

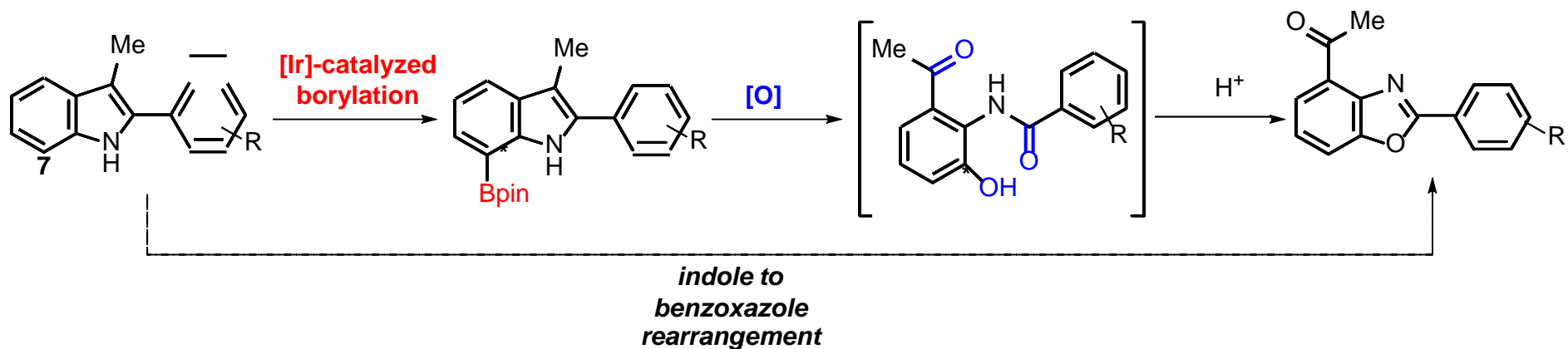
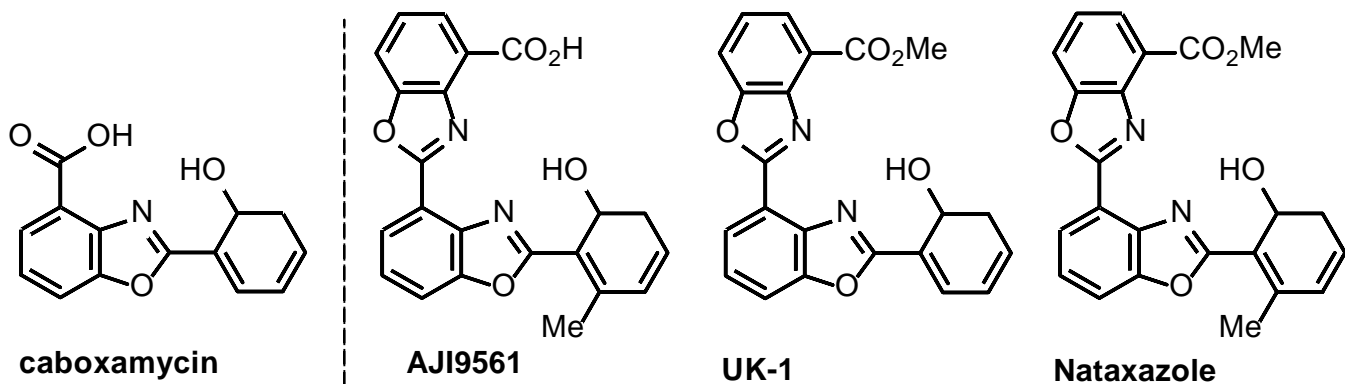
A new indole to benzoxazole rearrangement enabled by C-H borylation

Kirsty Anderson

kand719@aucklanduni.ac.nz

A/Prof Jonathan Sperry

Why benzoxazoles?

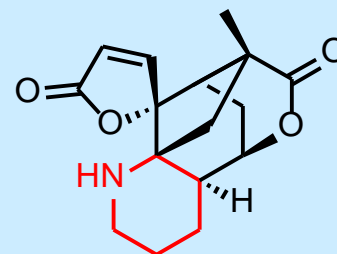
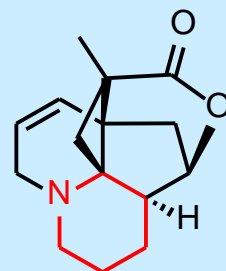
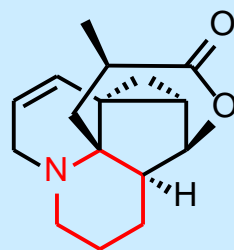


Studies towards the total synthesis of Annotinolide C

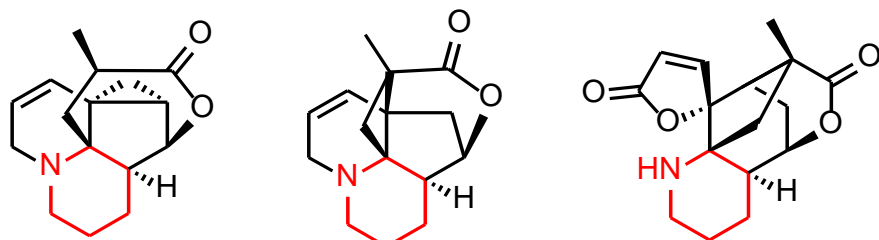
Nicola Brant

nbra166@auckland.ac.nz

Prof. Margaret Brimble Research Group



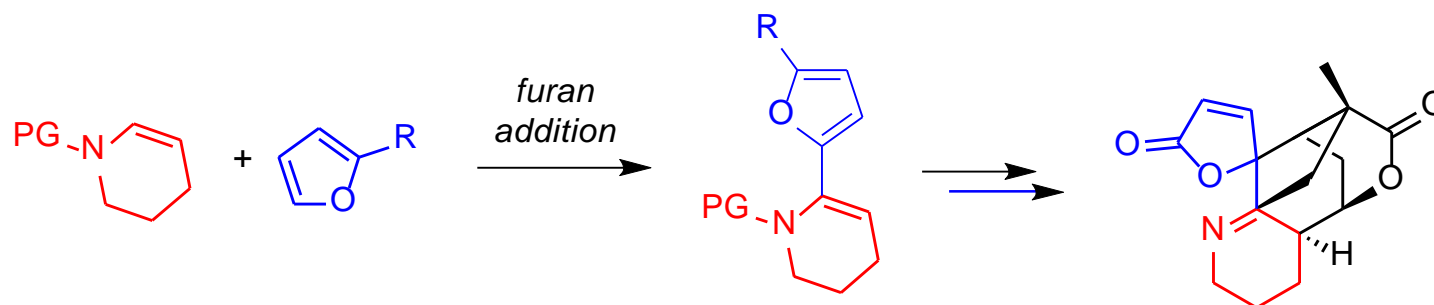
- Annotinolides show considerable antiaggregation activity against Alzheimer's disease.



Annotinolide family



- Developing methodology towards intermediates for total synthesis.



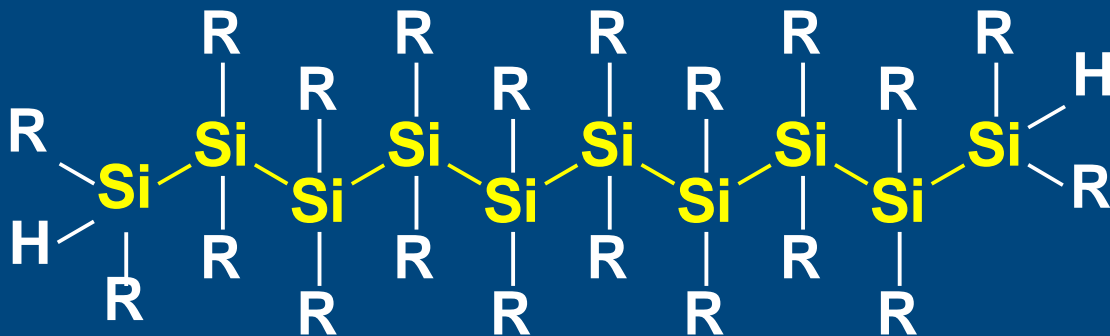
Annotinolide C

Polysilanes: The Unbridged Version

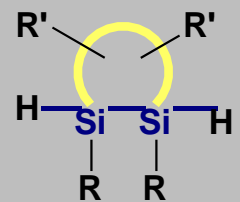
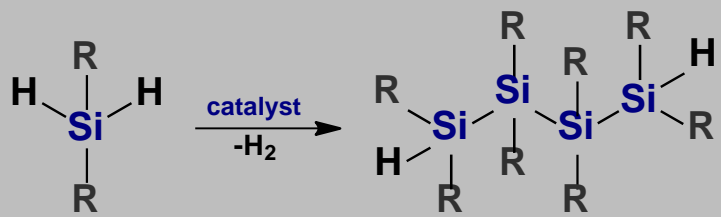
Kristel Castillo

kcas061@auckland.ac.nz

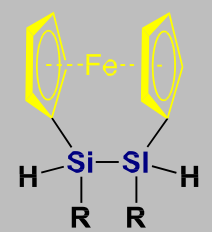
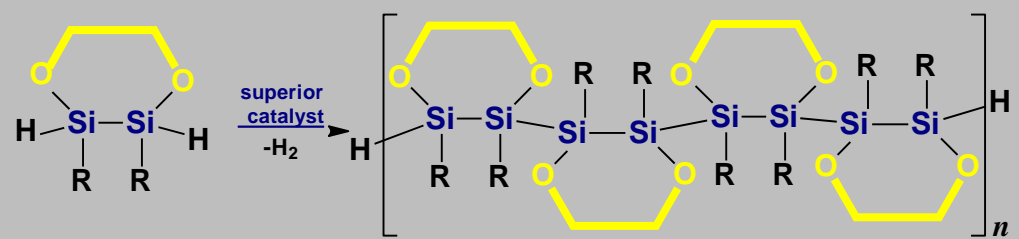
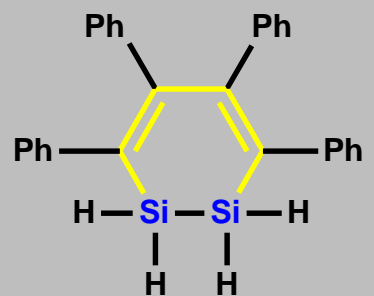
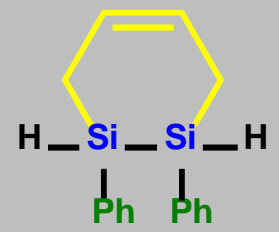
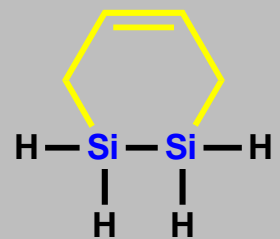
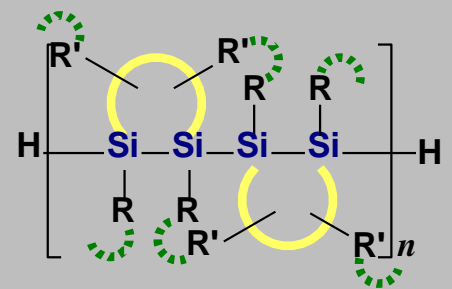
Dr Leitao Research Group



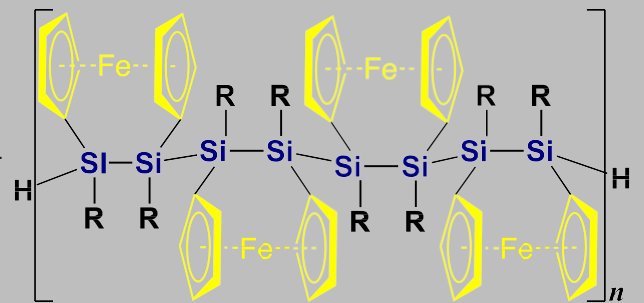
STATE-OF-THE-ART



superior catalyst
-H₂



superior catalyst
-H₂

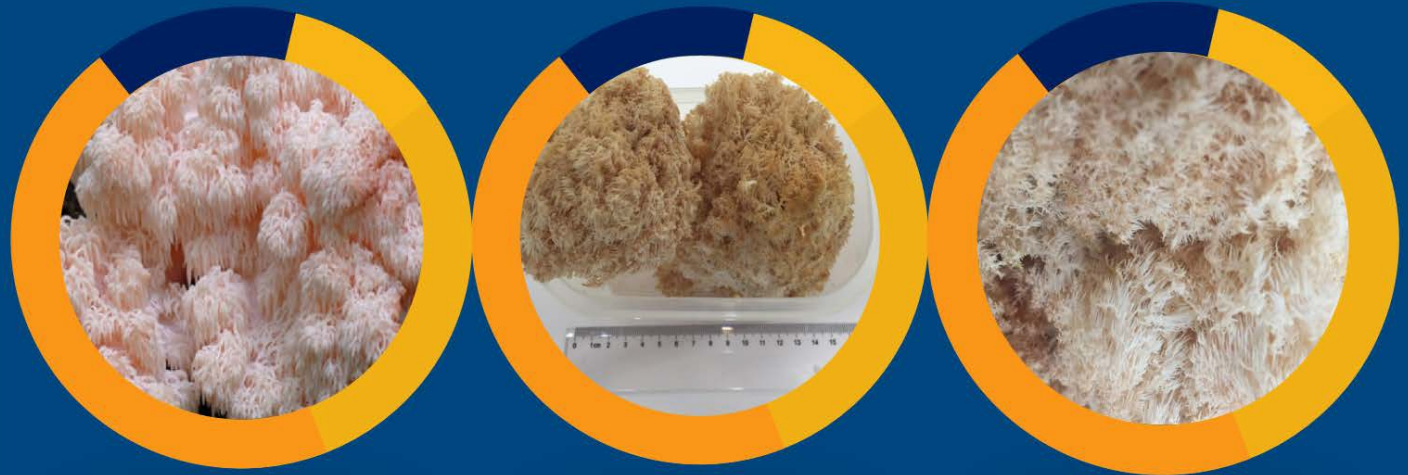


Compositional characterisation and potential health benefits of New Zealand grown fungus, *Hericium coralloides*

Grace Chen

zche696@aucklanduni.ac.nz

A/Prof Siew-Young Quek Research Group

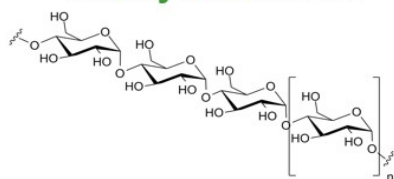


Research aim

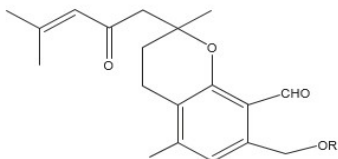
To gain a scientific understanding of the active chemical constituents in *Herium corralloids* through a combination of chemical characterization and bioactivity exploration.

3 Strategic goals

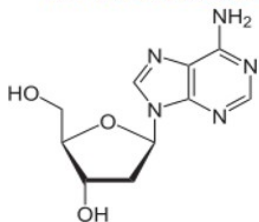
I. Polysaccharide



II. Hericenone & Erinacine



III. Nucleoside



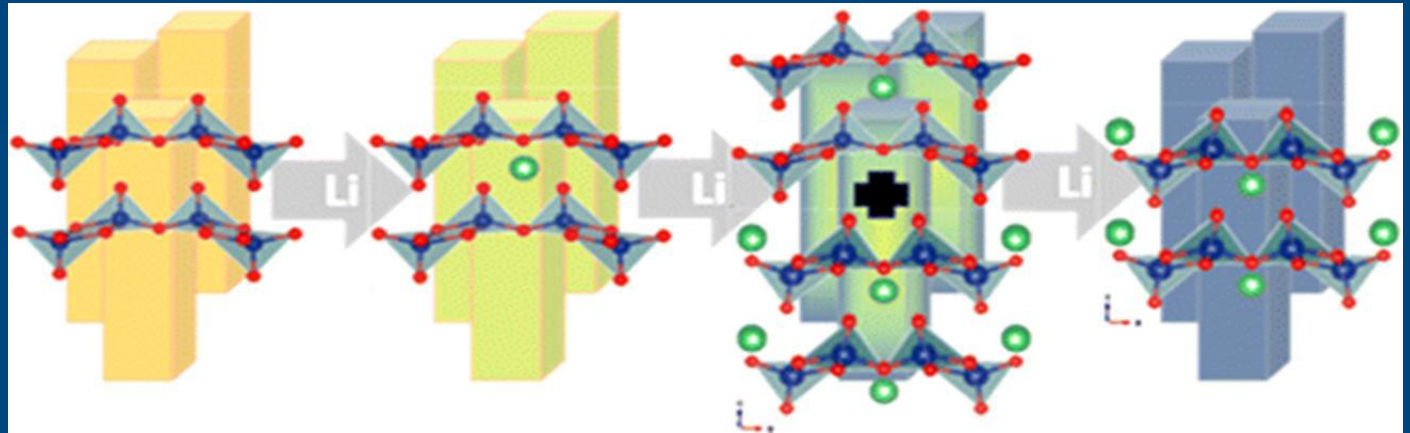
| Horizon 1 mid 2016 – mid 2017 | Horizon 2 mid 2017- mid 2019 | Horizon 3 mid 2019-end 2019 |
|---|---------------------------------|--------------------------------|
| <ul style="list-style-type: none">• Extraction and purification;• Structure elucidation and molecular weight determination.• Bioactive screening: anticancer; anti-inflammatory; immune-stimulation; anti-oxidant activity; inhibition of AchE/cytotoxicity of Aβ. | | |
| <ul style="list-style-type: none">• Extraction and purification;• Hericenone/erinacine monomer isolation;• Analytical method development;• Bioactive study: antioxidant; inhibition of AchE/cytotoxicity of Aβ. | | |
| <ul style="list-style-type: none">• Extraction and purification;• Nucleoside monomer isolation;• Analytical method development;• Bioactive study: immune-stimulation; inhibition of AchE/cytotoxicity of Aβ. | | |

Heterogeneous Lithiation of V_2O_5

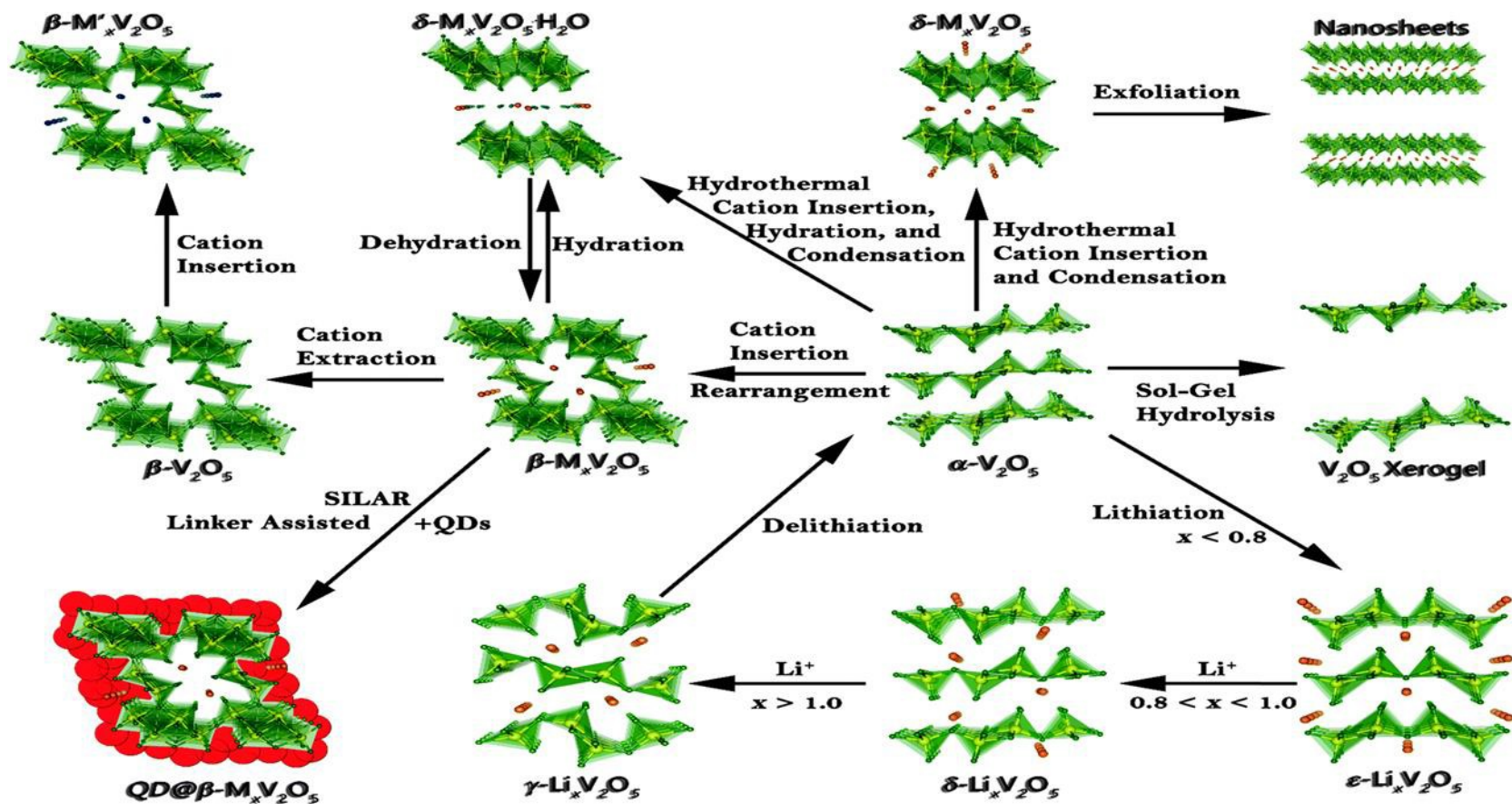
Andrew Ching

achi996@aucklanduni.ac.nz

Dr Soehnel Research Group



A Toolbox of Chemical Transformation



A Toolbox of Chemical Transformations

Photo-crosslinked Meridianin F derivatives for the identification of a PSA- NCAM modulator

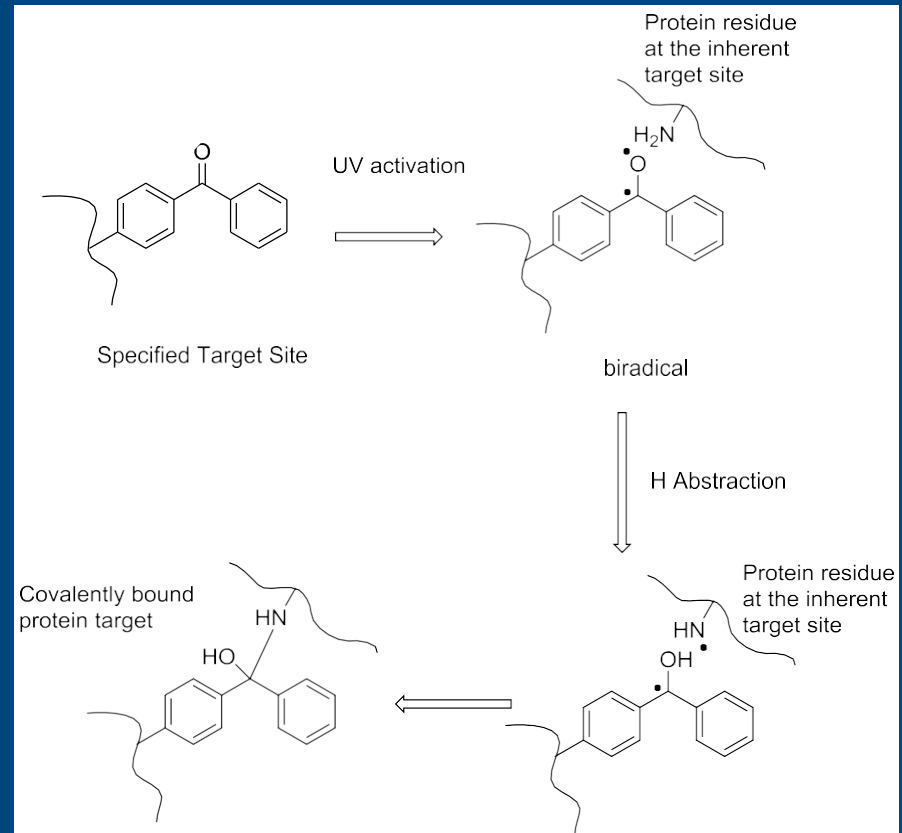
Ryan Joseph Dixon

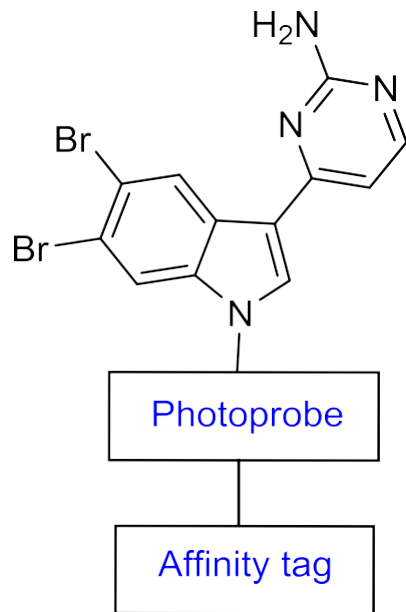
rdix785@aucklanduni.ac.nz

Associate Prof. Jonathan Sperry

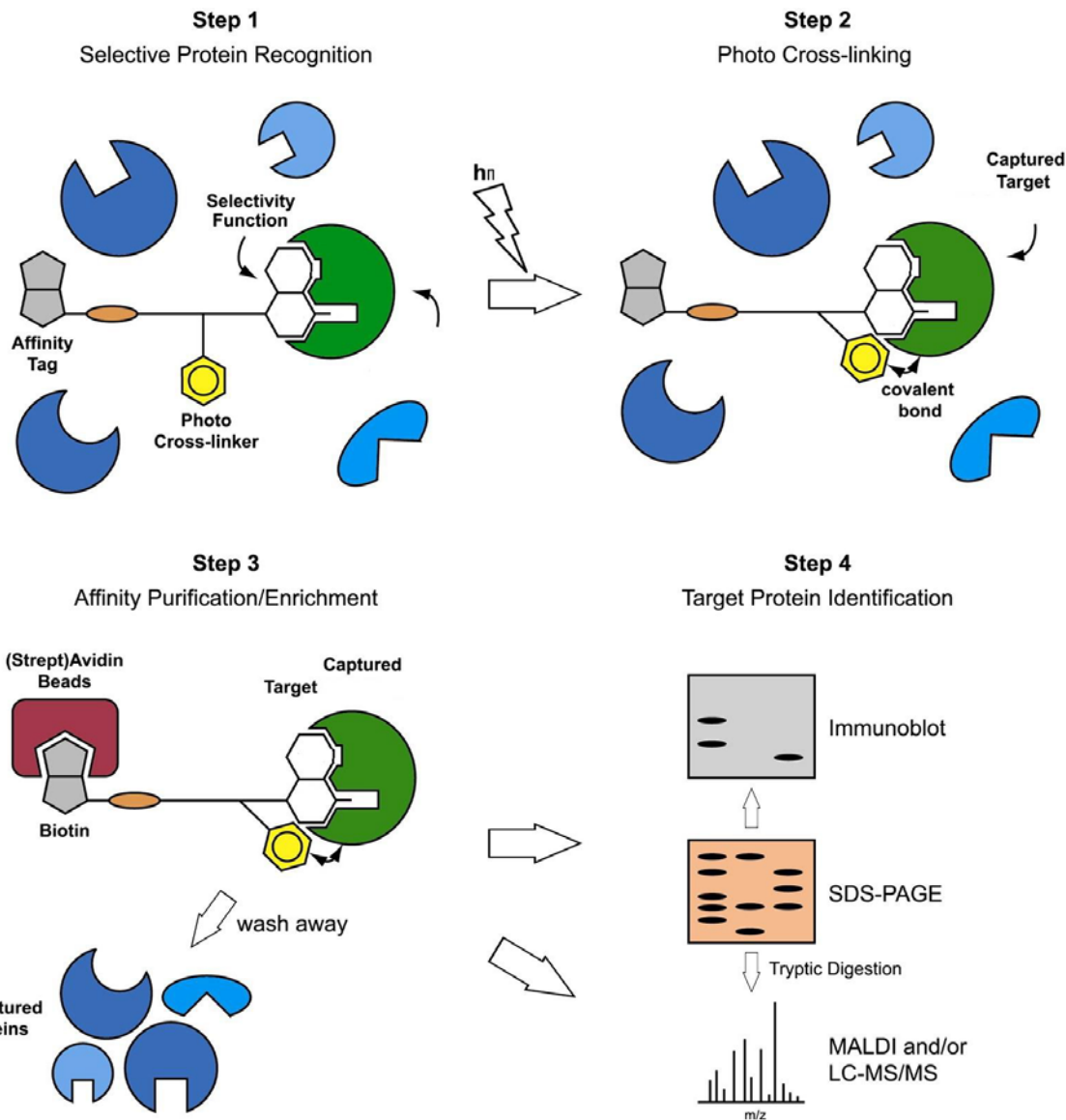
Prof. Ivanhoe Leung

Associate Prof. Maurice Curtis





- Meridianin F
- Photoaffinity labelling (PAL)
- Target Isolation
- Protein profiling using Mass spectrometry

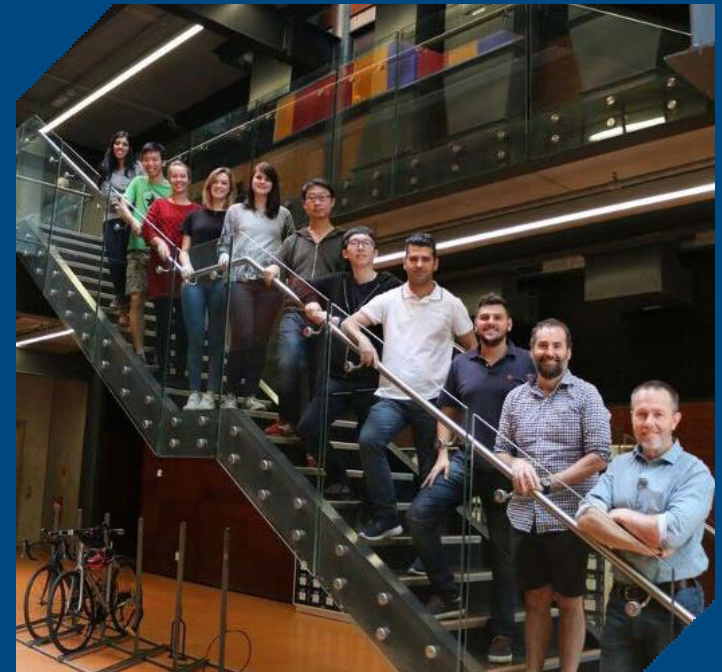


AGEd peptides and their link to Diabetes

Jakob Gaar

jgaa804@auckland.ac.nz

Prof. Margaret Brimble



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

Advanced Glycation Endproducts (AGEs) and Diabetes

Diabetes Mellitus

- Aim of my work
- Structural properties
 - NMR
 - X-ray crystallography
 - Biological properties
 - Immunochemistry
 - Receptor binding

415 M. patients worldwide

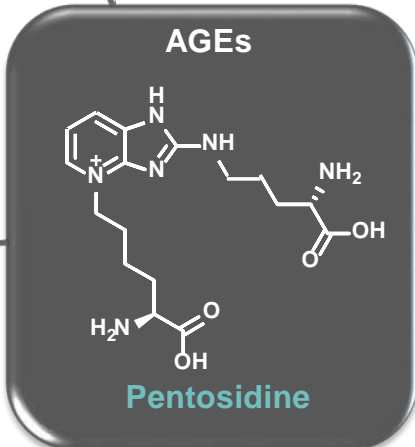
240,000 diagnosed in NZ



Participation in the pathogenesis

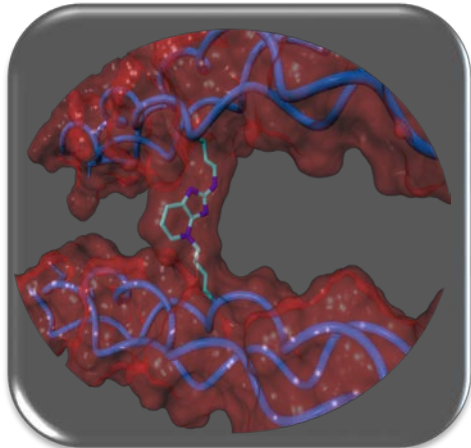
Hyperglycemia

Sugar



Protein

Modification of long-lived peptides like Collagen

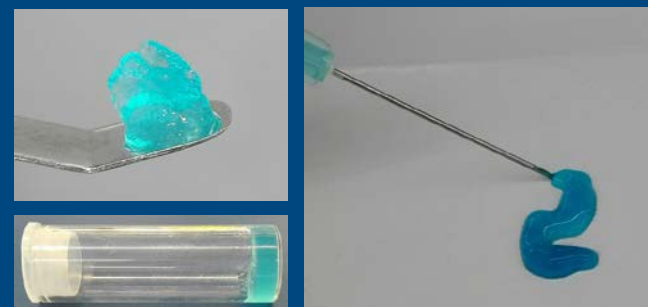
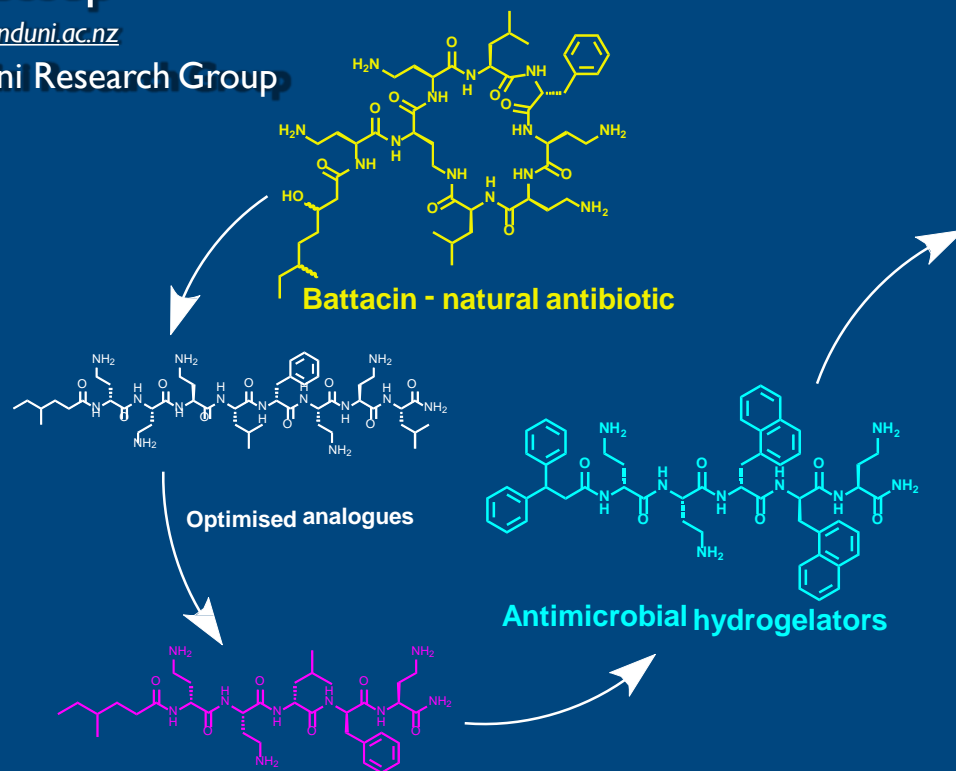


Optimising the octapeptins: antimicrobials and hydrogels inspired by battacin lipopeptides

Hugh Glossop

hglo647@aucklanduni.ac.nz

Dr Viji Sarojini Research Group



Engineering self-assembling peptide antibiotics

Aim

Turn peptide antibiotics into antibacterial hydrogels.

Significance

Peptide antibiotics are some of the last drugs effective against **drug resistant bacteria**.

As **hydrogels**, these peptides can be applied topically to skin infections and wounds.

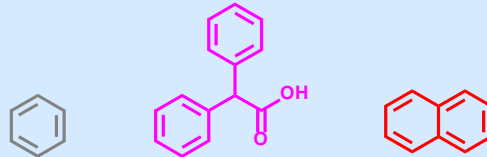


Stable

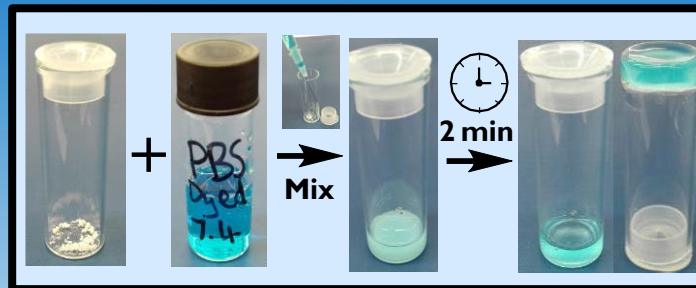
Injectable

Method

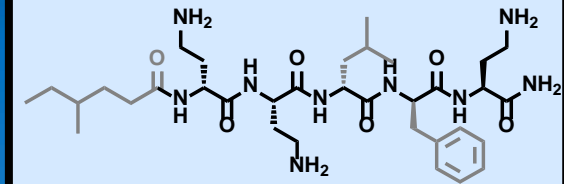
Modify known peptide antibiotics with hydrogel forming groups, e.g. aromatics:



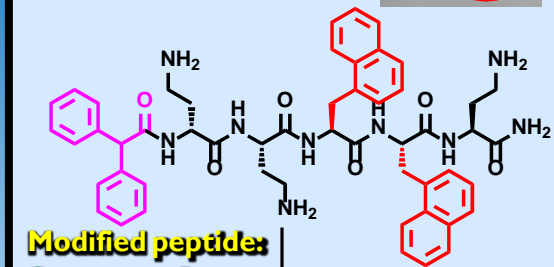
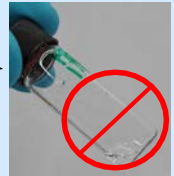
Rapid peptide gelation occurs



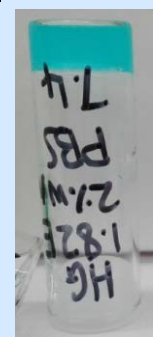
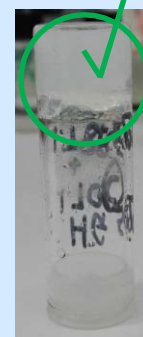
Example from the lab



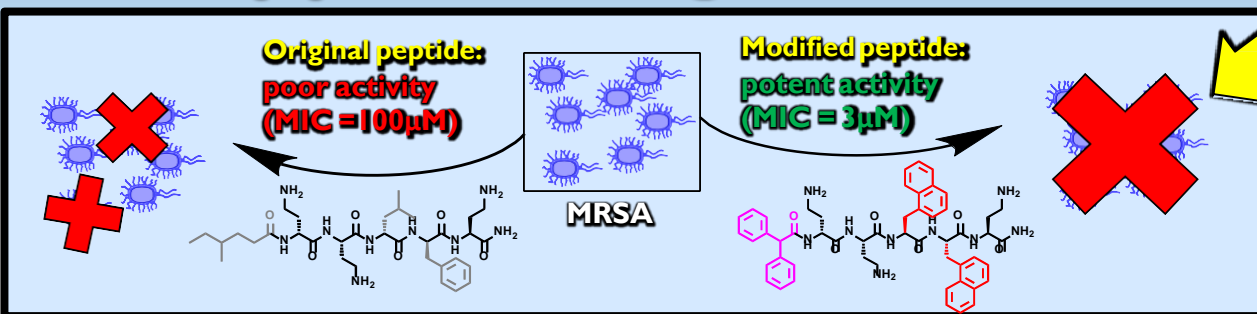
Original peptide:
no gel



Modified peptide:
forms gel



Candidate peptides inhibit drug-resistant bacteria:

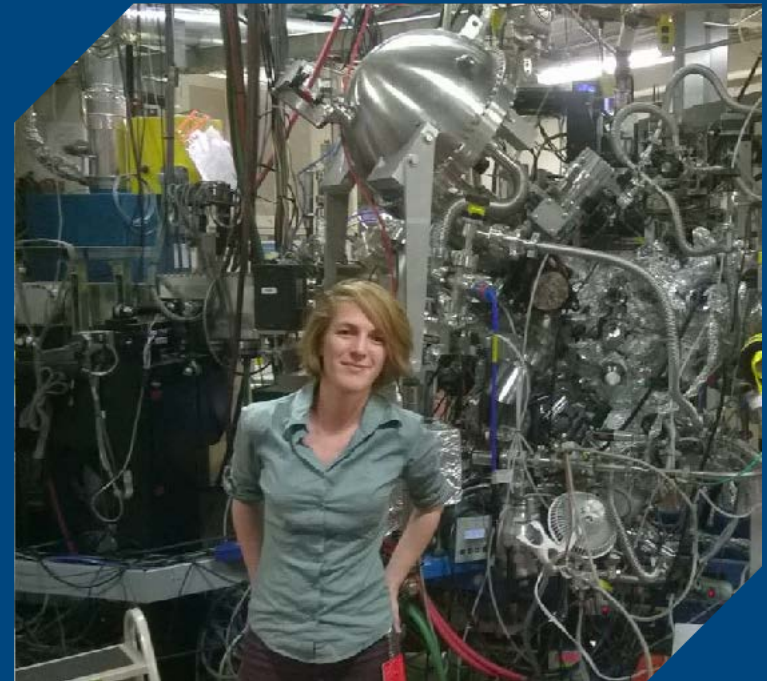


X-ray spectroscopy of vapour adsorption across a metal-insulator transition

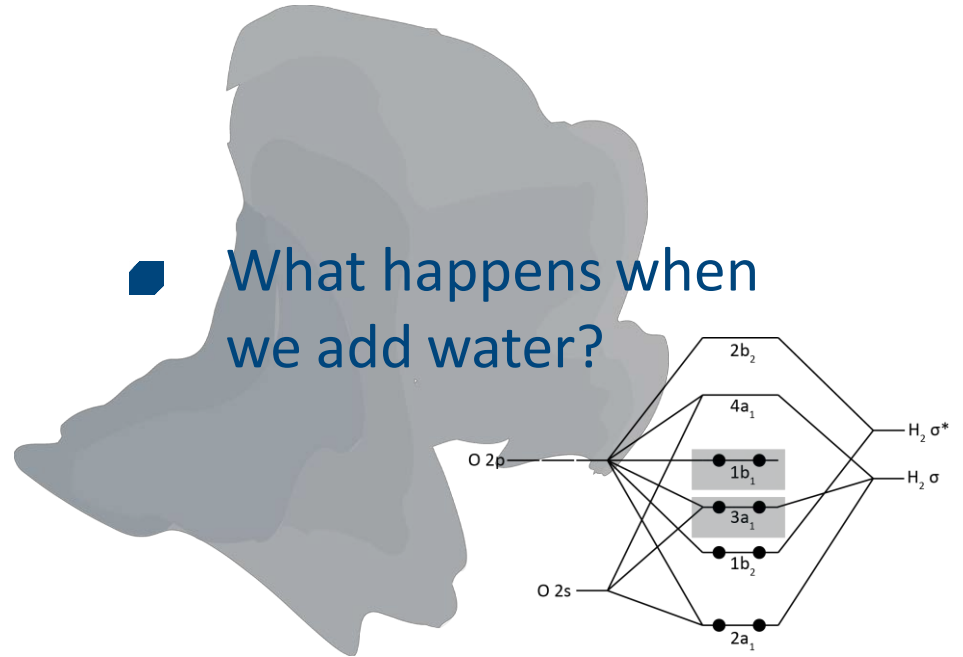
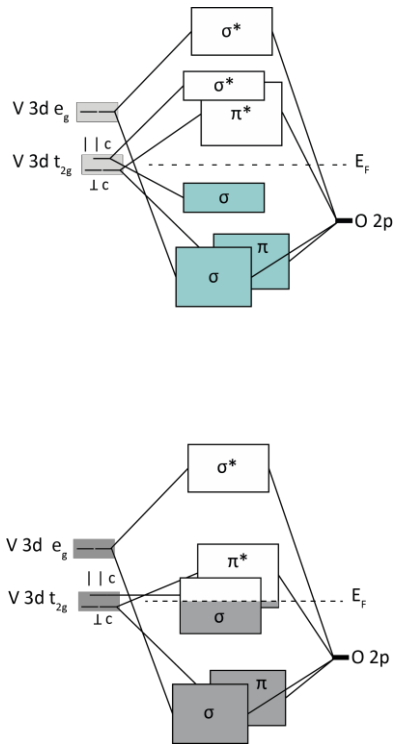
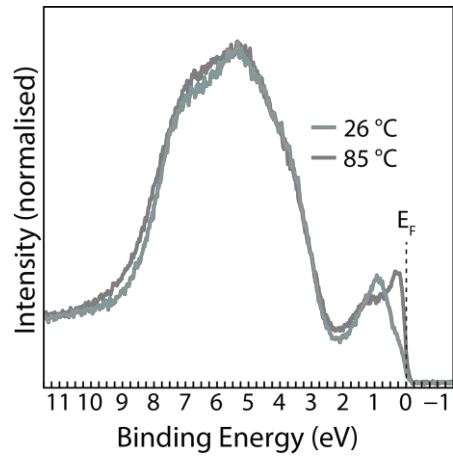
Dana Goodacre

dgoo930@auckland.ac.nz

Prof. Kevin Smith and A/P Tilo Söhnel Research Group



VO₂ metal-insulator transition



Structural and Inhibition Studies of ACC Oxidase

Dona Gunawardana

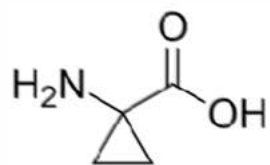
dgun031@auckland.ac.nz

Dr Leung Research Group

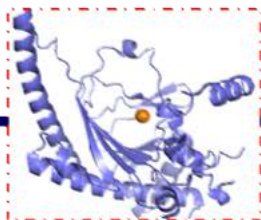
A/Prof Chris Squire



Overview...



ACC



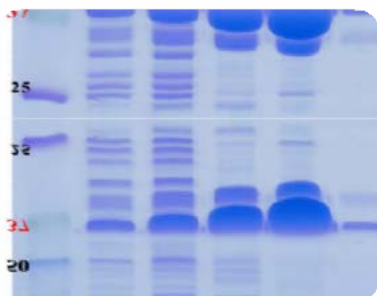
ACC Oxidase

Ethylene

Ethylene
receptors

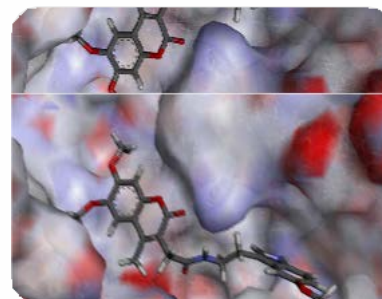
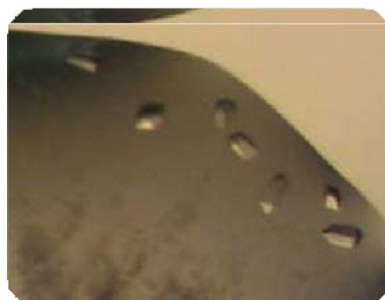


Fruit ripening



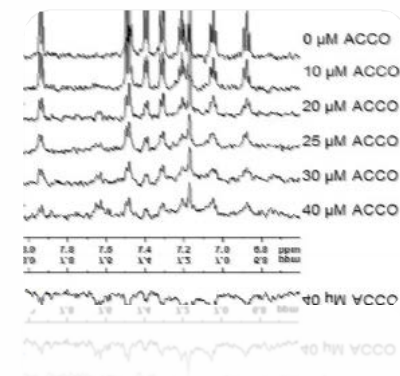
Protein purification

X-ray crystallography



Virtual screening & modelling

Biophysical techniques



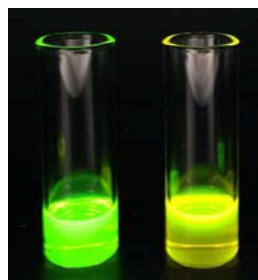
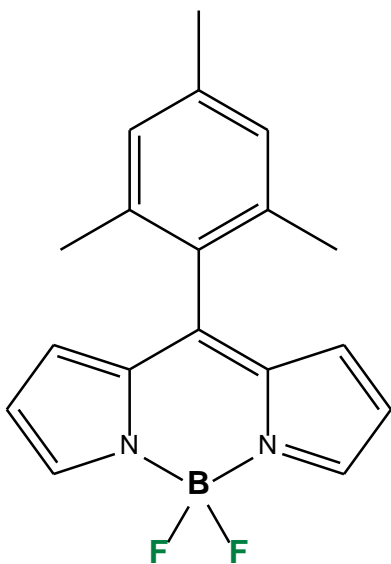
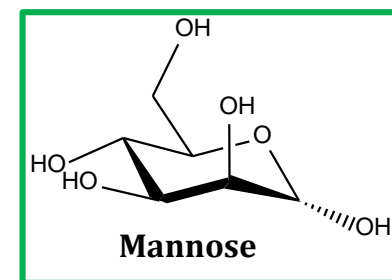
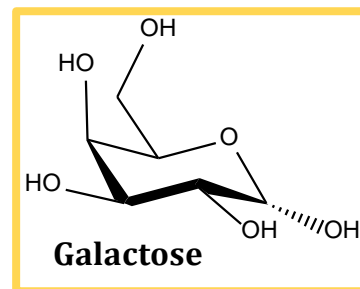
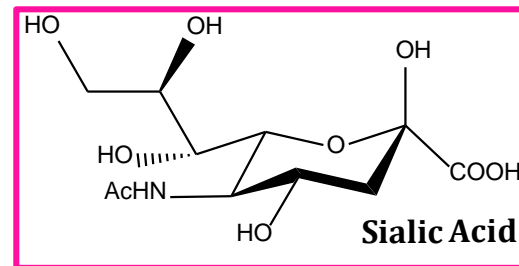
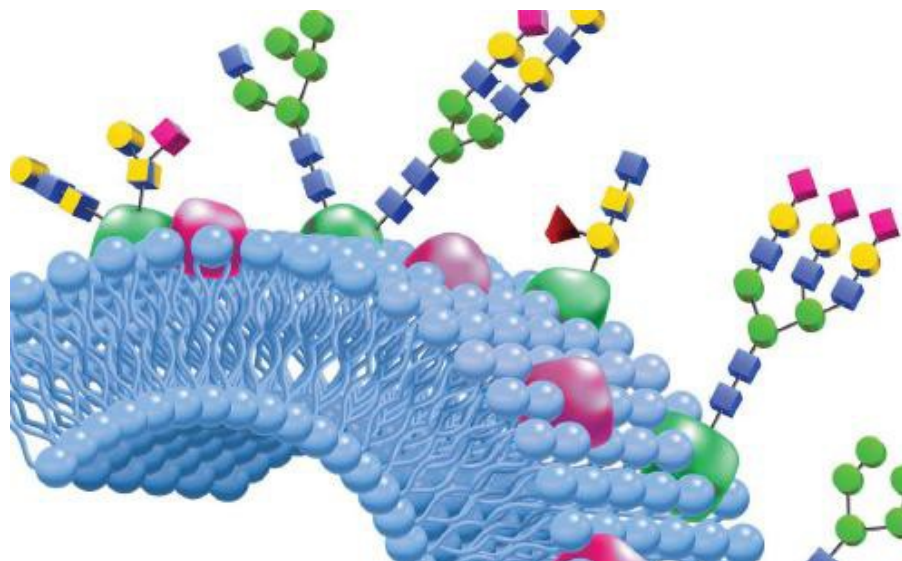
Investigating O-BODIPY- sugar binding for analysis, sensing and visualisation of saccharides

Miriana Horacek-Glading

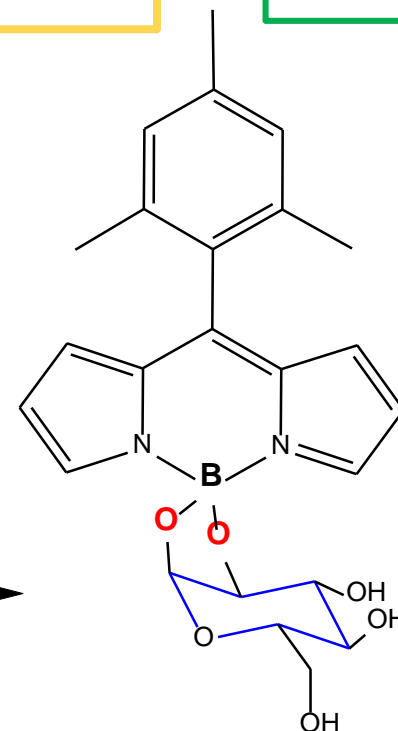
mhor003@auckland.ac.nz

Professor Penny Brothers &
Dr David Ware's Research Group





1. BCl_3 , CH_2Cl_2 , N_2
2. NaOMe , CH_3OH , N_2
3. D-Glu, PTSA, MeCN



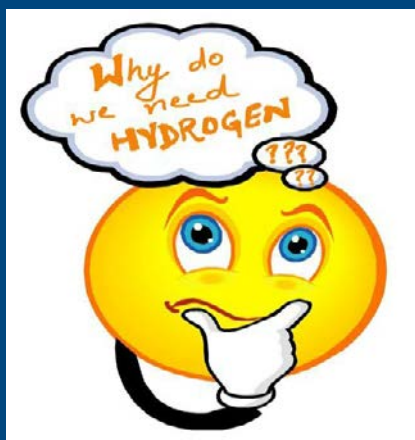
Light-Driven Hydrogen Production by BODIPY-Sensitized Cobaloxime Catalysts

Deepika Kanyan

dkan613@aucklanduni.ac.nz

Professor Penny Brothers and Dr David Ware

School of Chemical Sciences
Research Showcase 2017

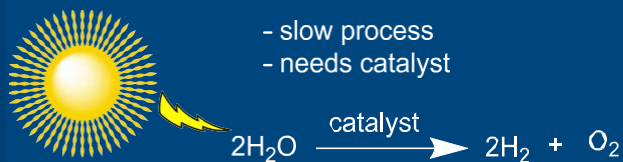


- Fossil fuels are depleting rapidly.
- Renewable source of energy.
- Clean burning fuel.

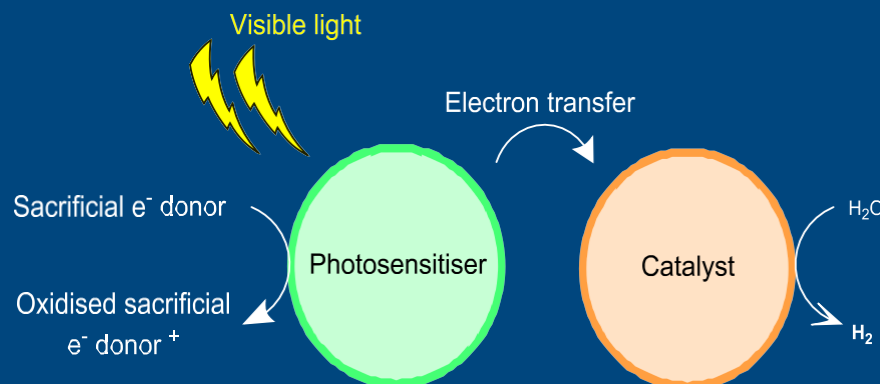
HOW TO GET IT FROM WATER?

" Photolysis of water "

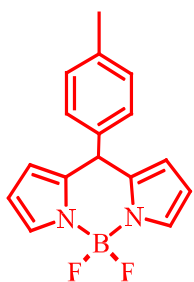
- slow process
- needs catalyst



THE PHOTOCATALYTIC SYSTEM

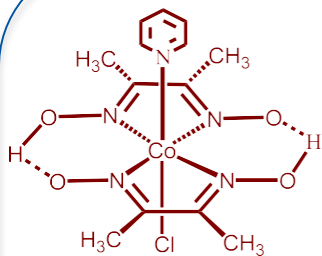


PHOTOSENSITISER

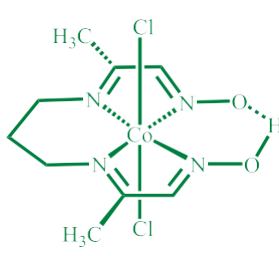


Boron dipyrromethene
or
BODIPY

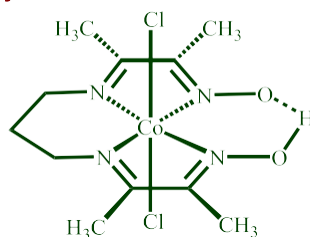
CATALYSTS



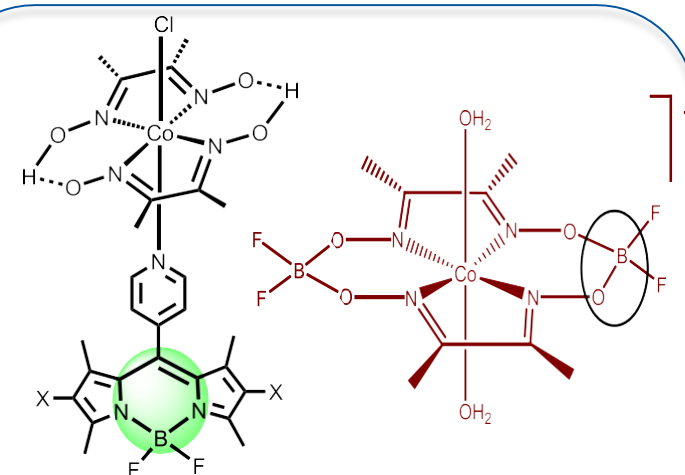
Co(dmgh)₂pyCl



Co(MO)(MOH)pnCl₂

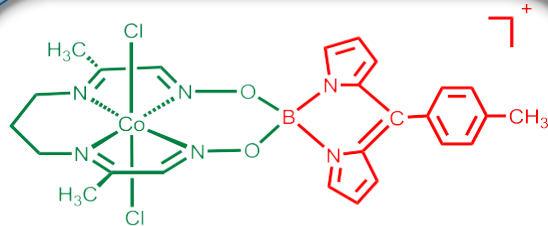


Co(DO)(DOH)pnCl₂

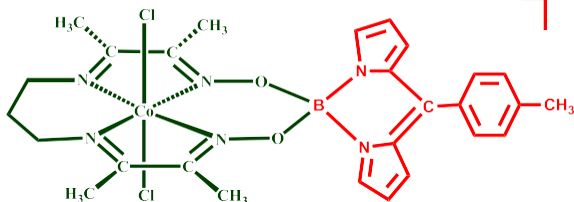


X = I, Br

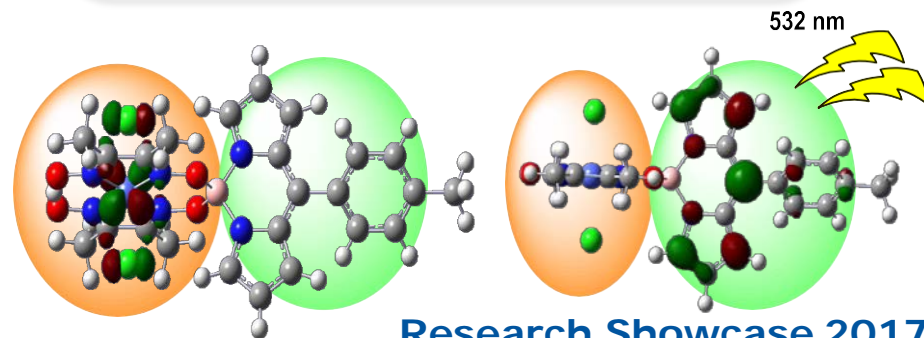
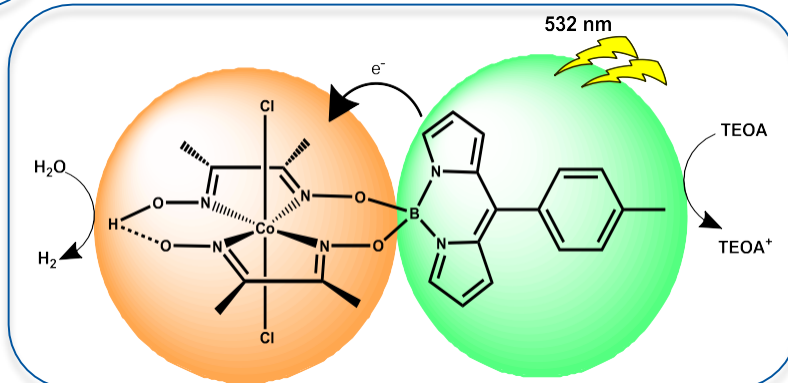
Example of a photocatalytic system



Co(MO)₂pnCl₂-BODIPY



Co(DO)₂pnCl₂-BODIPY



Nanotoxicology: How do nanoparticles invade your cells?

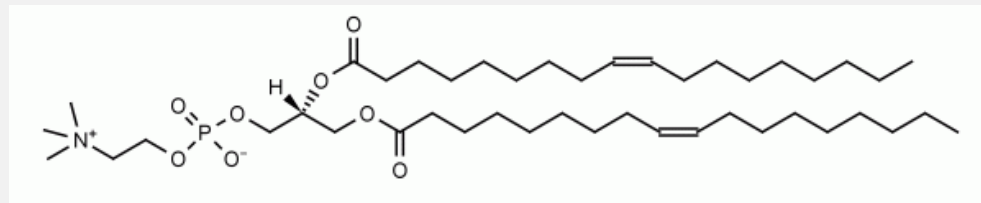
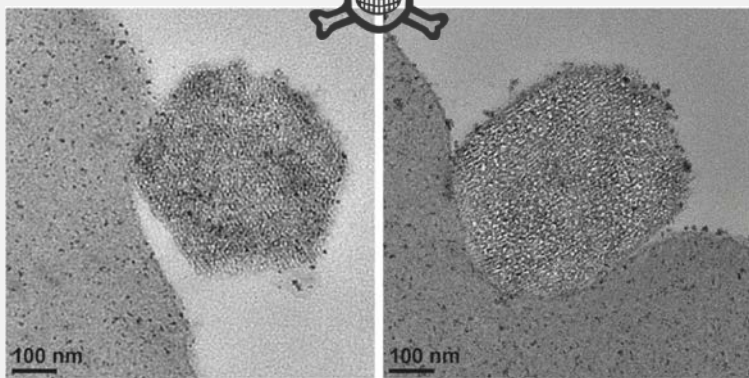
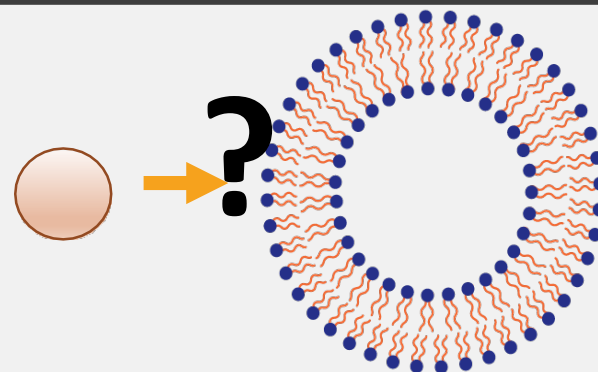
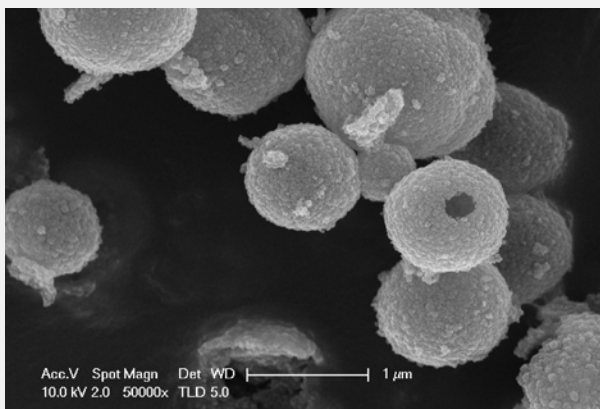
Shinji Kihara

skih331@aucklanduni.ac.nz

Dr Duncan McGillivray Research Group



HOW DO NANOPARTICLES INVADE YOUR CELLS?



Questions to be addressed:

- What properties of nanoparticles govern the toxic actions?
- How do nanoparticles perturb the membrane structure?

Alkaloid synthesis enabled by pyrrole C-H borylation

Magdalena Kohut

mkoh928@aucklanduni.ac.nz

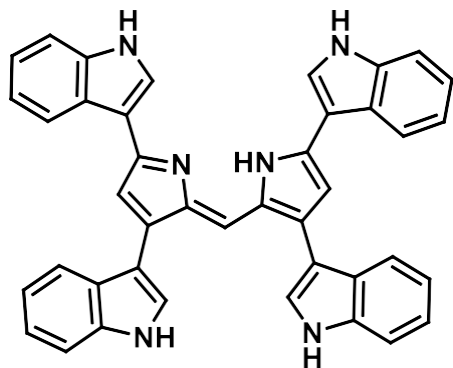
A/Prof Jonathan Sperry Research Group



Violaceous colonies of *Chromobacterium violaceum* on a blood agar plate.



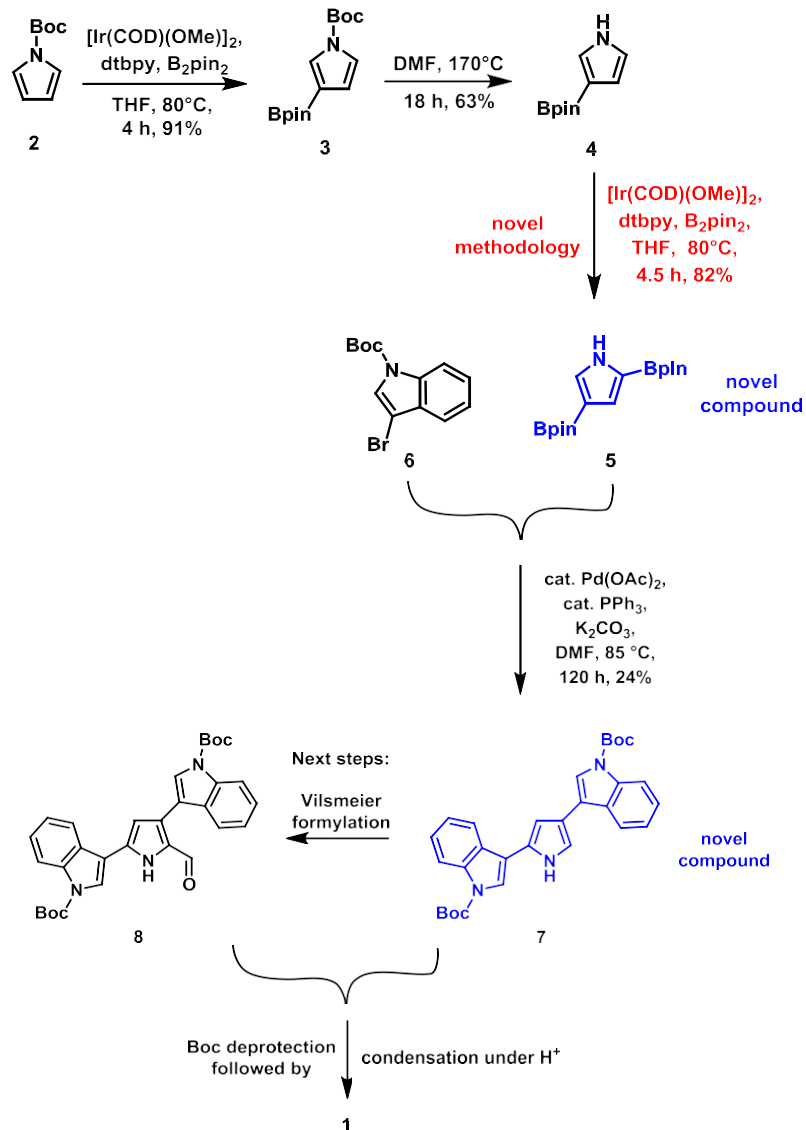
Synthetic studies towards deoxychromoviridan



deoxychromoviridan 1

- Green pigment in acidic and neutral media, red in basic medium
- Isolated in 1998 from *Chromobacterium violaceum* in a cell-free system
- No reported synthesis
- Interesting properties: metal chelation capability with iron, copper, zinc and cobalt salts

Synthetic route utilising Ir-catalysed C-H borylation methodology



Synthesis and Analysis of Marine Natural Product Plicatamide

Yangyi Lai

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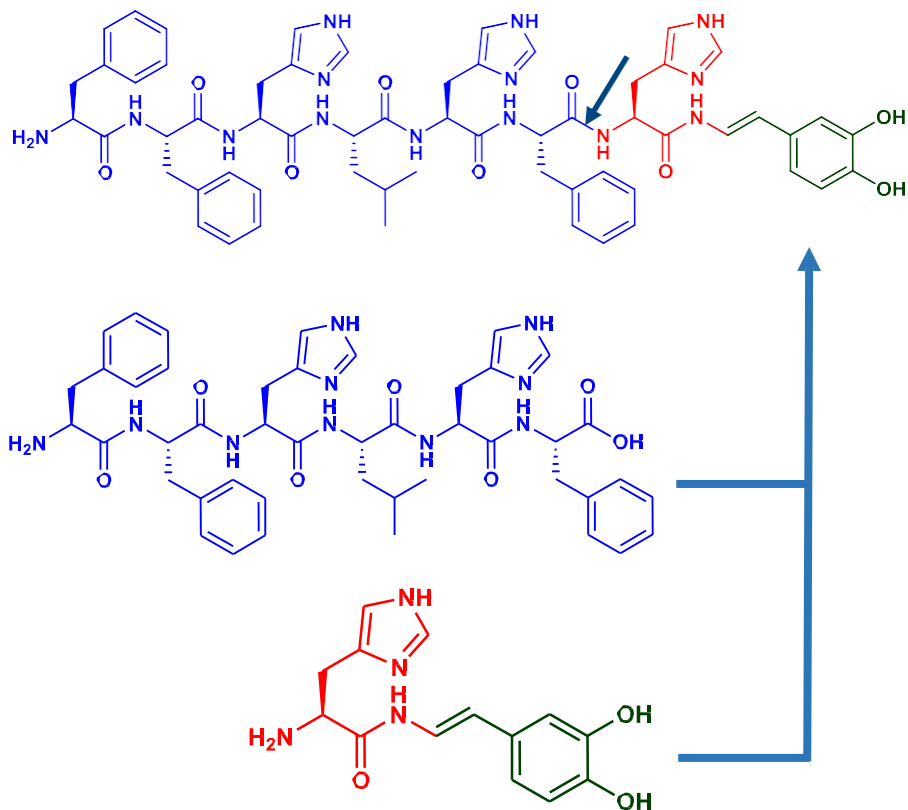
Borom, J. *Awesome Ascidians* v2.0; 2016.

- Isolated from ascidian blood cells
- Activity against Gram-positive organisms: *S. aureus* and *L. monocytogenes* & Gram-negative: *E. coli* and *P. aeruginosa*
- Antimicrobial peptides (AMP)
- Strong surface adsorption and crosslinking
- AMP with dehydrodopamine (dc Δ DOPA)

Plicatamide

Phe-Phe-His-Leu-His-Phe-His-dcΔDOPA

Synthesis



Future works

- Bioassay against selected bacteria to find antimicrobial activities
- Synthesis of analogues and extensive structure-activity relationship studies



Research Showcase 2017

Development of fluorescent metal complexes: cancer treatment and tool for chemical biology

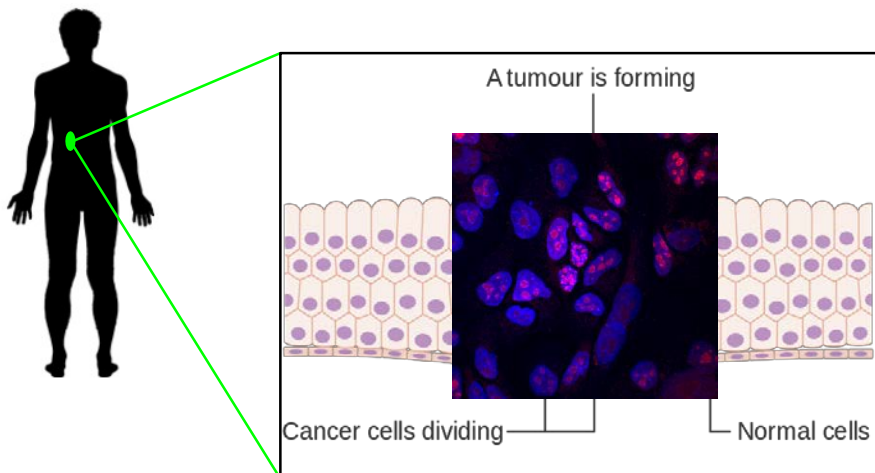
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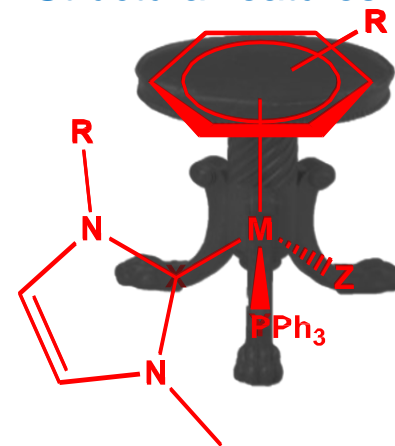
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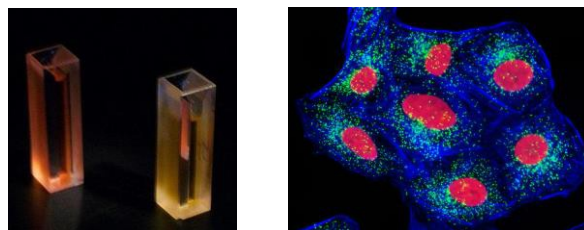
● Fluorescent metal complex



Piano-stool complexes: Structural features



NMR studies



UV-vis and fluorescence studies



Antiproliferative assays

Antibiotics from New Zealand Fungi

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Extraction and Isolation of Natural Products

