DECEMBER 2020

## VICTORIAN FACES OF THE FELLOWSHIP

## INTERNATIONAL SOCIETY ON THROMBOSIS & HAEMOSTASIS 2020 CONGRESS HIGHLIGHTS

## A DAY IN THE LIFE OF A MOLECULAR MICROBIOLOGY SCIENTIST

# BENCHPRESS

The official newsletter of
The Australian Institute of Medical and Clinical Scientists (Victoria Branch)
A.C.N 010 985 403

# Inside this Edition



## Got News to Share?

We would be delighted to share the good things you are doing in the scientific world.

Contact us at secretary.aims.vic@gmail.com or via Facebook (@AIMSVictorianBranch) to let us know.

The submission deadline for next issue of Benchpress is the 31st March 2021.

# A Note From the Chair

Since our last Benchpress in August, I'd like to welcome three new committee members to the Victorian branch team - Claire Gregory, Niki Lee, and Gurbaksh Singh. Claire, Niki and Gurbaksh are all recently admitted fellows of AIMS and join us from Austin Health, Northern Health and Eastern Health respectively. I look forward to working with Claire, Niki and Gurbaksh to bring more educational activities in their area of expertise including Microbiology, Transfusion Science and Haematology.

Speaking of educational activities, the Victorian branch hosted our "COVID Forum – From a Lab's Perspective" virtually on 14 November. It was well received with 100 attendees. Apologies go to those who missed out because of limited Zoom capacity. In future we will be organising virtual meetings with Zoom Enterprise to cater for more scientists.

The ongoing work to host the AIMS National Scientific Meeting "2021 Re-vision for the future" is continuing. We are lining up some exciting speakers to present at the meeting in the area of Biochemistry, Cytology, Histology, Haematology, Flow Cytometry, Cell Therapy, Transfusion Science, Microbiology and Molecular Genetics. We look forward to having in-person meetings again and to your participation and attendance.

This issue of Benchpress contains brief reports from; the virtual AIMS, ASM and ISTH meetings, professional practice and online learning experience, transition from technician to scientist, a day in the life of a molecular scientist and faces of the fellowship. Sadly, we bid farewell to one of our colleagues, Lee Yoong Loh, who passed away recently. Peter Gambell has written a touching tribute in this issue.

As the end of 2020 is fast approaching, I would like to extend my well wishes to you and your family for a safe and joyous Christmas and a brighter 2021.

**Tina Pham**
Chair
AIMS VIC Branch

# What's Going On?

### Australian Society for Microbiology Virtual Agriculture & Food Microbiology Night (7 October 2020)
***By Patricia Szczurek***

On 7th October 2020, The Australian Society for Microbiology Vic Branch hosted the Agriculture and Food Microbiology Night on Zoom. This was a very successful event, with almost 50 participants tuning in. Coming from a clinical laboratory, it was great to listen to three fantastic presentations on topics that I would normally not be exposed to.

The first presentation by Dr. Kate Howell from the University of Melbourne who discussed the importance of microbial biogeography in producing regionally distinctive wines. I was a bit sceptical, so since I was watching from home, I had to sample some wine for "educational" purposes just to be sure.

The second presentation was a very interesting talk titled "Psyllid microflora; implications for Liberibacter disease surveillance and pest control" by Dr. Jacqueline Morris (Agriculture Victoria/LaTrobe/UniMelb).

The final presentation for the evening was given by Mr. Behrad Radmehr from Swinburne who presented the work that he has been doing on the characteristics and diversity of Bacillus cereus group isolates from raw and pasteurised milks in Victoria. His research was very serious and found that the total level of B.cereus group contamination in his study was higher than in other countries and concluded that it is necessary to implement good hygienic and manufacturing practices by dairy producers to prevent post-pasteurisation contamination.

### Australian Society for Microbiology Clinical Microbiology Special Interest Group meeting (21 October 2020)
***By Claire Gregory***

On October 21st, Pathology Queensland (Princess Alexandra Hospital) hosted the Australian Society for Microbiology Clinical Microbiology SIG meeting. Another Zoom-COVID special, three presenters shared their knowledge about two of our less common and more curly friends – Helicobacter pylori and Strongyloides stercoralis.

Lyn Coleman's talk titled "All about the short and curly" explained the importance of culture and antimicrobial susceptibility testing of H.pylori, after a review of 533 isolates collected between 2015 and 2020. The use of a Gram stain and urease test for predicting growth was discussed, along with antimicrobial resistance patterns, and optimal requirements for culture of these fastidious organisms.

Dr David Looke gave an update on the epidemiology and pathogenesis of H.pylori, and discussed the available options for diagnosis and treatment, including salvage therapy. Those molecular scientists among us will be pleased to know that a pan susceptibility PCR of faeces is on the Christmas wishlist (but not likely for this year) for H.pylori specialists. H.pylori can be challenging for many labs due to their fastidious growth requirements and long incubation time; however these presentations emphasised the importance of susceptibility testing in guiding treatment in those patients who have failed first line therapy.

The final session of the evening was presented by Papiya Kundu on another of our curly friends – Strongyloides stercoralis. The epidemiology, life cycle, risk factors and disease states were discussed, along with diagnosis and treatment. Finally, an interesting but unfortunate case of Strongyloides hyperinfection was examined.

One of many meetings that are now being presented using a virtual platform due to COVID restrictions, these are easily accessible to many people, particularly those who would not ordinarily be in a position to attend due to the geographical location of presenters or other commitments. Whilst we are all looking forward to seeing the end of COVID, I have to admit that I am enjoying the accessibility of many of these presentations.

Thank you to all presenters and those involved in organising this wriggly exciting session!

# What's Going On?

**The Covid Forum – The Laboratory Perspective (14 November 2020)**
***By Tina Pham***

AIMS Victorian Branch, COVID Forum – a Lab's Perspective, was held via zoom on November 14th. The meeting brought together various pathology disciplines including biochemistry, haematology, microbiology and pre-analytical. 100 attendees zoomed in to hear the interesting talks.


Chris Romero kicked off the session and gave the audience a glimpse of the difficulties experienced by collectors, call centre and specimen reception staff processing 1500 swabs daily.

Catherine O'Brien and Elizabeth Dennis, provided the audience with an insight into the regional fight against COVID which in the Goulburn Valley lab relied on the Cepheid GeneXpert System.

Dr Eloise William presented an evaluation of the performance of alternative sample method (saliva) and 3D swab printing.

Dr Sarah Wong, went through the lab challenges in the first wave and second wave and the need to be flexible and inventive under pressure.

Dr Amas Lee, discussed the work currently done regarding cytokine storm and HLH associated with COVID-19 and the need for further research.

Amanda Denison discussed the challenges; ensuring supply chains for reagents consumables and kits and competing against the whole world, new assay selection and validation, going live with interfaces, staffing and finally expectations of patients and hospital versus what is actually achievable.

Dr Radha Ramanan gave the final talk, an overview of COVID impact in blood bank and supply, coagulopathy including prolonged APTT and lupus inhibitor and morphological changes.

A huge thank you to all the speakers! Such diverse talks. Looking forward to the next COVID Forum.

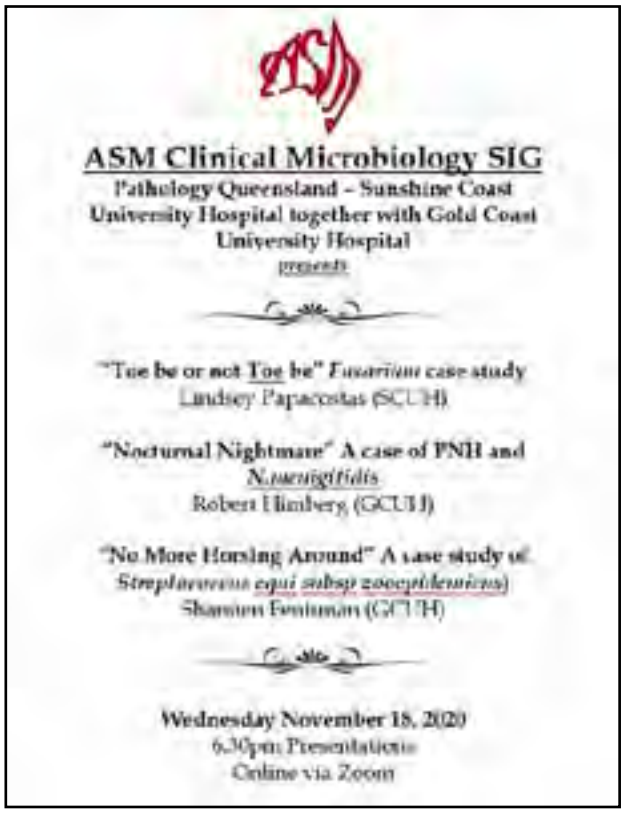




# What's Going On?

**Queensland Clinical Microbiology SIG Night (18 November 2020)**
***By Mikayla Kingston***

On the 18th of November, I had the pleasure to attend the Queensland Clinical Microbiology SIG night hosted by The ASM via Zoom. Normally this isn't an event available for a Victorian Medical Scientist to attend, so I was delighted to be a part of the meeting. There were 3 fantastic presentations organised.




The first presentation delivered by Lindsey Papacostas with the Title "Toe be or not Toe be" highlighted an interesting case study in an immunocompromised patient in which the patient developed septicaemia caused by the fungus Fusarium. The patient had an open foot wound with a toe ulcer, which was determined the likely cause of the blood infection.

The second presentation by Gold Coast University hospitals' Robert Himberg discussing a case study on a patient with Paroxysmal nocturnal haemoglobinuria (PNH) and a Neisseria meningitis blood infection. He delivered a presentation tilted "Nocturnal Nightmare" which highlighted the increase of contracting N. meningitidis association with a PNH treatment drug known as Eculizumab.

A third case studies presented by a very comical Shannon Fentimen from the Gold Coast University Hospital, she wasn't horsing around when she informed us of a patient contracting Streptococcus equi subsp. zooepidemicus, the blood cultures flagged positive 4 days after collection with a capsulated Gram positive cocci seen in the Gram stain. It was suggested she contracted the usually non-virulent S. equi subsp. zooepidemicus from her career with equines.

Overall, 53 participants tuned in from across Australia to hear the interesting cases along the Gold Coast and Sunshine Coast. I believe it was a successful night and would love to learn more from around the country!

# International Society on Thrombosis & Haemostasis 2020 Congress Highlights

By Joe Rigano

The XXIIX International Society on Thrombosis and Haemostasis (ISTH) Congress was due to be held in Milan from the 12th to 14th of July 2020. Due to the global pandemic, the meeting was held virtually and virtual highlights of the congress took place from the 30th of October to 12th of November. This report provides a brief summary of the latest therapies in the field of thrombosis and haemostasis.

## GENE THERAPY FOR THE TREATMENT OF HAEMOPHILIA

Gene therapy provides a functional replica of the disease-causing gene that is either absent or expressed as a non-functional protein making it highly effective in treating monogenic diseases such as haemophilia. The adoption of viral vectors derived from mammalian viruses that have naturally evolved to deliver their genetic cargo into cells and tissues has circumvented the initial barrier of inefficient delivery of the therapeutic genetic payload into target cells and tissues. These vectors contain minimal wild-type viral sequences, and their pathogenic, replicative, and structural viral genes are replaced with the therapeutic gene cassette. Hepatic in vivo gene transfer using adeno-associated viral (AAV) vectors has shown the best success in pre-clinical and clinical studies. Haemophilia is well suited for correction by gene therapy because the bleeding phenotype is responsive to a wide range of factor levels, and precise regulation is not necessary. As clotting factor proteins are secreted into the circulation, it is possible to correct the bleeding diathesis with gene delivery to a fraction of total hepatocytes (Figure 1).

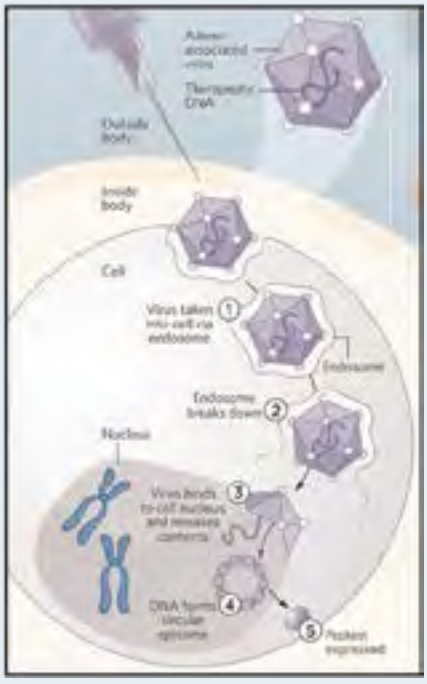



*Figure 1. AAV vector delivering therapeutic DNA into a target cell.*

AAV vectors are derived from wild-type AAV, a member of the parvovirus family. Wild-type AAV is non-pathogenic, weakly immunogenic, and replication deficient, requiring a helper virus for replication. AAV vectors can deliver a therapeutic transgene cassette up to 5 kb into both dividing and non-dividing cells. The majority of AAV vector genomes do not integrate into the host genome, and gene delivery into dividing cells results in progressive loss of transgene. AAV serotypes are segregated into clades based on viral capsid homology. The viral capsid

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governs both tissue tropism and intracellular viral particle trafficking. Engineered AAV capsids generated by random and directed mutagenesis and capsid gene shuffling have been created to enhance human hepatocyte tropism, resist neutralising antibodies, and evade elimination of transduced hepatocytes by cytotoxic T cells. Engineering of the expression cassette continues to be a key component for successful gene therapy. Vector potency can be enhanced through the design of stronger synthetic liver-specific promoters, codon-optimised factor VIII (FVIII) and factor IX (FIX) cDNAs, and use of engineered FVIII (B-domain deleted FVIII variants) and FIX (hyperactive FIX-Padua variant R338L) genes.

Immune recognition by cytotoxic CD8+ T cells or antibody responses to the vector capsid (the transgene product) can compromise therapeutic expression of the transgene. Humans are naturally infected with wild-type AAV during childhood, and thus may develop neutralizing antibodies (NABs) that often cross-react with multiple serotypes and prevent gene transfer with AAV vectors. Activation of capsid-specific CD8+ T cells may result in targeting of transduced hepatocytes, mild and transient transaminitis, and loss in factor levels. An immune suppression protocol was developed based on steroid drugs that are rapidly given in response to increases in transaminases in the blood to preserve transgene expression. Vector dose and transgene expression levels have a significant effect on whether an immune response is induced against both the AAV vector and transgene product. Importantly, optimal transgene expression in the hepatic environment can lead to immune tolerance to the therapeutic protein antigen, and to date, no clinical gene therapy study has reported detecting B- or T-cell response directed against either FVIII or FIX. Initial clinical studies for AAV gene therapy for haemophilia have been conducted in adults older than 18 years, in which patients have had sufficient exposure days without an inhibitor, a common exclusion criterion. Additional rigorous clinical studies will be needed in previously untreated patients, more so for patients with haemophilia A, in whom the inhibitor frequency is 25% to 30%, to determine the relative risk for inhibitor formation after gene transfer.

The first clinical trial for haemophilia A, used a liver gene transfer of an AAV5 vector expressing a codon optimized BDD-FVIII-SQ protein. Patients in the highest-dose cohort expressed a range of therapeutic FVIII levels, with a median of 77% and range of 19% to 164% of normal at 52 weeks (Figure 2), with a significant reduction in annual bleeding rate and recombinant FVIII usage (Figure 3). Most patients treated in the high-dose cohort received an extended course of prophylactic prednisolone in response to mild elevations in transaminases that did not correlate to a T-cell response. In addition, trials enrolling by invitation a phase 1/2 study to evaluate high-dose gene delivery in patients with haemophilia A with pre-existing AAV5 capsid antibodies.

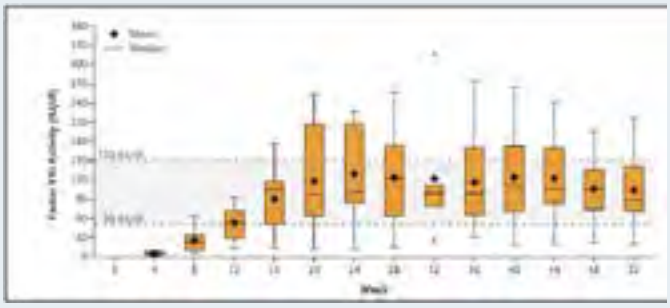

*Figure 2. FVIII levels at 52 weeks post gene transfer.*

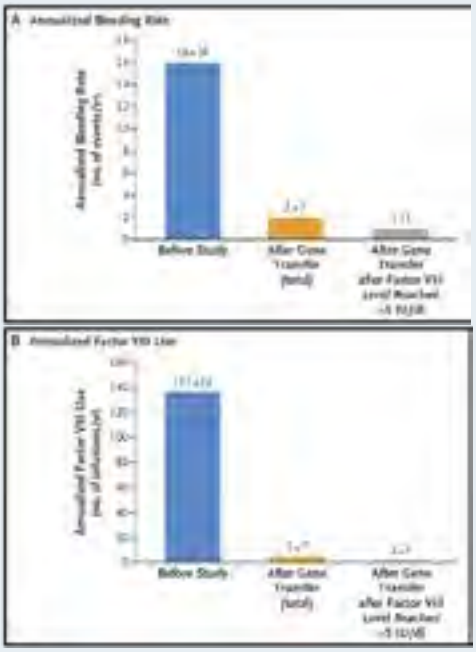

*Figure 3. Annualised bleeding rate and FVIII use pre and post gene transfer.*

A haemophilia B clinical trial was initiated using an AAV8 capsid with several amino acid substitutions to package a hyperactive FIX-Padua expression cassette. FIX-Padua is a naturally occurring hyperactive FIX variant (R338L) with a reported approximately 8-fold increase in specific activity. Ten patients were treated with an intermediate dose and had a median FIX activity of 34% with a range of 14% to 81% (Figure 4) with a significant reduction in annual bleeding rate and FIX usage (Figure 5). Two participants had asymptomatic transient transaminitis that was resolved through steroid treatment with only 1 showing moderate loss in FIX activity. Eight of the 10 treated patients had stable FIX activity during reported follow-up, and no indication of an AAV capsid T-cell response.

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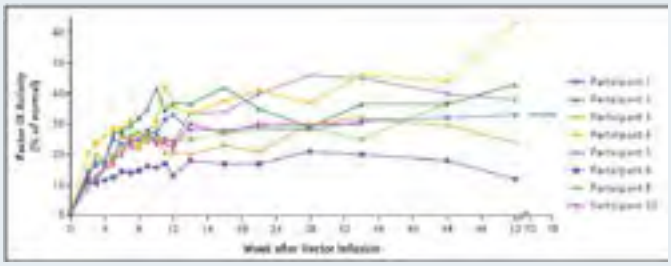

*Figure 4. FIX levels at 52 weeks post gene transfer.*

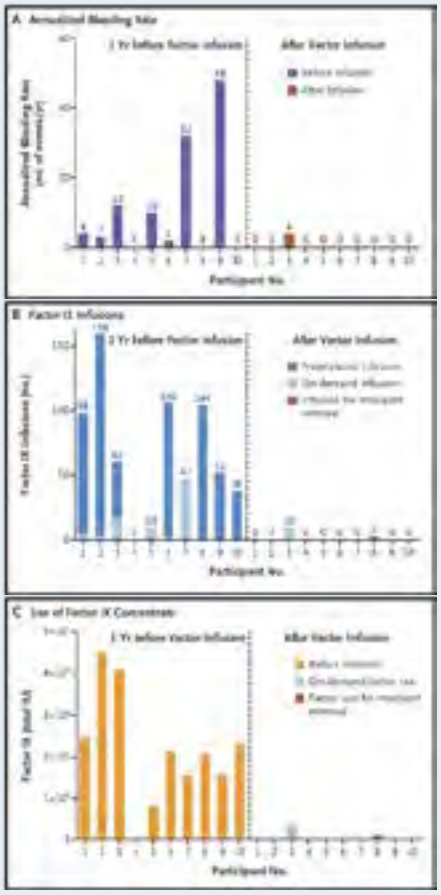

*Figure 5. Annualised bleeding rate and FIX use pre and post gene transfer.*

The risk for insertional mutagenesis after AAV-mediated gene transfer is low, as the majority of vector genomes persist episomally. Even though natural infection with AAV is not linked to cancer, deep sequencing studies show that integration of the AAV genome can occur in the liver. An increased incidence of hepatocellular carcinoma (HCC) has been reported in animal models after gene transfer of AAV. Another potential toxicity related specifically to AAV gene therapy for haemophilia A is overexpression of FVIII. Recent research demonstrated that overexpression of FVIII in hepatocytes may induce cellular stress as a result of the accumulation of misfolded FVIII protein in the endoplasmic reticulum (ER). Because hepatocytes do not naturally express FVIII protein, nor the closely associated vWF protein, the risk for ER-induced stress in hepatocytes is a potential concern. However, it is not clear that an ER stress response to FVIII occurred in AAV-treated patients with haemophilia A. Nonetheless, preclinical studies have focused on engineering FVIII proteins that are more efficiently secreted from hepatocytes.

Although hepatic gene transfer has the potential to induce immune tolerance, adjunct immune modulation may further enforce tolerance to the FVIII or FIX transgene products. The mammalian target of rapamycin has received particular attention, as it causes activated induced cell death after signalling through the T-cell receptor in CD41+ T effector cells while sparing Treg. In animal models, a regimen based on administration of rapamycin and FVIII or FIX antigen has been successful in promoting tolerance of haemophilia in the context of protein or gene therapy. Nanoparticle delivery of rapamycin is effective at suppressing AAV cellular and humoral immunity. Transient B-cell depletion by monoclonal antibody therapy (using anti-CD20) reduced the risk for inhibitor formation in the context of AAV gene therapy and enhanced reversal of FVIII inhibitors in haemophilia A. A similar protocol is in clinical development to prevent anti-drug antibodies in other enzyme replacement therapies and to suppress NAB formation against AAV vectors, thus improving the chances for successful re-administration of vector.

Given the exciting breakthroughs with new haemophilia therapies, there is debate regarding the benefits of gene therapy, considering recently approved enhanced half-life factors and other non-factor biologics. However, enhanced half-life products thus far have failed to show a substantial gain in half-life for FVIII. Non-factor biologics that target coagulation pathway inhibitory proteins and a bispecific antibody FVIII mimetic show much promise but have also been associated with thrombosis in clinical evaluation, perhaps because of a lack of functional regulation that is inherent in FVIII and FIX products (Figure 6). Alternative gene therapy approaches targeting haemopoietic stem cells with lineage-restricted expression in CD68 monocytes and platelets are being investigated. Targeting expression to platelets may avoid neutralisation of FVIII by inhibitors, and also has potential for immune tolerance induction. However, these approaches may require pre-conditioning of bone marrow at least with a non-myeloablative regimen and transient immune suppression. Two separate AAV-based gene therapy phase 1/2 clinical trials for haemophilia A have now reported stable FVIII levels after a single vector dose, demonstrating that gene therapy is the most effective investigational treatment of patients with adult haemophilia A. In haemophilia B, even though

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enhanced half-life FIX products have benefited from a greater improvement in half-life, multiple phase 1/2 gene therapy clinical trials have now reported stable therapeutic FIX expression after a single treatment using an AAV vector. Given the robustness of expression thus far, up to 6 years, it is likely that AAV gene therapy for haemophilia B will be a highly attractive therapeutic option for patients once approved. Although the clinical data supporting gene therapy for haemophilia have been extremely positive, the enrolled subjects have a pre-selection bias, and thus some caution is advised in extending the benefits of gene therapy to the general population of patients with haemophilia. Nonetheless, with continued growth and success, AAV gene therapy may replace enzyme replacement therapy as a potential curative therapy for haemophilia.

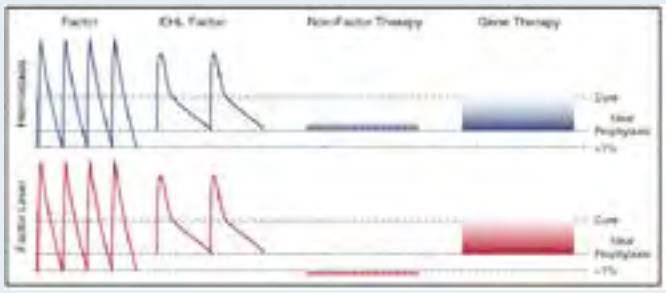

*Figure 6. Current and novel haemophilia therapies and their effects on factor levels and haemostasis.*

# Victorian Faces of the Fellowship

## Gurbaksh Singh

Principal Scientist
Boxhill Hospital

My journey into the Fellowship was influenced by a fellow colleague, Craig Baker, who saw the potential in me. The month leading to the first exam in 2017 was daunting! Juggling between a new role in the Laboratory, time with the family and studying was very challenging. I tried my level best, but unfortunately, I did not pass.

With the support of my Wife: Narveen, Mentor: Tina Pham and Colleague: Craig Baker, I carried on and did not give up. I worked on my time management and further structured the way I studied. It was not easy, some days were harder than others, but after passing the second exam, I gained more confidence. All subsequent modules became more enjoyable and I found that my theoretical knowledge, confidence and understanding improved and grew exponentially as I progressed with each module.

At the time COVID-19 hit the Australian shores, I was working on the final phases of the Fellowship. It was challenging, but also exciting at the same time. My dissertation titled 'Pitfalls in the assessment of Disseminated Intravascular Coagulation in patients On Dabigatran' got accepted in October 2020. I sat the Viva Voce in the same month. I was extremely nervous during the examination which went for 90 minutes via Zoom but was extremely pleased to find out that I passed at the end of it. I was overwhelmed with joy and could not believe that I had completed all requirements for the Fellowship. Two days later, on the 21st of October 2020, it was official, all the hard work for the past 4 years paid off! I was officially admitted as a Fellow of AIMS.

The AIMS fellowship program has been rewarding in many ways. It made me a better teacher, a mentor and also helped my career growth, moving up from a Grade 1 Scientist to a Grade 3 Scientist and eventually to Principal Scientist. My love for Haematology, Coagulation and Transfusion grew everyday as I progressed through the course. The journey wasn't easy, but gave me the opportunity to learn at my own pace and allowed me to take a break when I needed it. So, was it worth it? Yes, 100%, without a doubt!

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The AIMS Fellowship has always been my goal ever since I was a bursary student at Austin Pathology. As a young scientist growing up in the medical science world, I looked up to all the senior scientists and all AIMS Fellows, and wondered if I was ever going to be able to achieve this by-no-means easy feat.

Fast forward a number of years, having to balance working based on a 24/7 roster, managing personal life-issues and studying, I finally sat for the exam. I remember spending a full year preparing for the first exam in the Transfusion Medicine stream and when the time came, I thought to myself, "This isn't too bad!". But the proof was in the pudding and so I waited patiently for the result of the exam to come out. When the results were finally released, to my surprise, not only did I pass, I did quite alright and I thought to myself "I can actually do this".

Two years on and just before my Viva Voce, it struck me that I was so close to completing the Fellowship Program and all that stood between me and the Fellowship was an oral exam and a dissertation. The emotions that I was experiencing, a combination of anxiety, nerves and fear was hard to describe. But straight after the exam, I was told that I passed and should receive official confirmation in a couple of weeks.

## Niki Lee

Senior Scientist
Northern Health

At this stage, I was confident that the Fellowship would be attained as my dissertation "The Simplicity and Challenging Nature of the Direct Coombs Test" was already near completion. Six months later, I received an email confirming that the dissertation was accepted and I fulfilled all criteria for admission as an AIMS Fellow. The joy and happiness that I felt was indescribable. So, for all budding young scientists, I sincerely encourage you to pursue this highly rewarding qualification! It is by no means a walk in the park, but the knowledge you gain will ensure that you become a valuable asset to any organisation.

# Australian Institute of Medical & Clinical Scientist (AIMS)

# Fellowship

The AIMS Fellowship is an attractive and highly competitive option to academic post graduate degrees. It is recognised by the Commonwealth of Australia for meeting the requirements for supervision of category GX and GY laboratories.

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| Transfusion Science |
| Clinical Biochemistry |
| Cytology |
| Haematology |
| Anatomical Pathology |
| Immunology |
| Microbiology |
| General (including Core Laboratory) |

Qualification for the Fellowship is by EXAMINATION in one of the eight disciplines.

Candidates for the Fellowship must have been members for a minimum of two years and must meet certain other criteria.

The Fellowship program is modular - candidates must complete:

- Two compulsory modules
- Two elective modules
- A viva voce examination
- A scientific dissertation OR a successful relevant research degree thesis completed within the last two years (eg Honours, Masters, PhD); OR a relevant paper published in a peer reviewed journal.

To enrol in the Fellowship program or for further information please contact the AIMS National Programs Manager:

Ph: +61 7 3876 2988
E mail: programs@aims.org.au

# Students' Perspectives on Professional Placement & Online Learning

By Tina Pham

Professional placements are valuable experiences where medical science students can develop their professional knowledge and skills in industry to fully prepare them to work anywhere in Australia in diagnostic pathology or medical research. In this issue, we hear from **Nee Edirisinghe**, **Tadina Dahal and Racine Benjamin**.

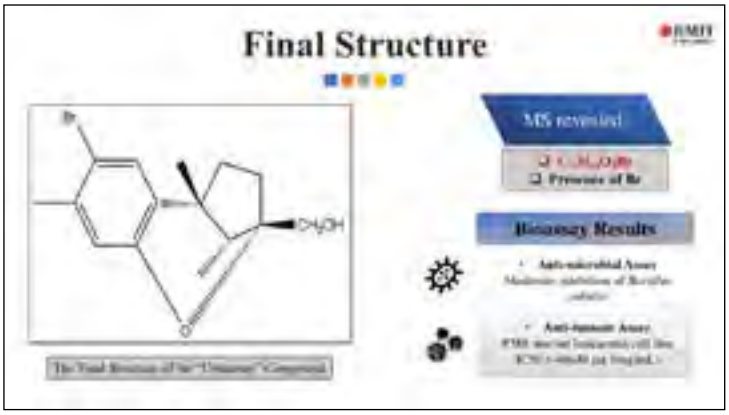
**Nee Edirisinghe**
RMIT University
(Bundoora)

I embarked on my coursework postgraduate studies (Master of Laboratory Medicine) in March 2019 at RMIT University (Bundoora campus), with an exciting passion for Science, yet, without a clear idea of where exactly I wanted to base my future career. Early on in the degree, I discovered the joys of scientific research brought upon by the thorough exposure to the many practical skills embedded in this program. This led me to choose 'Research Project' as my final unit for the degree.

I was uncertain how I would cope learning such a heavy, hands-on unit fully online due to the COVD-19 restrictions. This doubt faded away almost as soon as it appeared, as my supervisor, the teaching team, and the lab colleagues were all wonderful, understanding and encouraging. I learnt invaluable skills in scientific writing, presenting and critical thinking skills which I will carry with me as I progress in my career.

The highlight of my experience was being able to learn an entirely new technique (Nuclear Magnetic Resonance (NMR) Spectroscopy) in short 6 weeks. This enabled me to determine the structure of an unknown bioactive compound displaying anti-cancer and anti-bacterial activities using the first principles of one and two-dimensional NMR. Although extremely challenging at first, it was enthusing to learn and apply the principles of one of the gold-standard techniques in structure elucidation, and this is a tremendously valuable skill as NMR is generally regarded an irreplaceable tool in determining the molecular structure of unknown bioactive compounds.

These 16 weeks marked my first major research experience, despite having undertaken the course in such an unusual semester. I am grateful to my supervisor at the Dias Laboratory, RMIT University, for his expertise and excellent supervision, for his research team for the motivation and the constant constructive feedback, and for the teaching staff for navigating some of the roughest waters with our cohort, to finally guide us successfully towards the finish line. It marked the conclusion of a delightful research experience, and also the end of the Master's degree. This experience is undoubtedly one I will always use to not only remind myself of my resilience, commitment, and discipline in the tougher days, but also to be grateful for RMIT University for delivering quality education and an integral research component regardless of a global pandemic.

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**Tadina Dahal**
RMIT University

I have been an exception in the year 2020. Despite the challenges brought upon by the COVID 19, I was one of a few fortunate students to have secured a professional placement from RMIT University. I was even more blessed to be allocated to Special Haematology at St Vincent's Hospital, Melbourne as a student Medical Scientist.

My placement started in August 2020, just when stage 4 lockdown started. With all the precautions in place, I was delighted to march towards obtaining firsthand experience of a medical scientist and utilize the knowledge and practical experiences that I gained from my master's degree in laboratory medicine. At the same time, I wanted to look up to and learn from the professionals who have decades of experience in providing laboratory services and results for patient care and management.

Flow cytometry is an advancing technology that enables us to characterize cell surface markers using targeted specific monoclonal antibodies. During my placement, I gained competency in flow-based assays such as HLA-B27, Lymphocyte typing, NHL and AML surface markers studies, CD34+ counts, PNH and V-beta Repertoire analysis. I had opportunities to navigate instruments such as BC Navios 10 colours, 3 lasers, software such as Kaluza and design composites for analysing internal quality control. In addition, I was also trained to perform FBC, ESR, Hb capillary electrophoresis, stem cell cryopreservation and molecular assays.

Alongside this, I became knowledgeable in the quality management aspects of the laboratory ranging from sample processing, result validations, QCs, to external QAPs performing audits and test correlations. Getting familiar with the beeping noise of the instruments and troubleshooting the error was an everyday part of my placement. While I learned different laboratory techniques, I was also moved by the patient-centred care that scientist provided liaising with other departments and producing accurate and valid results.

My placement experience has provided invaluable laboratory skills and improved my communication, organisational and collaboration skills. I am immensely grateful to the placement organizing committee at RMIT University and my placement supervisors, Tina Pham; Ingrid Cutter for providing me this excellent opportunity to gain valuable insight into the life of medical scientists working in a pathology laboratory.

To students who are going on professional placement in the coming years, I say you will have an exciting time in the laboratory, and every day you will find new things to learn. Please take on new challenges for professional and personal development and do not hesitate to seek appropriate advice and support from your supervisors and teachers. Good luck!

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**Racine Benjamin**
RMIT University

This YouTube clip on Chediak-Higashi Syndrome, by Racine Benjamin for her RMIT project, was inspired by film director Wes Anderson and the "noir" art form.

In brief, Chediak-Higashi syndrome is a rare, inherited condition that usually occurs in childhood. It is caused by the mutation in the lysosmal trafficking regulator gene and is characterised by decreased pigmentation of hair and eyes, easy bruising, immunodeficiency with recurrent bacterial infections and progressive neurological dysfunction. The presence of abnormally large intracytoplasmic granules especially in white blood cells are diagnositic. Treatment is with allogeneic haemopoietic stem cell transplantation. This, however, only cures the haematological dysfunction; it does not stop the neurological impairment.

For Racine, any topic can be moulded to craft a story which allures and captivates the audience if it is done with passion and pleasure. Her advice for future students would be to discover where your passion lies, spark that inspiration, and tailor it to any of your goals.

# A DAY IN THE LIFE OF A MOLECULAR MICROBIOLOGY SCIENTIST: DARREN HEWSON

By Claire Gregory

In light of COVID-19, microbiologists have played an important role in the pandemic. I had the opportunity to speak to Darren Hewson, Senior Scientist for the Molecular Biology & Immunoserology Department at Melbourne Pathology, to find out more about some of the challenges he face.

**What can you tell me about your current role as a Medical Scientist?**
As senior scientist most of my role is about supporting the staff and the day to day running of the lab and troubleshooting whatever challenges arise. Stores, equipment, monitoring QC, checking the technical quality of the testing, authorising results, oversight of rosters and liaising with other departments or external stakeholders. The medium to long term goals of the department are also important to keep in mind – are our current tests meeting clinical needs, validating new tests, writing and reviewing manuals, and continuously hunting for better processes.

**Can you describe your typical work day (pre-COVID)?**
Moving from a bench scientist to senior scientist there is much less of a typical day. Before COVID we were a small department, the start of my day was checking that testing was progressing, stepping in to do some bench work if we have gaps, following up any issues. The middle of the day is hopefully administration and the later part of the day is authorising the results, but a fair bit can happen amongst all that. Whatever does happen the number one priority is that the tests are set up and that the results go out.

**How has your working day changed since the COVID pandemic began?**
The massive volumes and pressure on turn-around-times have made us a 24 hour lab. During the surges in May and then July, August, September everybody had to do long days of bench work. Myself and half our team did 6 months of evening shift and were batching, pipetting, and running the analysers late into the evening.

**How has your lab adapted to meet the demands of COVID testing?**
Usually we would avoid like the plague having more than one workflow for a single result but huge supply chain challenges and the throughput needed have meant having to branch out to have multiple machines and reagents. Nucleic acid extraction in particular suffered. Many critical reagents went onto drip feed rationing with the vendors being managed by the government. Vendors were often unable to even get supplies onto the limited number of planes that were flying. Supply of certain plastic consumables practically ground to a halt. We spent a lot of time on the internet and on the phone to ensure that we had back up plans for everything we use.

We have had big changes in staffing. We were lucky to have a core experienced staff who really knew what they were doing ready to go at the start of the pandemic. Through the first wave we were able to draft in staff from other departments – even if they had never done PCR before their general pathology experience helped us keep everything accurate and safe. Then we switched to training a lot of new staff all at once which has seen us through the second wave and into our relative calm today. Everybody responded incredibly and constructively. Our new staff have been keen to learn but have also been amazing in getting down to the task at hand. That positive and calm response from everybody really meant the year was a lot easier than it might have been.

**What instruments are you using for COVID testing?**
The list is pretty long but the bulk of our work is with the Roche platforms (6800 and MP96) and Seegene assays. Honorable mention also has to go the Kingfisher Flex extractors and the GeneXpert

**What are your interests outside of work?**
Unfortunately, given the year we have had, I like a bit of travel and live music. Luckily I have had a bit going on at work to keep me entertained instead.

# From Technician to Scientist – My First Year in the Lab

By Emma Lee

Towards the end of 2019, I accepted a medical scientist position after five years working as a laboratory technician. 2020 was going to be a promising year for embarking on this journey as a new scientist at Monash Health.

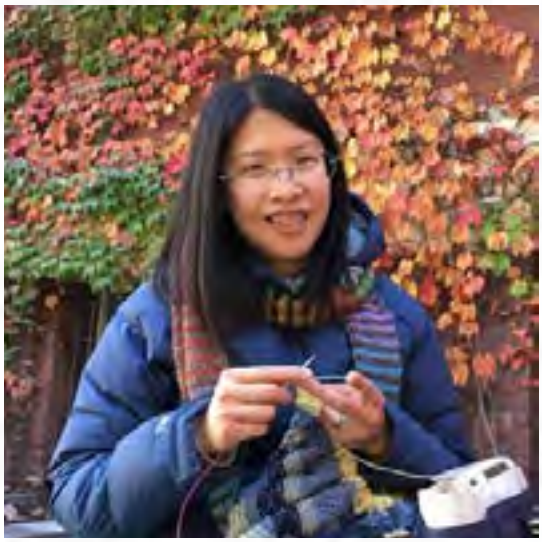
A few months into the role, it became clear to me that the key to mastering skills such as culture reading, follow-up, and reading Grams relied on good training and with time and experience comes expertise. Because it was an entirely new environment, hospital system, team, culture and work complexity, the onslaught of new information to absorb on a daily basis was challenging. Previously, as a technician, or 'hands' of the lab, I was relied upon for my setup techniques, but as a scientist, I had to be the 'brains'. Working in microbiology had a new perspective, one that was beyond streaking fast and yielding single colonies, because now I understood both the setup at the beginning, the final reporting and the impact on the clinical outcome of a patient at the end. Further, a colleague once said, "in this role you can put more of yourself in the work" and so owning my approach to working up cultures is what I have come to appreciate about being a scientist.

Then COVID-19 arrived. I remember the day the first positive sample for coronavirus in Victoria arrived in our laboratory. We didn't know much about COVID at the time and specimens were sent externally to VIDRL for testing and staff wore stringent PPE from top to bottom. This situation soon evolved when in-house testing was established and we saw thousands of swabs arrive in the laboratory daily. This was followed by an onslaught of phone calls — 'do you have my results yet?', 'what's the ETA on this swab?', 'what do you mean you can't expedite a PCR once it's begun the run?' and so on. And when clinical circumstances changed for a patient, it became a virtual needle-in-a-haystack situation when searching for the swab. As you can imagine it was an incredibly overwhelming time.

Also our entire staff was split into two teams to better protect us in case someone contracted COVID-19. A strategic move, but difficult to live with without constant fatigue. For weeks on end, we either started work at dawn, or finished an hour short of midnight—and some worked night shifts. In terms of developing new skills for current and new staff, COVID also put a strain on the amount of available trainers due to the split teams. While I did lament an alternate universe whereby, I would be consolidating knowledge and skills under normal circumstances and pressures, I have appreciated the personal growth that nothing besides a global pandemic could have otherwise catalysed. Amidst all the disappointment and devastation we had to endured in 2020, the silver lining is working in a relatively safe field and I am thankful for the blessing in disguise.

# Obituary: Lee Yoong Loh

## (1980 – 2020)



By Peter Gambell

Sadly after a brief illness, Lee Yoong Loh passed away on 29th August, at the Peter MacCallum Cancer Centre, with her husband Victor by her side. I delivered the following eulogy at Lee Yong's funeral on 5th September.

"I'd like to say some words about Lee Yoong, the Medical Scientist who had a passion for transfusion medicine and for helping patients who relied on receiving a blood transfusion to stay alive.

After various Scientist roles at Royal Melbourne Hospital, The Alfred Hospital, Melbourne Pathology and the Red Cross, Lee applied for an experienced Haematology & Blood Bank scientist position at the Peter Mac in 2016.

I was impressed with Lee Yoong's CV, her experience, her intelligence and her friendly nature during the interview. And I was pleased that Lee had a strong commitment to further education & continuing Professional Development. At the time of her interview, Lee was undertaking her Fellowship in Transfusion Medicine discipline, through the Australian Institute of Medical Scientists. All of these factors gave me great confidence that Lee would be an excellent addition to our team at Peter Mac.

Lee commenced in the role in September 2016 & I knew quickly that we had made the right decision to welcome Lee into our close knit team. She was a very fast learner, it did not take Lee very long to become fully trained and able to participate in our sole scientist roster.

Lee was a very good public speaker, she regularly attended and presented at various Scientific Meetings including the annual National Blood Transfusion Meeting. Her oral presentations were always current, well researched and presented in a way that all members of the audience were able to understand and take away various learnings from the presentation.

In the Pathology Lab, we refer to the bread and butter laboratory work as "On the bench". And it was "On the bench" that Lee excelled. She was an excellent Medical Scientist, particularly in her scientific field of passion, Transfusion medicine. One of my haematologist colleagues mentioned to me this week that whenever we had a bleeder requiring blood products, he always felt extremely comforted when he knew that Lee was working in the lab, and looking after "the case".

In a busy 24/7 laboratory, it can often be a challenge to fill difficult shifts at short notice. Lee was a wonderful team player in this respect. Vuong & I both knew that we could always rely on Lee when we needed her.

As scientists working in the laboratory, there can sometimes be a disconnect between the work we do on laboratory samples, and the patient. That was not the case with Lee. I always knew that Lee had a very strong patient focus.
As we all know and regret, Lee became a patient of the Peter Mac over the last 9 months or so. She fought her battle with Cancer with great strength and dignity. During her treatment earlier this year, Lee was very clear to us that she wanted to continue working in the lab, in a part-time role, as her treatment permitted. And this she did. She wanted to continue to help other patients, via her work in the laboratory, as she herself was going through a difficult Cancer journey. Even a few weeks ago, when Lee was very unwell, she explained to our Head of Haematopathology who visited her on the ward, that she was keen to get back to work again soon, when her condition improved.

Sadly, this did not occur. We will all miss you deeply Lee Yoong, may you Rest In Peace."

# GET YOURSELF CERTIFIED!


The Australian Council for Certification of the Medical Laboratory Scientific Workforce (ACCMLSW) is a newly created not for profit company established to administer the voluntary certification scheme for medical scientists and technical officers.

**WHY BECOME CERTIFIED?**
Your status as a certified medical laboratory professional is a public guarantee that you are qualified, competent and continuing your professional development.

- Recognition of scientific qualifications
- Certification aligned with competency development and assessment processes
- Acknowledgement of participation in continuing educational activities
- Increased professional credibility and prestige in the industry
- Support of industry standards
- Demonstrated commitment to superior professionalism
- Advantage in the recruitment process

The certification scheme is now open. Applications received before 31 December 2020 will receive a 10% discount on the normal application fee.

Visit the website http://www.accmlsw.org.au/apply to apply. If you encounter any problems or have any questions, please email: office@accmlsw.org.au.


Australasian Professional Acknowledgement Continuing Education (APACE) is a voluntary programme that recognises professional activities which contribute to professional growth.

**WHY BECOME CERTIFIED?**
- Participation in CPD activities demonstrates a commitment to ongoing continuing education and professional development.
- APACE provides formal recognition of activities that may have been pursued on personal basis without recognition – records for a professional development portfolio.
- An APACE Certificate enhances professional profile and is a bonus on a resume.
- Recognition of participation in activities provides encouragement to maintain, improve and extend knowledge and skills for scientific and professional duties.
- CPD is about extending your knowledge and keeping up with, or ahead of, current developments and practices.
- CPD participation ensures a competent workforce and enhanced quality of service for increased confidence of service users.

The programme is open to members of AIMS, AACB, ASM, THANZ, ANZSBT and FSA. APACE participants can lodge applications and activities using the online diary www.apace.org.au.

**Congratulations to the following for obtaining/renewing their APACE certificate recently:**
- Claire Gregory – Austin Health
- Melissa Lane – Cabrini Path
- Marie Pathy – Austin Health
- Denise Jackson –RMIT
- Di Jodie Zou –FSA/SIRT
- Kelli Sorby – FSA/SIRT
- Patricia Szczurek – Austin Health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## Call for Committee Nominations

Being a committee member is an excellent activity for personal development and provides opportunities to broaden progessional and personal skill sets and create connections with others in the industry.

We are currently seeking a **Student Member** for the 20/21 term.

Email us at secretary.aims.vic@gmail.com to express your interest and we will get in touch with you soon for a chat. We look forward to hearing from you!

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