Melbourne Dental School

2024 Start of Year Intake Honours & Master of Biomedical Science Research Project Handbook

bio21 institute

THE UNIVERSITY OF MELBOURNE

Faculty of Medicine, Dentistry & Health Sciences

Melbourne Dental School

Welcome to Melbourne Dental School

We have a longstanding record of excellence in health and biomedical research which has led to significant translation into clinics and patient treatment. Research in the School covers a broad range of scientific endeavour from basic science to clinical studies to population health. This embraces various disciplines including **microbiology**, **immunology**, **cancer cell biology**, **biochemistry & molecular biology**, **chemistry**, **anatomy**, **cell biology, public health** and **materials engineering**. Our research also reaches out beyond oral health and dentistry into broader fields of wound healing, drug delivery, orthopaedics and microbiomics.

We are incredibly passionate about the mentoring and the training of future researchers. Indeed, our mission is to deliver excellence in research and education with a vision to be a world-class, research-based School. To achieve this goal, we provide outstanding research training and support for all laboratory and clinician research students as they develop research knowledge and expertise and help drive new discoveries that lead to better outcomes for patients. So, if you are passionate about improving patient health and wellbeing, or interested in developing new therapeutic treatments we encourage you to join us in the pursuit of knowledge by applying to do Honours or a Master's degree at the Melbourne Dental School. Working closely with our researchers, students undertake their project in state-of-the-art research laboratories at the Melbourne Dental School and Bio21 Institute.

There are a number of factors you might want to consider when making the decision about undertaking an Honours year or Master's degree, such as the amount of time spent on your research project, opportunities to undertake professional skills-based subjects, and which pathway would be most advantageous for possible entry into a PhD program in the future. Regardless of your choice, the School provides a stimulating and challenging intellectual environment that allows you to experience research first-hand and put your scientific knowledge into practice. The diversity of Australian and international students from many social and ethnic backgrounds at the School greatly enhances the learning experience. Having arrived in the School from the UK in 2020, I have been keen to develop an environment where collaborative research and working drives novel findings and success. Undertaking your project in the School will mean you will be supported by supervisors committed not only to the research they undertake, but the development of you as a researcher and critical thinker.

This booklet provides information that will help you decide on potential research projects. They all have potential clinical impact. Please take your time to identify projects that are of interest and contact potential supervisors for more information. I am very confident they will be eager to discuss your research interests and talk about their own research, show you around their laboratories, and introduce you to other students and researchers.

I look forward to seeing you at the School and hearing about your exciting research.

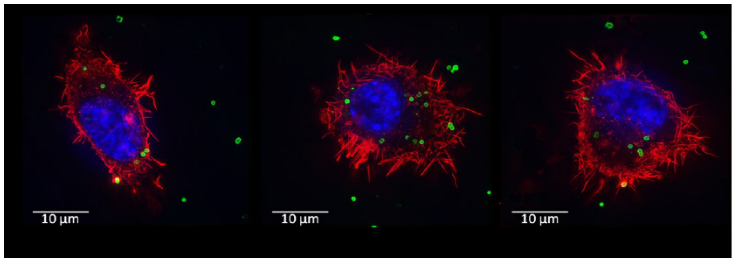
Professor Alastair J Sloan
Head of School

Honours and Master of Biomedical Science Projects

Host–Microbe Interactions in Health & Disease

Host–microbe interactions: investigating mucosal and systemic immune responses to bacteria

The initial interaction of bacteria and bacterial products with mucosal tissue and the immune response induced are fundamental to bacterial infection and disease. We are focused on investigating how antibiotic susceptible and resistant bacteria differ in their interactions and what materials they produce (e.g., outer membrane vesicles, OMVs) to aid infection. We are also interested in discovering how oral bacteria interact with the host to cause disease and how they are associated with systemic conditions (e.g., oral, pancreatic and bowel cancer). We have already found that there is synergy between pathogenic and non-pathogenic bacteria in causing disease and immunopathology. We are offering a number of projects investigating: (1) mucosal and systemic immune responses to single and multi-bacterial species infection; (2) what and how bacterial factors such as OMVs interact with immune cells; (3) how bacteria effect immune cell trafficking into the mucosa and the effect of infection by multiple bacteria; (4) how OMVs aid infection of antibiotic susceptible and resistant bacteria and oral bacteria that cause chronic periodontitis.



Phagocytosis of unopsonised, complement- or antibody-opsonised *Porphyromonas gingivalis* (green) by macrophages.

Areas/techniques in which expertise will be developed

Flow cytometry (multi-parameter), fluorescence activated sorting, aseptic technique, bacteriology and microbiological techniques, tissue culture, real-time PCR and cytokine DNA microarray, SDS PAGE, ELISA, ELISPOT, cytotoxicity assays, animal and human sample handing and experiments, report writing, paper editing/writing, working as a member of a team, and research management.

Supervisors

Prof. Neil O'Brien-Simpson – neil.obs@unimelb.edu.au
Dr. Sara Hadjigol - sara.hadjigol@unimelb.edu.au

Degree availability

Bachelor of Science (Honours)
Bachelor of Biomedicine (Honours)
Master of Biomedical Science

Location

ACTV Research Group, Melbourne Dental School & Bio21 Institute

Number of vacancies

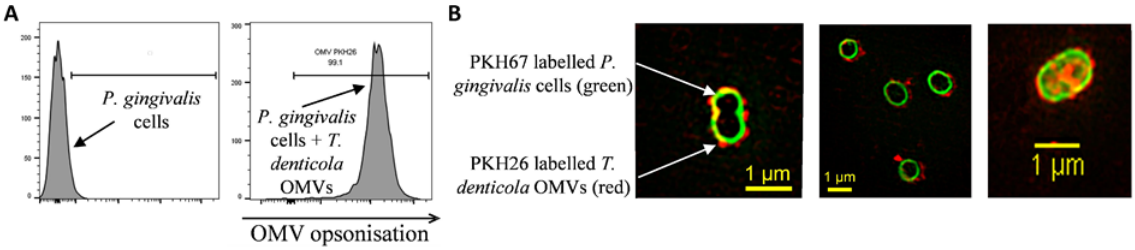
Two students

Recent publications

- Cecil JD*^, O'Brien-Simpson NM, Lenzo JC, Holden JA, Perez-Gonzalez A, Mansell A, Reynolds EC. Outer membrane vesicles prime and activate macrophage inflammasomes and cytokine secretion *in vitro* and *in vivo*. Frontiers in Immunology (2017) 8:1017.
- Holden J, O'Brien-Simpson NM, Lenzo J, Orth R*^, Mansell A, Reynolds EC. *Porphyromonas gulae* activates unprimed and gamma interferon-primed macrophages via the Pattern Recognition Receptors Toll-Like Receptor 2 (TLR2), TLR4, and NOD2. Infection and Immunity (2017) 85(9): e00282-17.
- O'Brien-Simpson NM, Holden JA, Lenzo JC, *et al*. A therapeutic *Porphyromonas gingivalis* gingipain vaccine induces neutralising IgG1 antibodies that protect against experimental periodontitis. NPJ Vaccines (2016) 1:16022
- Lam RS*^, O'Brien-Simpson NM, Holden JA, Lenzo JC, Fong SB*^, Reynolds EC. Unprimed, M1 and M2 macrophages differentially interact with *Porphyromonas gingivalis*. PLoS ONE (2016) 11(7):e0158629.

Microbial flow cytometry: developing diagnostic tools for immune responses to bacteria, nano- and micro-materials, and vesicles

Analysis of nano-materials and microbes using flow cytometry is a novel area of research. A major issue in studying nano- and micro-particle interaction with mammalian cells or microbes or analysis of microorganisms by flow cytometry has been the sensitivities of flow cytometers. As part of the University's Cytometry Platform the Melbourne Dental School node has developed methodologies to detect and resolve 100 nm particles, thus allowing detection of exosomes and outer membrane vesicles in biological fluids. The methodologies allow detection and sorting of mixed bacterial populations and enable analysis of rare events in mammalian cells and microbes. The projects offered are in the development of nano- and micro-flow cytometry assays for the detection, analysis and sorting of: (1) bacteria-bacteria interactions, (2) nanoparticle interactions with bacteria and/or mammalian cells, (3) bacterial outer membrane vesicle (OMV) interactions with bacteria and host cells, (4) isolation and identification of bacteria from mixed biofilm and biological samples, (5) isolation of exosomes, OMVs from biological samples and their identification.



Microbial flow cytometry (A) showing that OMVs from one bacteria coat another species, and (B) high resolution confocal microscopy (OMX 3D-SIM) Z-projection images of *P. gingivalis* (green) coated with *T. denticola* OMVs (red).

Areas/techniques in which expertise will be developed

Flow cytometry, fluorescence activated sorting, aseptic technique, bacteriology and microbiological techniques, tissue culture, peptide/polymer chemistry, peptide/protein purification (HPLC/FPLC), SDS-PAGE, ELISA, ELISPOT, cytotoxicity assays, animal and human sample handing and experiments, report writing, paper editing/writing, working as a member of a team, and research management.

Supervisors

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Dr. Sara Hadjigol - sara.hadjigol@unimelb.edu.au

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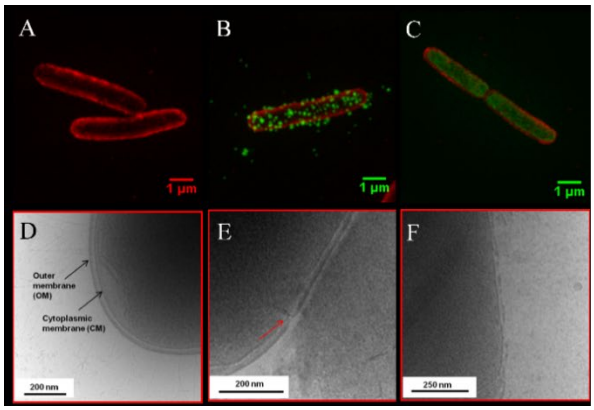
- O'Brien-Simpson NM, Pantarat N, Attard TJ, Walsh KA, Reynolds EC. A rapid and quantitative flow cytometry method for the analysis of membrane disruptive antimicrobial activity. PLoS One (2016) 11(3):e0151694.
- Lenzo JC, O'Brien-Simpson NM, Cecil J*^, Holden JA, Reynolds EC. Determination of active phagocytosis of unopsonised *Porphyromonas gingivalis* by macrophages and neutrophils using the pH-sensitive fluorescent dye pHrodo. Infection and Immunity (2016) 84(6):1753-60.
- O'Brien-Simpson NM, Pantarat N, Walsh KA, Reynolds EC, Sani MA, Separovic F. Bacterial fluorescent-dextran diffusion assay. Antimicrobial Agents and Chemotherapy - Bio-Protocols (2014) http://bio-protocol.org/e1191.

Microbiomes in Health & Disease

Antimicrobial materials – synthesis of novel peptides, nanoparticles and organic polymers to target antibiotic resistance in bacteria

By 2050, it is predicted that more people will die from bacterial infections than cancer. Currently, multidrug resistant (MDR) bacterial infections cause >700,000 deaths/year and incur an estimated annual treatment cost of >US $20 billion. Antimicrobial resistance is considered "*one of our most serious health threats*" and thus new, potent and selective antimicrobial agents that do not induce resistance like traditional antibiotics are urgently required. We wish to recruit students into 3 areas of research: (1) Antimicrobial nanomaterials – we are investigating antimicrobial nanomaterials, termed Structurally Nanoengineered Antimicrobial Peptide Polymers (SNAPPs). This project will use novel and established assays in an iterative chemical biology approach to modify antimicrobial nanomaterials to enhance killing of MDR bacteria. (2) Antimicrobial peptides targeting oral bacteria – the oral cavity is a reservoir for transferable antibiotic resistance, a phenomenon increased in patients with chronic periodontitis. This project will investigate methods for narrowing the activity spectrum of AMPs to target only periodontal pathogens, reduce cytotoxicity, and leave unharmed bacteria associated with oral health. (3) Antibiotic adjuvants – one approach to address antibiotic resistance is to combine antibiotics with an "antibiotic adjuvant", which potentiates or restores the activity of the antibiotic towards MDR bacteria. This project will use an iterative chemical biology approach to modify AMPs or SNAPPs to enhance their antibiotic adjuvant properties.



High resolution confocal microscopy images (A-C) and Cryo-TEM images (D-F) of E. coli before (A, D) and after (B, C, E, F) incubation with the novel antimicrobial SNAPP.

Areas/techniques in which expertise will be developed

Bacteriology & microbiological techniques, mammalian tissue culture, peptide & polymer chemistry, peptide & protein purification (HPLC, FPLC), SDS-PAGE, ELISA, ELISPOT, cytotoxicity assays, animal handing and experiments, paper editing & writing, working as a member of a team, and research management.

Supervisors

Prof. Neil O'Brien-Simpson – neil.obs@unimelb.edu.au
Dr. Sara Hadjigol - sara.hadjigol@unimelb.edu.au

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Bachelor of Science (Honours)
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Location

ACTV Research Group, Melbourne Dental School & Bio21 Institute

Number of vacancies

Two students

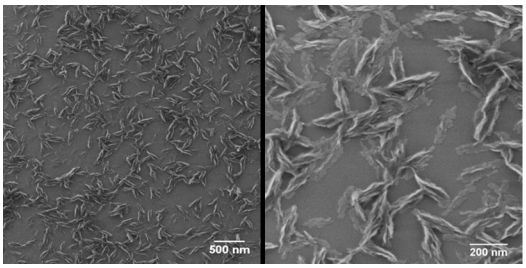
Recent publications

- Lam SJ*^, O'Brien-Simpson NM, Pantarat N, Sulistio A, Wong EHH, Chen Y-Y, Lenzo JC, Holden JA, Blencowe A, Reynolds EC, Qiao GG. Nature Microbiology (2016) 1:16162.
- Li W^, Separovic F, O'Brien-Simpson NM, Wade JD. Chemically modified and conjugated antimicrobial peptides against superbugs. *Chemical Society Reviews* (2021)
- Lenzo JC, O'Brien-Simpson NM, Cecil J*^, Holden JA, Reynolds EC. Infection and Immunity (2016) 84:1753.
- O'Brien-Simpson NM, Pantarat N, Attard TJ, Walsh KA, Reynolds EC. PLoS ONE (2016) 11:e0151694.

Oral Cancer

Vaccine design and development to improve immune responses to viral diseases and cancer

Cytotoxic T lymphocytes (CTL) are critical for immunosurveillance and killing of virus-infected cells and cancer cells. Many viral infections and squamous cell carcinomas (SCC) occur at mucosal sites; however, parenteral vaccination does not induce mucosal immunity. For the vaccine to induce a protective CTL response, it needs to be administered via a mucosal route and deliver its antigen cargo to dendritic cells. Further, the vaccine will need to activate these cells to induce both CTL and T helper (Th) cell antigen-specific responses, which is necessary for strong effector and memory CTL responses. We have demonstrated that nanoparticles are effective mucosal vaccine delivery vehicles and different pattern recognition receptor (PRR) ligands used to functionalise antigen-loaded nanoparticles can enhance or abrogate CTL and Th responses. Our research has shown that protein coated and PRR functionalised nanoparticles are more rapidly phagocytosed and induce stronger CTL and Th cell immune responses. Finally, we have developed a novel and reliable method for producing different sized calcium phosphate nanoparticles that has applicability for a broad range of vaccines. The overall aim of our research is to combine these new technologies for an integrated, preclinical evaluation of novel calcium phosphate nanoparticle vaccines and compare their ability to induce CTL responses via mucosal or parenteral immunisation. We wish to recruit students into 3 areas of research: (1) Determining the immuno-stimulatory capability of antigen and molecular adjuvant loaded calcium phosphate nanoparticles *in vitro*. (2) Determining the immuno-stimulatory capability of calcium phosphate nanoparticle vaccines *in vivo*. (3) Evaluating the efficacy of calcium phosphate nanoparticles as mucosal vaccines to induce protective CTL responses.



Helium-ion microscopy images of calcium phosphate nanomaterial coated with antigen.

Areas/techniques in which expertise will be developed

Flow cytometry, fluorescence activated sorting, aseptic technique and mammalian tissue culture, real-time PCR and cytokine array, SDS-PAGE, ELISA, ELISPOT, cytotoxicity assays, animal and human sample handing and experiments, paper writing/editing, working as a member of a team, and research management.

Supervisors

Prof. Neil O'Brien-Simpson - neil.obs@unimelb.edu.au
Dr. Sara Hadjigol - sara.hadjigol@unimelb.edu.au

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Master of Biomedical Science

Location

ACTV Research Group, Melbourne Dental School & Bio21 Institute

Number of vacancies

Two students

Relevant publications

- Gause KT^, Yan Y, O'Brien-Simpson NM, Cui J, Lenzo JC, Reynolds EC, Caruso F. Advanced Functional Materials (2016) 26:7526.
- Gause KT^, Yan Y, Cui J, O'Brien-Simpson NM, Lenzo JC, Reynolds EC, Caruso F. ACS Nano (2015) 9(3):2433-44.
- Yan Y, Gause KT^, Kamphuis MM, Ang CS^, O'Brien-Simpson NM, Lenzo JC, Reynolds EC, Nice EC, Caruso F. ACS Nano (2013) 7:10960-70.

Regenerative Biology

Periodontal ligament 3D model

The periodontal ligament is a soft connective tissue which is situated between the root of a tooth and the alveolar wall of the bony tooth socket. Its principal function is supporting the teeth in their sockets, whilst also permitting them to withstand the forces of mastication by acting as a sensory receptor. Chronic periodontitis is an inflammatory disease causing the destruction of the supporting gum tissue, periodontal ligament and bone of the tooth socket and is one of the most prevalent global dental diseases. Current clinical treatments for periodontal disease are successful in the short term but they are limited to tissue repair rather than tissue regeneration and there is a clinical need for successful long-term regeneration of the periodontal tissues and future treatment strategies based on tissue engineering approaches offer interesting opportunities. To develop regenerative treatment strategies and smart materials that can mediate infection and reduce the need for experimental animals in investigating dental materials and treatments in the future, reproducible model systems are required. Current pre-clinical models for periodontal tissue regeneration are limited. Current tissue slice ex vivo systems have been successful in simulating dentine/bone regeneration whilst animal models are ethically challenging and expensive.

This project will develop a 3D model of a periodontal ligament, through use of tooth root dentine and initially gingival fibroblasts within a synthetic hydrogel. This model will assess whether a periodontal ligament can be developed to align at a perpendicular angle to the dentine matrix of the tooth prior to the addition of a mesenchymal stem cell population. This project will also investigate the synthesis and secretion of matrix proteins present within the model through use of cell, molecular and histological analyses and the response of the cells to growth factors released from the dentine.

Areas/techniques in which expertise will be developed

Cell culture, 3D models, histology, immunostaining, H&E staining, confocal imaging, translational research, bioinformatics, biostatistics, research management, oral presentation skills, scientific writing skills.

Supervisors

Dr. Rachael Moses - rachael.moses@unimelb.edu.au
Prof. Alastair Sloan - alastair.sloan@unimelb.edu.au
Dr. Brooke Farrugia - brooke.farrugia@unimelb.edu.au
Dr. Reuben Staples – r.staples@uq.edu.au
Prof. Saso Ivanovski – s.ivanovski@uq.edu.au

Degree availability

Bachelor of Science (Honours)
Bachelor of Biomedicine (Honours)
Master of Biomedical Science

Location

Melbourne Dental School & Biomedical Engineering

Number of vacancies

One student

Recent publications

- A.J. Sloan, S.Y. Taylor, E.L. Smith, J.L. Roberts, L. Chen, X.Q. Wei, R.J. Waddington. A Novel Ex vivo Culture Model for Inflammatory Bone Destruction. J Dent Res. 2013;92(8):728-734.
- J.L. Roberts, J.-Y. Maillard, R.J. Waddington, S.P. Denyer, C.D. Lynch, A.J. Sloan. Development of an Ex Vivo Coculture System to Model Pulpal Infection by Streptococcus anginosus Group Bacteria. J Endod. 2013;39(1):49-56.

Does NLRP3 inflammasome play a role in host defence (innate immunity) and regenerative capacity in dental pulp stem cells (DPSC)?

Dental pulp stem cells (DPSCs) are a quiescent population of stem cells present in stem cell niches within the dental pulp, which become activated following stimulation/trauma. To understand inflammation in the dental pulp, the role of NLRP3 signalling pathway is being investigated in this project. This signalling pathway is stimulated by a two-step signal that triggers a complex cellular cascade causing the assembly of NLRP3 inflammasome to produce pro-inflammatory cytokines, IL-1ß and IL-18. This project will investigate the role of the NLRP3 inflammasome in host defence (innate immunity) and regenerative capacity in DPSCs. This will look at how NLRP3 inflammasome activation in DPSCs affects IL-1ß and IL-18 production and the ability of the DPSCs to differentiate into odontoblast-like-cells (OLCs). This project will also look at whether exposure to IL-1ß and IL-18 can directly affect the ability of DPSCs to differentiate into OLCs.

Areas/techniques in which expertise will be developed

Cell culture, RNA purification, reverse-transcription, quantitative real-time PCR, cell lysis & Western blotting, ELISAs, translational research, bioinformatics, biostatistics, research management, oral presentation skills, scientific writing skills.

Supervisors

Dr. Rachael Moses - rachael.moses@unimelb.edu.au
Prof. Alastair Sloan - alastair.sloan@unimelb.edu.au
Dr. Shannon Wallet – shannon_wallet@unc.edu
Dr. Yinghong Zhou – yinghong.zhou@uq.edu.au

Degree availability

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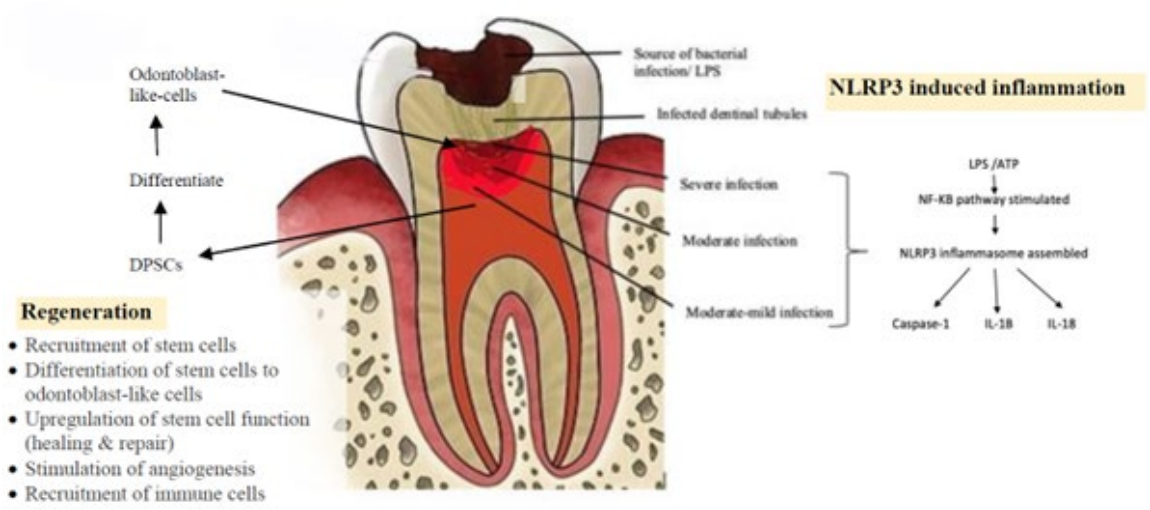
Master of Biomedical Science

Location

Melbourne Dental School & Bio21 Institute

Number of vacancies

One student



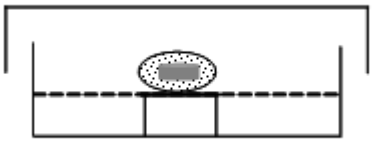
Recent publications

- Jiang W, Lv H, Wang H, Wang D, Sun S, Jia Q, et al. Activation of the NLRP3/caspase-1 inflammasome in human dental pulp tissue and human dental pulp fibroblasts. Cell Tissue Res. 2015;361(2):541-55.
- Zhang A, Wang P, Ma X, Yin X, Li J, Wang H, et al. Mechanisms that lead to the regulation of NLRP3 inflammasome expression and activation in human dental pulp fibroblasts. Mol Immunol. 2015;66(2):253-62.
- Liu D, Zeng X, Li X, Cui C, Hou R, Guo Z, et al. Advances in the molecular mechanisms of NLRP3 inflammasome activators and inactivators. Biochem Pharmacol. 2020;175:113863.
- Alraies A, Alaidaroos NYA, Waddington RJ, Moseley R, Sloan AJ. Variation in human dental pulp stem cell ageing profiles reflect contrasting proliferative and regenerative capabilities. BMC Cell Biology 2017; 18:12.

Gingival organotypic 3D model

The oral mucosa protects the underlying connective tissues from environmental stresses, trauma, and infection. The gingiva (gum) belongs to both the oral mucosal membrane and the periodontium. It can be considered a combination of epithelial and underlying connective tissues that forms a collar of masticatory mucosa around the teeth. It covers the underlying periodontal ligament and alveolar bone. Gingivitis is the inflammation of the gingival tissues and is a non-destructive disease, which If left untreated can progress to periodontitis, a far more destructive disease. The most common cause of gingivitis is the response of the tissues to a bacterial biofilm (plaque), which is attached to tooth surfaces.

Unlike dermal skin tissue (which also consists of a combination of epithelium and connective tissue), the metabolic activity of the oral gingiva results in greater susceptibility to damage, where continuous insult and penetration of irritants into the tissues leads to irreparable inflammatory tissue loss. This is a significant risk factor when developing new oral healthcare products designed to reduce plaque formation, reduce the risk of gingivitis, and deliver agents to the tooth surface (tooth whitening products, toothpastes). Such products require extensive toxicity assessment prior to regulatory approval and currently these are undertaken on cell culture assays, commercial co-culture or tissue systems and animal studies. *Ex vivo* or 3D tissue models offer significant advantage for the study of multiple cell types altogether in their natural tissue environment. This project will develop a 3D tissue model from human oral mucosa (gum tissue) for use by the oral healthcare industry to replace animal models of gum disease and assessment of new oral healthcare products and agents.



Areas/techniques in which expertise will be developed

Cell culture, 3D models, histology, immunostaining, H&E staining, confocal imaging, translational research, bioinformatics, biostatistics, research management, oral presentation skills, scientific writing skills.

Supervisors

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Degree availability

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Bachelor of Biomedicine (Honours)
Master of Biomedical Science

Location

Melbourne Dental School & Biomedical Engineering

Number of vacancies

One student

Recent publications

- Schroeder, H.E., Listgarten, M.A., The gingival tissues: the architecture of periodontal protection. Periodontology 2000; 1997; 13;(1); 91-120.
- Smith, E.L., Locke, M., Waddington, R.J., Sloan, A.J., An *ex vivo* rodent mandible culture model for bone repair. Tissue Eng Part C Methods; 2010; 16(6):1287-96

Antimicrobial composite gels to prevent infection triggered failure of dental restorations

Infection is a primary cause of failure for dental restorations (fillings, root canal) leading to repeated and increasingly invasive procedures. Currently over 50% of the estimated 12M procedures carried out in the UK annually at a cost of over (£250 M) are to address failure of previous restorative work. Systemic antibiotics are ineffective, and the dental industry currently has no viable alternative for effective treatment.

We have developed a composite hydrogel delivery system which delivers biocompatible liposomes carrying antimicrobial drugs. Rheological properties are optimised for delivery deep within tooth and root canal cavities. This approach is designed to provide high local drug concentrations directly at the site of infection, with prolonged delivery at the inhibitory concentrations required to prevent reinfection. The gel has been developed as a platform technology with broad scope for development of multi-modal drug delivery.

This project will progress to proof-of-concept studies for our gel system through optimisation of liposome loading in the gel, advanced microscopy to investigate liposome distribution, and testing of the system in a tooth explant model.

Areas/techniques in which expertise will be developed

Cell culture, 3D models, histology, immunostaining, H&E staining, confocal imaging, translational research, bioinformatics, biostatistics, research management, oral presentation skills, scientific writing skills.

Supervisors

Dr Rachael Moses - rachael.moses@unimelb.edu.au
Professor Alastair Sloan - alastair.sloan@unimelb.edu.au
Dr Genevieve Melling - g.e.melling@bham.ac.uk
Professor Ivan Darby - idarby@unimelb.edu.au

Degree availability

Master of Biomedical Science

Location

Melbourne Dental School & Biomedical Engineering

Number of vacancies

One student

Recent publications

- L. Jiang, W.N. Ayre, G.E. Melling, B. Song, X. Wei, A.J. Sloan, X. Chen. Liposomes loaded with transforming growth factor β1 promote odontogenic differentiation of dental pulp stem cells. J Dent. 2020;103:103501.
- G.E. Melling, J.S. Colombo, S.J. Avery, W.N. Ayre, S.L. Evans, R.J. Waddington, A.J. Sloan. Liposomal Delivery of Demineralized Dentin Matrix for Dental Tissue Regeneration. Tissue Eng. Part A. 2018;24(13-14):1057-1065.

Evaluating University of Melbourne Dental Placements

Evaluating Rural Dental Placements

A maldistribution of dental practitioners exists in Australia and the dental workforce in rural and remote areas suffers a significant labour force issue.
Multiple dental student clinical placement programs have been introduced by universities, to address the rural workforce and increase student exposure to rural areas and communities.

Data has been collected in 2021 -2022 and this project will involve evaluating this data and the dental school placements.
This study will build on previous work completed in 2020 and assist in the quality improvement of placement programs going forward. Comparisons with previously collected data will enable further evaluation.

Areas/techniques in which expertise will be developed

Literature reviewing and research ethics. Simple statistical analysis and qualitative analysis.

Supervisors

Caroline Koedyk - ckoedyk@unimelb.edu.au
Professor Julie Satur - juliegs@unimelb.edu.au

Degree availability

Honours

Location

Melbourne Dental School

Number of vacancies

One student

Recent publications and/or Images

- Koedyk, C, Satur, J, Vaughan, B. What do dental students value about their rural placements—Is clinical experience enough? *Aust J Rural Health*. 2021; 29: 670– 677.

How to Apply for 2024 Start of Year Intake Honours or Master of Biomedical Science at the Melbourne Dental School

Entry to the Honours and Master of Biomedical Science programs is based on: (1) project availability, (2) academic background, and (3) suitability.

1. Identify projects in this handbook that are of interest to you.
2. Contact the relevant project supervisor to discuss your interest in their research. It is a good idea to email them a copy of your CV and your academic transcripts to help them understand your background, interests and academic strengths.
3. Make a time to meet with potential supervisors to discuss your project interests and discuss your academic record.
4. Visit the laboratory and meet other students and researchers.
5. In some cases, supervisors may be willing to offer you a provisional place in their laboratory (a provisional offer indicates that you have a guaranteed place in the Honours course, providing you satisfy all other entry requirements).
6. Apply:
    - For students who have completed a **Bachelor of Science, Bachelor of Oral Health** or **Bachelor of Biomedicine**, apply for our **Honours** projects online through the Faculty of Medicine, Dentistry and Health Sciences (MDHS) website: https://study.unimelb.edu.au/find/courses/honours/bachelor-of-biomedicine-degree-with-honours/how-to-apply/
    - For **Master of Biomedical Science**, apply online through the Faculty of Medicine, Dentistry and Health Sciences (MDHS) website: study.unimelb.edu.au/find/courses/graduate/master-of-biomedical-science/how-to-apply/

School Contacts

Coordinators for Bachelor of Science (Honours), Bachelor of Biomedicine (Honours) & Master of Biomedical Science:

Dr. Catherine Butler
Phone: 9341 1565
Email: mds-honours@unimelb.edu.au

Academic Programs Manager

Ms Cassie Kearns
Email: dental-office@unimelb.edu.au