THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

SCIENCE
SCHOOL OF CHEMICAL SCIENCES

10TH ANNUAL
Research Showcase
6 June 2018

Programme booklet

School of Chemical Sciences

10th Annual Research Showcase

Wednesday 6th June 2018

Organising Committee

Dr Viji Sarojini (Chair)
Dr Erin Leitao
Prof Jadranka Travas-Sejdic
Mr Tasdeeq Mohammed
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Welcome

Welcome to the School of Chemical Sciences Research Showcase

I am very pleased to welcome you to the 10th Annual School of Chemical Sciences Research Showcase. Our Showcase provides an opportunity for us to share our excitement about research with the broad Chemical Sciences community. Over the past decade this event has been a focal point of our year, at which our PhD students share their interest in and excitement about research.

We welcome our research students and fellows, commercial suppliers and research partners, along with all other attendees who wish to learn about our research. This year, over 100 PhD students from our School will be presenting their research in interdisciplinary areas such as Food Science, Forensic Science, Green Chemical Science, Materials Chemistry, Medicinal Chemistry, and Wine Science, as well as in the traditional disciplines of Analytical, Inorganic, Organic, and Physical Chemistry.

Eight PhD students have been invited to give 15-minute presentations on their research, while all our first-year PhD students will give 2-minute "Thesis Challenge" talks which give an insight into the breadth of research activities in our School. We also have an invited keynote speaker, Dr. Carla Meledandri, from the University of Otago, who was the winner of the 2017 Prime Minister's Emerging Scientist Prize.

A major component of the day is the poster display, which features the research of most of our PhD students. Please take the opportunity to read the posters and talk with the presenters. In past years, opportunities for collaboration and new research directions have arisen from these informal discussions, and we expect the same will occur this year. I am sure that you will sense the energy and enthusiasm in our students as they discuss their projects.

Finally, I thank the members of the Research Showcase Committee, and especially the Chair Dr. Viji Sarojini for organising this celebration of our research.

Associate Professor Gordon Miskelly - Head, School of Chemical Sciences

Programme

Morning Session

08:00 – 08:45	*Registration*
08:45 – 08:50	*Welcome: Associate Professor Gordon Miskelly, Head of School*
08:50 – 08:55	*Address by Deputy Vice Chancellor (Research) – Professor James Metson*
08:55 – 09:00	*Address by Dean of Graduate Studies – Associate Professor Caroline Daley*
09:00 – 10:00	*PhD Presentations (15 minutes)*
10:00 – 10:35	*PhD Presentations (2 minutes)*
10:35 – 11:05	*Morning Tea*
11:05 – 12:05	*PhD Presentations (15 minutes)*
12:05 – 12:40	*PhD Presentations (2 minutes)*
12:40 – 14:40	*Lunch and Poster Session*

Afternoon Session

14:45 – 15:45	***Keynote Speaker: Professor Carla Meledandri, University of Otago***
	Nanomaterials for dental applications: from academic innovation to commercialisation
15:45 – 16:15	*Prize Giving and School Photo*
16:15 – 18:00	*Reception*

Keynote Speaker

Dr Carla Meledandri is a Senior Lecturer in the Department of Chemistry at the University of Otago and a Principal Investigator in the MacDiarmid Institute for Advanced Materials and Nanotechnology.

Carla received her B.S. degree in Chemistry from Penn State University in 2001. From 2002 – 2004, she worked as a Research Associate in the Department of Blood Research at the Walter Reed Army Institute of Research in Maryland, USA, where her work involved the investigation of membrane lipid and protein interactions with novel cryoprotecting agents.

She completed her PhD research (2008) and a postdoctoral fellowship (2009) at Dublin City University in Ireland where her work focussed on the preparation and fast field-cycling NMR characterisation of membrane-bound nanoparticles and nanoparticle assemblies for applications in magnetic resonance imaging. Carla moved to New Zealand and joined the academic staff at the University of Otago in 2009.

Nanomaterials for dental applications: from academic innovation to commercialisation

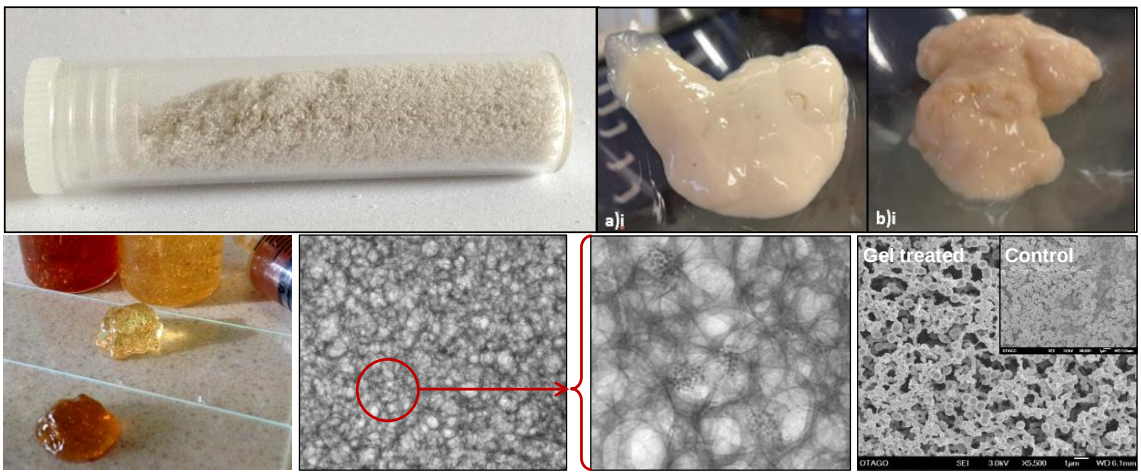
G. C. Cotton,[1] D. R. Schwass,[2] W. J. Duncan[3] and C. J. Meledandri[1]*

[1]*Department of Chemistry and MacDiarmid Institute of Advanced Materials and Nanotechnology, University of Otago, PO Box 56, Dunedin 9054, New Zealand.*
[2]*Department of Oral Rehabilitation, Faculty of Dentistry, University of Otago, PO Box 56, Dunedin 9054, New Zealand.*
[3]*Department of Oral Sciences, Faculty of Dentistry, University of Otago, PO Box 56, Dunedin 9054, New Zealand.*

Email address of presenting author: cmeledandri@chemistry.otago.ac.nz

In recent years, our team has developed an interdisciplinary research programme dedicated to the development of new silver nanoparticle-based materials for application in dentistry. This work aims to solve a series of dental problems, ranging from tooth decay to periodontal disease, by providing persistent antibacterial action to manage disease and prevent recurring infections. Our approach involves the preparation of a range of selectively-functionalised, antibacterial silver nanoparticles through the use of microemulsion techniques for incorporation into a variety of materials, from hydrogels to glass ionomer cements. Our materials demonstrate significant antimicrobial activity against a range both planktonic cells and biofilm species, and offer significant advantages over currently-used treatment strategies to combat disease.

Our team have been committed to pursuing both beneficial health and commercial outcomes for our work, and in this talk, our journey from the lab bench, through animal trials and onto successful commercialisation of a range of technologies, including spin-out company formation, will be highlighted.



Oral presentations

Session 1 (9.00am-10.00am)
Chaired by Rebecca Jelley

1. **Matthew Sullivan**
   Metallodrugs and their Side Chain Specific Reactions with Proteins: Structures and Properties

2. **Hans Choi**
   Medicinal chemistry of NZ anti-cancer agent portimine

3. **Danilo Correddu**
   Investigation into the role of ribosomal protein s15 phosphorylation in Parkinson's disease

4. **Matheus Vargas**
   Multidisciplinary spin- a centrifugal microfluidics project

Session 2 (11:05am-12:05pm)
Chaired by Kyriakos Varnava

5. **Chloe Cho**
   Structure-Activity Relationships of Guanidinylated Biodegradable Antimicrobial Polycarbonates

6. **Stephen Lo**
   Derivatisation of flavonoids found in food waste to enhance bioactivity

7. **Aubrey Dosado**
   Development of Efficient Phosphors for NIR Upconversion

8. **Weam Banjar**
   The application of diffusing wave spectroscopy to investigate the acid milk gel of low heat skim milk (LHSM) and A2 milk and comparing them with commercial yoghurts

Metallodrugs and their Side Chain Specific Reactions with Proteins: Structures and Properties

Matthew P. Sullivan,[§†] Dianna Truong,[§] Michél Nieuwoudt,[§] Nelson Y.S. Lam,[§] Graham A. Bowmaker,[§] David C. Goldstone,[†] Christian G. Hartinger[§]

§ School of Chemical Sciences, University of Auckland, Private Bag 92019, Auckland, New Zealand
† School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland, New Zealand

With the advancement of cisplatin into clinical usage, metal-based anticancer drugs have moved into the forefront of inorganic chemistry where the search for the next 'blockbuster' drug continues through synthetic chemistry and the study of modes of action.[1] This led to the advent of the piano-stool scaffold which confers a number of favourable properties including high stability required for possible oral application and which can be modulated through choice of metal centre and/or ligands. These modifications may also lead to significant changes in the biological activity and allow the design of complexes with specific functions through selective interaction with biological targets.[2]

We use different biophysical methods to understand the modes of action of novel anticancer agents. Here, studies on the interactions of piano stool complexes with hen egg white lysozyme (HEWL) will be presented in our aims to explore their binding modalities with this protein. We investigated a series of piano-stool complexes with Ru and Os centres, and studied the impact of alterations in their ligand sphere on the interactions with HEWL. Protein X-ray crystallography, ion mobility mass spectrometry, differential scanning calorimetry, dynamic light scattering, and electron spin resonance (ESR) were employed to characterise the interactions in terms of binding modality, structural changes and stability of the protein, and redox process at the metal centre.[3,4] The metal centre was found to influence the preference for binding to specific amino acid side chains as well as the kinetics of interaction (Fig. 1a). The latter was also modulated by ligand exchange reactions driven by the lability of metal-halido ligand bonds. The structure of the protein was found to be more compact at higher charge states, while the stability of HEWL decreased. Furthermore, for one class of compounds, the long standing paradigm that arene ligands stabilise the oxidation states of organoruthenium(II) complexes could be demonstrated, as Ru-HEWL adduct formation resulted in cleavage of the arene and oxidation to Ru^{III} (Fig. 1b).

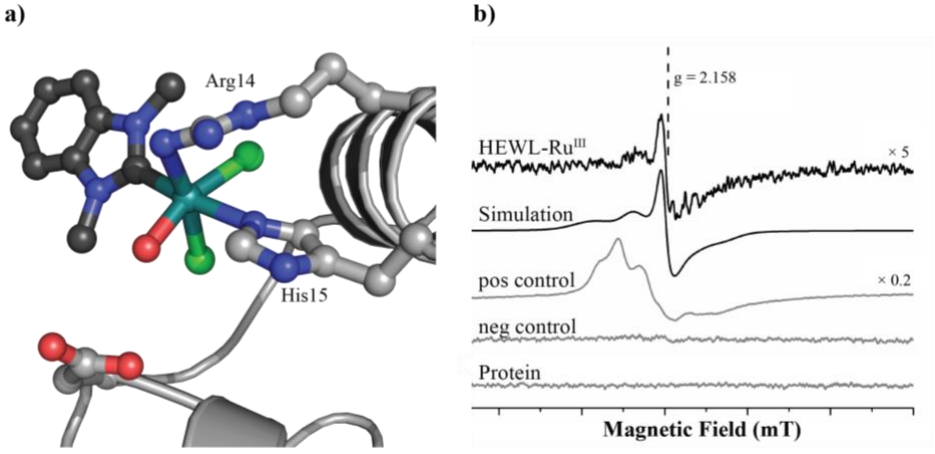


Figure 1. M(η^6-*p*-cymene)(1,3-dimethylbenzimidazol-2-ylidene)Cl_2 interactions with HEWL. a) [Ru(1,3-dimethylbenzimidazol-2-ylidene)(H_2O)Cl_2] fragment attached to Arg14 and His15 of HEWL. b) ESR spectra for the formed Ru^{III}-HEWL adduct, its simulated spectrum, positive and negative controls as well as the HEWL spectrum.

1. Sullivan, M. P.; Holtkamp, H. U.; Hartinger, C. G. In *Metallo-Drugs: Development and Action of Anticancer Agents;* Sigel, A.; Sigel, H.; Freisinger, E.; Sigel, R. K. O. Eds.; De Gruyter, 2018; pp. 351–386.
2. Peacock, A. F.; Sadler, P. J. *Chem. Asian J.* **2008,** *3*, 1890-1899.
3. Sullivan, M. P.; Groessl, M.; Meier, S. M.; Kingston, R. L.; Goldstone, D. C.; Hartinger, C. G. *Chem. Commun.* **2017,** *53*, 4246-4249.
4. Sullivan, M. P.; Nieuwoudt, M. K.; Bowmaker, G. A.; Lam, N. Y. S.; Truong, D.; Goldstone, D. C.; Hartinger, C. G. *Chem. Commun.* **2018**, DOI: 10.1039/C8CC02433B.

Medicinal Chemistry of NZ Anti-Cancer Agent Portimine

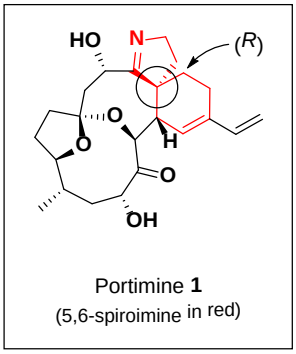
Hans Choi

Dist. Prof. Margaret Brimble, Dr. Daniel Furkert

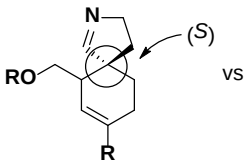
Cancer is a generic term for a variety of diseases which involve abnormal cell growth with a potential to invade or spread to other parts of the body. It is one of the leading causes of mortality in the world, responsible for approximately 9 million deaths per year on top of more than 14 million new cases reported annually.[1] Development of improved chemotherapeutic cancer agents with increased tissue selectivity and potency is an ongoing requirement for effective treatment of this important disease.[2]

Portimine (**1**) is a polycyclic ether natural product isolated from a culture of New Zealand benthic dinoflagellate, *Vulcanodinium rugosum*.[3] It belongs to a group of marine toxins called cyclic imine (CI) toxins which contain a spirocyclic imine moiety. Portimine demonstrates a low *in vivo* toxicity, but substantial *in vitro* activity against P388 leukaemia and lymphoma cell lines (LD_{50} = 2.7 nM), distinguishing itself from other CI toxins. The unusual activity profile may be attributed to the unique 5,6-spiroimine motif found only in portimine (shown in red).

This work aims to synthesise the spiroimine fragment of portimine and prepare a rationally designed analogue library to explore its mechanism of action. We have already developed a methodology towards spiroimine analogues with the opposite relative stereochemistry to that of portimine. Preliminary results have shown moderate activity of these analogues in inhibition of *Ciona* larval metamorphosis compared to portimine. Work is currently underway to synthesise spiroimine analogues with the correct stereochemical configuration at the spiro position for further biological studies.



Portimine **1**
(5,6-spiroimine in red)



Synthesised & tested

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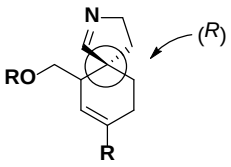


Synthesis underway

1. Cancer - Fact Sheet *World Health Organization* [Online], February 2017. http://www.who.int/mediacentre/factsheets/fs297/en/ (accessed 01 November 2017 Accessed).
2. Targeted Therapy *National Cancer Institute* [Online], August 2014. https://www.cancer.gov/about-cancer/treatment/types/targeted-therapies Accessed).
3. Selwood, A. I.; Wilkins, A. L.; Munday, R.; Shi, F.; Rhodes, L. L.; Holland, P. T., *Tetrahedron Lett.* **2013,** *54*, 4705-4707.

Investigation into the role of ribosomal protein s15 phosphorylation in Parkinson's disease

Danilo Correddu
Ivanhoe Leung

In Parkinson's disease, the C-terminal tail of the ribosomal protein s15 is phosphorylated by the mutant kinase LRRK2.[1] As result, there is an increase in protein translation and consequently neurodegeneration. The aim of this work is to understand, from the molecular point of view, how phosphorylation of a single amino acid can cause malfunction in mRNA translation and alteration of protein synthesis. Within the ribosome, s15 interacts with several ribosomal proteins. These include s18, which has a positively charged C-terminal tail. By using a peptide model that includes both the s15 and s18 tails, we showed that the introduction of a negative charge (as a result of phosphorylation) at s15 may change the structure and dynamics of the C-terminal tail of the neighbouring s18. It was postulated that the roles of the C-terminal tails of s15 and s18 in translation were to interact with mRNA.[2] Our observations have therefore led us to the hypothesis that s15 phosphorylation may be a physiologically-relevant 'switch' to modulate translation. Further studies are currently ongoing to investigate the exact molecular mechanisms of how s15 phosphorylation may lead to the dysfunctional translation in Parkinson's disease.

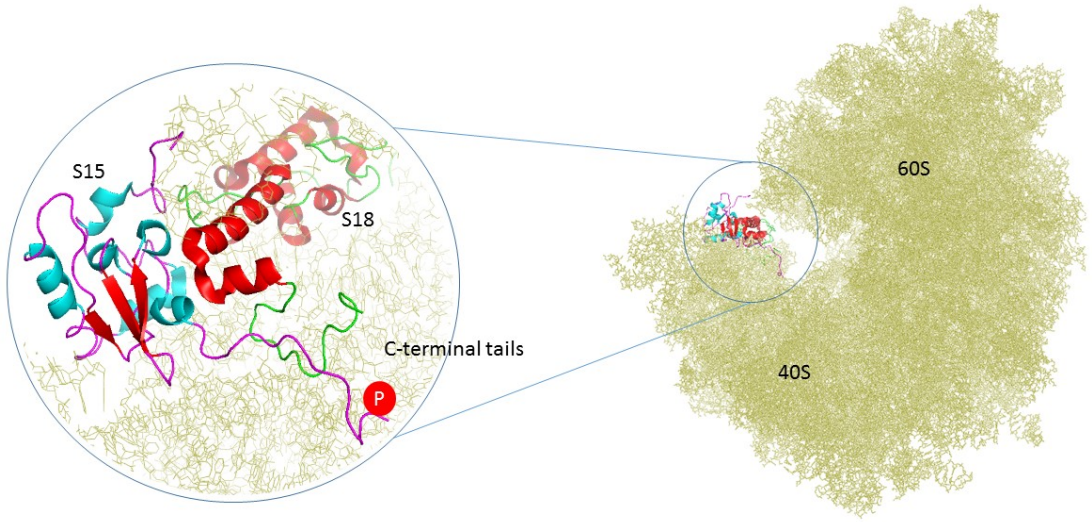


Figure 1. The ribosomal proteins s15 and s18 are located in the head of the 40S subunit of the ribosome. Their C-terminal tails interact with mRNA during translation.[3]

1. Martin, I.; Kim, J. W.; Lee, B. D.; Kang, H. C.; Xu, J. C.; Jia, H.; Stankowski, J.; Kim, M. S.; Zhong, J.; Kumar, M.; Andrabi, S. A.; Xiong, Y. L.; Dickson, D. W.; Wszolek, Z. K.; Pandey, A.; Dawson, T. M.; Dawson, V. L. *Cell* **2014,** *157*, 472-485.
2. Khairulina, J.; Graifer, D.; Bulygin, K.; Ven'yaminova, A.; Frolova, L.; Karpova, G. *Biochimie* **2010,** *92*, 820-5.
3. Natchiar, S. K.; Myasnikov, A. G.; Kratzat, H.; Hazemann, I.; Klaholz, B. P. *Nature* **2017,** *551*.

Title: Multidisciplinary Spin - A centrifugal microfluidics project

Authors: Matheus J. T. Vargas, Vibha Sekhar, David E. Williams and M. Cather Simpson

Microfluidics is the science and technology of processing, measuring and manipulating tiny volumes of fluid (10^{-9} to 10^{-18} litres) using channels the size of a human hair – or smaller. When we use centrifugal force as the main force to move the fluids through these channels it becomes centrifugal microfluidics (CM), or lab-on-a-disk.[1] Lab-on-a-disk is a highly interdisciplinary approach that uses chemistry, biochemistry, physics, biology and engineering. Its power is in its robust portability: a lab-on-a-disk system uses a single motor, well established analytical tools and ready-to-use disks for different types of diagnostics, measurements or automation in chemical and biochemical processes that can be used in lab or in open field. It is a sample-to-answer technique that offers simplicity in finding specific answers in an automated process, in which the only reagent absent at the start is the sample to be analysed. Clinical chemistry, immunodiagnostics and protein analysis, cell handling, molecular diagnostics, as well as food, water, and soil analysis are some of the current applications in the field.[2] Here we exemplify the interdisciplinary scope of different subjects in a centrifugal microfluidic project taking place at the University of Auckland.

(1) Strohmeier, O., Keller, M., Schwemmer, F., Zehnle, S., Mark, D., von Stetten, F., Zengerle, R., and Paust, N. (2015) Centrifugal microfluidic platforms: advanced unit operations and applications. Chem. Soc. Rev. 44, 6187–6229.

(2) George, M. W. (2006) The origins and the future of microfluidics. Nature 442, 368–373.

Fine Tuned Amphiphilic Guanidinylated Co(polycarbonates) for Control of Antimicrobial Activity and Selectivity

Chloe Cho
Chao Liang[1], Janesha Perera[2], Margaret Brimble[1], Simon Swift[2] and Jianyong Jin[1]
[1]*School of Chemical Sciences, University of Auckland, Auckland 1142, New Zealand*
[2]*Department of Molecular Medicine and Pathology, University of Auckland, Auckland 1142, New Zealand*

Increasing bacterial resistance to antibiotics and other biocides are posing great threats to human health which leads to an increasing demand for new antimicrobial agents or materials to combat and/or eradicate these global healthcare issues. Polymeric biocides have emerged as a promising candidate for antimicrobial agent and gained great interest in polymer research. Unlike traditional biocides, these antimicrobial polymers possess stable activity with less toxicity to humans and may be unlike to develop antibiotic resistance due to their unique physical antimicrobial mechanism.

Herein, a series of guanidine functionalized aliphatic biodegradable polycarbonates were synthesised via post-synthesis modification of alkyne containing polycarbonates using Cu(I)-catalyzed azide-alkyne cycloaddition (CuAAC) click reaction.[1] In order to investigate the structure-activity relationship of polymers, various structural parameters of polymer including charge densities and amphiphilic balance were tuned with the ratio of cationic:hydrophobic:hydrophilic groups. In addition, different alkyl chain length of guanidine functional groups were fused on polymers to modify spacer arm length of the side group. Among these polymers, we found that guanidine homopolymer with long spacer arm length without secondary hydrophobic structure showed broad-spectrum antimicrobial activity and non-toxicity which provides a new synthetic strategy to develop next generation of antimicrobial agents.

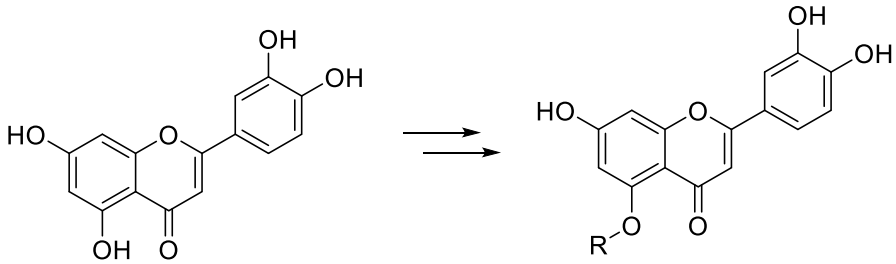
1. Cho, C. A. H.; Liang, C.; Perera, J.; Liu, J.; Varnava, K. G.; Sarojini, V.; Cooney, R. P.; McGillivray, D. J.; Brimble, M. A.; Swift, S. *Biomacromolecules* **2017**.

Derivatisation of flavonoids found in food waste to enhance bioactivity

Stephen Lo

A/Prof. David Barker and Dr. Bruno Fedrizzi

Flavonoids are a large class of secondary metabolites and phytochemicals found in plants, as well as fruits and vegetables. These compounds have become a great topic of interest due to the number of potential health promoting effects they can have in humans.[1,2]
Their immediate therapeutic effects, however, are significantly hindered by their low bioavailability.[3]
Derivatisation of, or making slight chemical structural modifications to, these flavonoids is a viable strategy to circumvent this issue. This would, hopefully, alter the physicochemical properties of the compound to improve its bioavailability. The structure of flavonoids often contain multiple hydroxy sites, making them simple to modify. Since certain hydroxy sites of these compounds contribute to the desired health promoting activities, the derivatisation strategy also needs to consider keeping these key structural features and only modifying those that are less important.[4]
Currently we have successfully produced a number of luteolin derivatives, where only the 5-hydroxy site has been modified (**Scheme 1**). Preliminary bioactivity studies on these derivatives reveal that they have even better activity than luteolin. We have also developed strategies to selectively derivatise other hydroxyl sites of luteolin. Producing more of these derivatives will determine whether we can make even greater improvements.



Scheme 1. Selectively derivatising the 5-hydroxy site of luteolin

Over the last decade there has been increased research interest to develop best methods to extract important compounds, such as flavonoids from food waste products.[5] Our future plan, is to employ an optimised extraction method to source our natural flavonoids from food waste as starting materials for derivatisation.

(1) Georgiev, V.; Ananga, A.; Tsolova, V. Recent Advances and Uses of Grape Flavonoids as Nutraceuticals. *Nutrients* **2014**, *6* (1), 391–415.
(2) Havsteen, B. H. The Biochemistry and Medical Significance of the Flavonoids. *Pharmacol. Ther.* **2002**, *96* (2–3), 67–202.
(3) Thilakarathna, S. H.; Rupasinghe, H. P. V. Flavonoid Bioavailability and Attempts for Bioavailability Enhancement. *Nutrients* **2013**, *5* (9), 3367–3387.
(4) Bors, W.; Heller, W.; Michel, C.; Saran, M. Flavonoids as Antioxidants: Determination of Radical-Scavenging Efficiencies. *Methods Enzymol.* **1990**, *186*, 343–355.
(5) Jelley, R. E.; Herbst-Johnstone, M.; Klaere, S.; Pilkington, L. I.; Grose, C.; Martin, D.; Barker, D.; Fedrizzi, B. Optimization of Ecofriendly Extraction of Bioactive Monomeric Phenolics and Useful Flavor Precursors from Grape Waste. *ACS Sustain. Chem. Eng.* **2016**, *4* (9), 5060–5067.

Development of Efficient Phosphors for NIR Upconversion

Aubrey Dosado
Geoffrey I.N. Waterhouse, Dongxiao Sun-Waterhouse

Inorganic crystal matrices, such as $NaYF_4$, doped with rare earth ions such as Yb^{3+}, Tm^{3+}, Er^{3+}, are capable of upconverting multiple low energy near-infrared (NIR) photons into visible and UV photons. NIR absorption (980 nm) by Yb^{3+} in $NaYF_4$:Yb, Tm leads in multiple UV-Vis emissions (Figure 1) due to the ladder-like energy levels, f-f transitions and energy transfers of Yb^{3+} and Tm^{3+}.[1] This study systematically explored the effect of synthesis conditions and crystal morphology on the NIR upconversion performance of $NaY_{0.795}F_4$:$Yb_{0.20}$,$Tm_{0.005}$. These upconverters were prepared via hydrothermal treatment at 180 °C from metal nitrates, whilst varying the NaF concentration, pH and the structure regulating agents (citric acid and trisodium citrate).[2] Samples were characterised by XRD, TEM, SEM, XPS, UV-Vis absorbance and luminescence measurements. Upconverted emission intensities were observed to be highly dependent on crystal size and shape, with $NaYF_4$:Yb,Tm samples prepared with citric acid showing the most intense emissions overall. Gold nanoparticles were deposited on the surface of the upconverters to elucidate the influence of plasmon resonance on emission intensity.[1,3] Further, the growth of nanorods on these nanoparticles will be attempted to promote increased NIR absorption. Other upconverters such as rare earth-doped $NaBiF_4$ analogues are also being developed.[4]

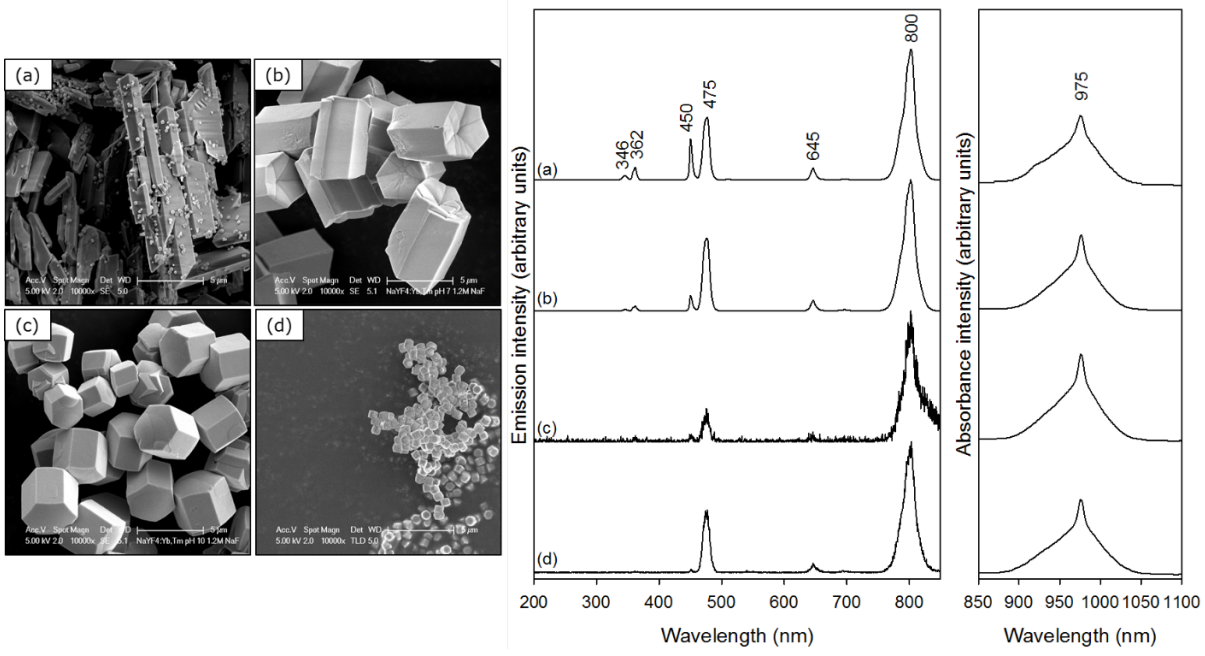


Figure 1. (left) SEM images of hexagonal phase $NaY_{0.795}F_4$:$Yb_{0.20}$, $Tm_{0.005}$ prepared with (a) citric acid (b) citric acid adjusted to pH 7, (c) citric acid adjusted to pH 10 and (d) trisodium citrate. (right) Corresponding emission and absorption spectra.

1. Wu, D. M.; García-Etxarri, A.; Salleo, A.; Dionne, J. A. *The Journal of Physical Chemistry Letters* **2014,** *5*, 4020-4031.
2. Jiang, T.; Qin, W.; Zhou, J. *Journal of Fluorine Chemistry* **2013,** *156*, 177-182.
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Application of Diffusing Wave Spectroscopy to Investigate the Acid Milk Gel of Low Heat Skim Milk (LHSM) and A2 Milk and Compare Them with Commercial Yoghurts

Weam S. Banjar
Yacine Hemar

Milk is a very valuable food for human, its stability is affected under certain conditions such as acidification and heat treatment. The aggregation of milk occurs by disturbing the casein micelles when the pH of the milk drop from 6.7 to the isoelectric point of casein (pH 4.6); this is the basis of yogurts production. It is well known that combining heat treatment with the acidification shifts the gelation point to more alkali pH (Alexander & Dalgleish, 2004). Two types of acid milk gels (heated and unheated milks) were investigated using Diffusing wave spectroscopy (DWS), and their behaviour is compared to different commercial yoghurts. In addition acid milk gels made from A2 milk are also investigated. This study shows that Diffusing-wave spectroscopy is an adequate method to study these system.

Reference:

Alexander, M., & Dalgleish, D. (2004). Application of transmission diffusing wave spectroscopy to the study of gelation of milk by acidification and rennet. *Colloids and Surfaces B: Biointerfaces*, 83-90.

Two Minute Talks

First Session (10.00am-10:35am)

1. **Indra Yudhipratama**
   Synthetic studies towards opaliferin, a tetracyclic polyketide metabolite
2. **Zifei Wang**
   Design and Synthesis of Norbormide derived BODIPY-conjugated fluorescent probes for in vivo cell imaging
3. **Qing Wang**
   Metal nanoparticles meet metal organic frameworks (MOFs) for H_2 storage
4. **Lakshini Thewarashige**
   Self-cleaning coatings for pre-painted steel roofing
5. **Nabangshu Sharma**
   Development of biophysical assays to study PC-PLC: a novel inhibition target for the treatment of cancers
6. **Saman Sabetghadam**
   Bilayer nanoemulsion filled in hydrogel beads for longer storage-ability and pH-triggered release of curcumin
7. **Rebecca Richards**
   Forensic DNA methylation profiling
8. **Urawadee Rajchakit**
   Antimicrobial peptide-conjugated nanoparticles against bacterial pathogens
9. **Delsa Pulickal**
   Anti-bacterial modification of phormium tenax fibre- an eco-friendly simple method
10. **Maurycy Prystupa**
    Achieving C-H functionalisation of indoles at the C-5 position
11. **Mohinder Naiya**
    Design and Synthesis of pH switchable trioxatrianguline derivatives: Act as DNA Intercalating agents
12. **Valentina Lucarelli**
    Development of a new biosensor to detect mammal pests
13. **Taniela Lolohea**
    Atmospheric pressure plasma processes for functional surfaces
14. **Jessica Liyu**
    Synthetic studies towards pegaharmaline A
15. **Honglei Ling**
    Synthesis of microporosity "golden" polymers for gas separation membrane applications
16. **Wai Keong Lau**
    The influence of different processing methods on the phytochemicals in tamarillo and their functional properties
17. **Qaisar Latif**
    Novel emergent properties of Janus particles
18. **Vipin Kumar**
    Reinforcing the silicon backbone in polysilanes

Second Session (12.05pm-12.40pm)

19. **Nadiia Kovalenko**
Malacidins- new hope against antibiotic resistance

20. **Shi Wei Kim**
Synthetic studies towards Hyrtioseragamine A

21. **Mahmood Jamil**
Adaptive laser beam shaping for micro-machining and micro-fabrication

22. **Mike Renjie Huang**
From pig farms to hospitals- combating MCR-1, the bacterial resistance against our last resort antibiotic

23. **Ruoyu Hou**
Exploiting NZ fungal communities to enhance tropical aroma in wine

24. **Natalie Haverkate**
A study of thieno[2,3-b]pyridines: novel modifications to improve anti-proliferative activity

25. **Thomas Grant**
Eco-friendly antifouling co-biocides

26. **Sunandita Ghosh**
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27. **Ewan Fisher**
Luminescent carbon dots by hydrothermal synthesis

28. **Noor Febrianto**
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29. **Ryan England**
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30. **Annabelle Collins**
Design and synthesis of a selective inhibitor of isocitrate lyase to combat tuberculosis

31. **Timothy Christopher**
Exploring the structures of novel lithium containing garnet oxides

32. **Jamal Cheema**
An electrochemical sensor which uses insect odorant receptors to detect volatile compounds from insect pests

33. **Luis Camacho**
Catalytic decomposition and detection of perfluorinated carbons (PFC's) during the aluminium process

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Targeting mycobacteria carbon metabolism- the key to new drugs against tuberculosis

34. **Geoff Ang**
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9	Grace, Chen	*Bioactive compounds from New Zealand native fungus (Hericium coralloides)*
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15	Joseph, Vella	*Computational Modelling of X-ray Absorption Spectroscopy*
16	Kelvin, Tong	*Supramolecular Flower Power for Anticancer Drug Delivery*
17	Kirsty, Anderson	*A new indole to benzoxazole rearrangement enabled by C-H borylation*
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