performs comprehensive analysis of patient blood samples. The two immune responses measured are circulating lymphocyte frequency and circulating cytokine concentration. This methodology aids in unravelling the complexities of the adaptive immune response.

For the right candidate, project design can be tailored based on skills. Students with laboratory proficiency can conduct wet lab experiments, while those with experience in bioinformatics can perform computational analysis. Alternatively, students without a technical background can contribute through clinical correlation studies, substantiating findings via literature review or exploring cytokine-associated clinical features.

This project requires a foundational understanding of immunology.

Proposed research methods

The wet lab research methods will include spectral flow cytometry and multiplex immunoassay. Spectral flow cytometry will be performed on peripheral blood mononuclear cells, and using 30 cell-surface markers to discern B and T cell sub-populations. Concurrently, multiplex immunoassays, such as the Mesoscale Discovery System and the Bioplex bead-based array, will measure serum cytokine concentrations.

Computational methods will include hierarchical clustering, principal component analysis, T-SNE and uMAP. This comprehensive data analysis will elucidate intricate relationships within immune profiles.

For clinical validation studies, the outcomes obtained through the aforementioned methods will be rigorously validated against established scientific literature.

Preferred study discipline being undertaken by the student

Medicine or Medical Science (must have undertaken Immunology course)

Benefits to the student and to the department

Participation in this research placement offers students experience in advanced immunology analysis of patient blood samples. Engaging with techniques like spectral flow cytometry, multiplex immunoassays, or computational methodologies enriches their skill set and understanding of contemporary research practices. This project will also expose students to a work environment that is collaborative between Canberra Health Services and The Australian National University.

For the department, this placement will contribute to ongoing research endeavours. It may provide novel insights into immune system dynamics and their implications in the diseases studied. Student involvement reinforces the department's reputation for collaborative research.

How does this project align with any or all of the three strategic objectives of *Better Together: A strategic plan for research in the ACT health system* (100w max)

This project is aligned with the strategic objectives outlined in the above document.
Objective 1 is recognised through our collaborative team, fostering a skilled workforce dedicated to generating, analysing, and implementing data.
Objective 2 is recognised, as our research teams are equipped with high-quality methods, ensuring impactful contributions.
Objective 3 is recognised through our role in enhancing health infrastructure, exemplified by our association with Canberra Clinical Genomics.

ACTHD/CHS Department where the student will be based

Immunology. Note most time will be spent at ANU campus.

Will the student be in a patient facing role at any time during the project?

No

Will the student require access to CHS and/or ACTHD network / DHR / applications / database? If yes, please identify
No

Will the student require CHS / ACT Health building access? If yes, please identify
No

Supervisor availability across key dates	
Friday 10 Nov – Preplacement presentation session, Canberra Hospital Auditorium *Approximate duration 9am-12pm – supervisors are not required for full session. Possible Webex option.*	Yes
Placement period 10 Nov – 9 Feb Please indicate availability across this time. *E.g. leave over Christmas/New Year*	ANU campus is closed from 23rd December 2023 to 2nd January 2024
At least two face-to-face sessions with the student each week during their 6-week placement.	Yes
Friday 9 Feb – Final presentation session, Canberra Hospital Auditorium *Approximate duration 9am-1pm – supervisors are not required for full session. Possible Webex option.*	Yes

☒ I have read and I agree to the ACT Health privacy policy which includes statements on how the ACT Health Directorate acts lawfully to collect and use data to report on activities and to plan for future events and initiatives; including that we may use your details to contact you if required for program delivery and/or evaluation and to inform you of future similar opportunities.

Please submit form to health.research@act.gov.au