

Curriculum Vitae

Stephen Cochrane MSci PhD AMRSC

Lecturer of Organic Chemistry and Chemical Biology
School of Chemistry and Chemical Engineering
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UNIVERSITY EDUCATION

Doctor of Philosophy in Organic Chemistry (Sept 2010 – Dec 2015)
University of Alberta, Edmonton, Alberta, Canada

MSci in Chemistry (Sept 2006 – June 2010)
Queens University Belfast, Belfast, Northern Ireland, United Kingdom

RESEARCH EXPERIENCE

Sir Henry Wellcome Postdoctoral Fellow (Feb 2016 – Mar 2017)
Department of Chemistry, University of Oxford, Oxford, UK
Research Sponsors: Prof. Benjamin G. Davis and Prof. James H. Naismith (St. Andrews)
Project: Uncovering the mode of action of lipid II flippase: A new antibiotic target

PhD Student (Sept 2010 – Dec 2015)
Department of Chemistry, University of Alberta, Edmonton AB, Canada
Supervisor: Prof. John C. Vederas
Project: Structural and mechanistic studies on antimicrobial lipopeptides

Undergraduate Research Project (Sept 2009 – May 2010)
School of Chemistry, Queens University Belfast, Belfast, Northern Ireland, UK
Supervisor: Dr. William P. D. Goldring
Project: Synthesis of cationic lipids for gene therapy

Summer Research Project (June 2009 – Sept 2009)
Department of Chemistry, University of Alberta, Edmonton AB, Canada
Supervisor: Prof. John C. Vederas
Project: Solid supported syntheses of both components of the lantibiotic lactacin 3147

Summer Research Project (Aug 2008 – Sept 2008)
Queens University Ionic Liquids Laboratory, Belfast, Northern Ireland, UK
Supervisor: Dr. Martin J. Earle
Project: Novel reactions of selenium in ionic liquids

Summer Research Project (June 2008 – July 2008)
Department of Pharmacy, University of Oslo, Oslo, Norway
Supervisor: Dr. Trond V. Hansen
Project: Synthesis of a SIRT1 inhibitor for the treatment of type II diabetes

MAJOR SCHOLARSHIPS AND AWARDS

Independent Fellowships

2016 : £250,000 – Sir Henry Wellcome Postdoctoral Fellowship

Graduate Awards and Scholarships

2015 : \$5,000 – Andrew Stewart Memorial Prize
2014 : \$60,000 – Alberta Innovates Health Solutions Graduate Scholarship
2013 : – CHEM 502 Graduate Seminar Award
2011 : \$150,000 – Vanier Canada Graduate Scholarship
2011 : \$18,000 – Presidents Doctoral Prize of Distinction
2010 : \$9,000 – Provost Doctoral Entrance Award

Undergraduate Awards and Scholarships

2010 : – Cecil Wilson Top Graduate Award
2009 : – Level 3 Foundation Award
2008 : – IAESTE NI Trainee of the Year
2006 : – Queens University Belfast Entrance Scholarship

PEER-REVIEWED PUBLICATIONS

12. **Cochrane, S. A.**; Findlay, B.; Bakhtiary, A.; Acedo, J. Z.; Rodriguez-Lopez, E. M.; Mercier, P.; and Vederas, J. C. The Antimicrobial Lipopeptide Tridecaptin A₁ Selectively Binds to Gram-Negative Lipid II. *Proc. Natl. Acad. Sci. USA* **113**, 11561-11566 (2016)
11. **Cochrane, S. A.**; and Vederas, J. C. Lipopeptides from *Bacillus* and *Paenibacillus* spp.: A Gold Mine of Antibiotic Candidates. *Med. Res. Rev.* **36**, 4-31 (2016).
10. **Cochrane, S. A.**; Li, X.; He, S.; Yu, M.; Wu, M.; and Vederas, J. C. Synthesis of Tridecaptin-Antibiotic Conjugates with in Vivo Activity Against Gram-Negative Bacteria. *J. Med. Chem.* **58**, 9779-9785 (2015).
9. **Cochrane, S. A.**; Surgenor, R. R.; Khey, K. M. W.; and Vederas, J. C. Total Synthesis and Stereochemical Assignment of the Antimicrobial Lipopeptide Cerexin A₁. *Org. Lett.* **17**, 5428-5431 (2015).
8. **Cochrane, S. A.**; Lohans, C. T.; van Belkum, M. J.; Bels, M.; and Vederas, J. C. Studies on Tridecaptin B₁, a New Tridecaptin Analogue with Activity Against Multidrug Resistant Gram-Negative Bacteria. *Org. Biomol. Chem.* **13**, 6073-6081 (2015).
7. Kwon, M.; **Cochrane, S. A.**; Vederas, J. C.; and Ro, D-K. Molecular Cloning and Characterization of Drimenol Synthase from Valerian (*Valeriana officinalis*). *FEBS Lett.* **588**, 4597-4603 (2014).
6. **Cochrane, S. A.**; and Vederas, J. C. Unacylated Tridecaptin A₁ Acts as an Effective Sensitizer of Gram-Negative Bacteria to Other Antibiotics. *Int. J. Antimicrob. Agents* **44**, 493-499 (2014).
5. **Cochrane, S. A.**; Findlay, B.; Vederas, J. C.; and Ratemi, E. S. Key Residues in Octyl-tridecaptin A₁ Analogs Linked to Stable Secondary Structure in the Membrane. *ChemBioChem* **15**, 1295-1299 (2014).

4. **Cochrane, S. A.**; Lohans, C. T.; Brandelli, J. R.; Mulvey, G.; Armstrong, G. D.; and Vederas, J. C. Synthesis and Structure-Activity Relationship Studies of N-Terminal Analogues of the Antimicrobial Peptide Tridecaptin A₁. *J. Med. Chem.* **57**, 1127-1131 (2014).
3. Lohans, C. T.; van Belkum, M. J.; **Cochrane, S. A.**; Huang, Z.; Sit, C. S.; McMullen, L. M.; and Vederas, J. C. Biochemical, Structural and Genetic Characterization of Tridecaptin A₁, an Antagonist of *Campylobacter jejuni*. *ChemBioChem* **15**, 243-249 (2014).
2. **Cochrane, S. A.**; Huang, Z.; and Vederas, J. C. Investigation of the Ring-Closing Metathesis of Peptides in Water. *Org. Biomol. Chem.* **11**, 630-639 (2013).
1. Liu, W.; Chan, A. S. H.; Liu, H.; **Cochrane, S. A.**; and Vederas J. C. Solid Supported Chemical Synthesis of Both Components of the Lantibiotic Lacticin 3147. *J. Am. Chem. Soc.* **133**, 14216-14219 (2011).

PRESENTATIONS AT NATIONAL AND INTERNATIONAL CONFERENCES

5. **Cochrane, S. A.**; Findlay, B.; Bakhtiary, A.; Acedo, J. Z.; Rodriguez-Lopez, E. M.; and Vederas, J. C. (2016) Tridecaptin A₁ Selectively Binds to Gram-Negative Lipid II. Poster presentation at the 34th European Peptide Symposium in Leipzig, Germany.
4. **Cochrane, S. A.**; and Vederas, J. C. (2015) Probing the Mechanism of Action of Tridecaptin A₁, a Non-Ribosomal Lipopeptide with Gram-Negative Activity. Poster presentation at the 24th American Peptide Symposium in Orlando, FL, USA.
3. **Cochrane, S. A.**; and Vederas, J. C. (2014) Structural and Mechanistic Studies on the Antimicrobial Lipopeptide Tridecaptin A₁. Orally presented at the 33rd European Peptide Symposium in Sofia, Bulgaria.
2. **Cochrane, S. A.**; and Vederas, J. C. (2013) Structural and Mechanistic Studies of Lipopeptide Antibiotic Tridecaptin A. Orally presented at the 2013 Volcano Conference in Chemical Biology in Pack Forest, WA, USA.
1. **Cochrane, S. A.**; Huang, Z.; and Vederas, J. C. (2012) Ring-Closing Metathesis of Peptides in Water. Poster presented at the 95th Canadian Chemistry Conference and Exhibition in Calgary, Alberta, Canada.

PRESENTATIONS AT LOCAL SYMPOSIA

5. **Cochrane, S. A.** (2015) Structural and Mechanistic Studies on Antimicrobial Lipopeptides. Orally presented at the 2015 Pigeon Lake Symposium in Pigeon Lake, Alberta, Canada.
4. **Cochrane, S. A.** (2014) Tridecaptin A₁: The Gift That Keeps on Giving. Orally presented at the 2014 Pigeon Lake Symposium in Pigeon Lake, Alberta, Canada.

3. **Cochrane, S. A.** (2013) Diazenes, Nisin and Tridecaptin A₁: A Triforce of Projects. Orally presented at the 2013 Pigeon Lake Symposium in Pigeon Lake, Alberta, Canada.
2. **Cochrane, S. A.** (2012) Ring-Closing Metathesis of Peptides in Water and the Solid-Supported Synthesis of Nisin. Orally presented at the 2012 Pigeon Lake Symposium in Pigeon Lake, Alberta, Canada.
1. **Cochrane, S. A.** (2011) Structural Modification and Mechanistic Studies on Neopetrosiamides Through Chemical Synthesis. Orally presented at the 2011 Pigeon Lake Symposium in Pigeon Lake, Alberta, Canada.

TEACHING AND LEADERSHIP

Laboratory Manager (April 2016 – present)

I am currently the laboratory manager of one of the Davis group labs (8 people). Duties include maintaining health and safety standards, organizing waste disposal, keeping the laboratory well stocked with chemicals and consumables and providing guidance to colleagues on good practices in organic chemistry.

Undergraduate student supervision (May 2016 – present)

Sadra Hamedzadeh, University of Oxford, working on the synthesis of di-lipidated analogues of the antibiotic tunicamycin.

Undergraduate student supervision (May 2015 – Sept 2015)

Kevin M. W. Khey, University of Alberta, working on the novel synthesis of orthogonally protected 4-hydroxylysine (*Org. Lett.* **17**, 5428).

Undergraduate student supervision (June 2014 – Sept 2014)

Richard R. Surgenor, University of Alberta, working on the isolation and total synthesis of cerexin A₁ (*Org. Lett.* **17**, 5428).

Undergraduate student supervision (April 2014 – July 2014)

Manon Bels, University of Alberta, working on the isolation and total synthesis of tridecaptin B₁ (*Org. Biomol. Chem.* **13**, 6073).

Teaching Assistant (Sept 2014 – April 2015)

Instructed two weekly two-hour sessions, reviewing lecture material and problem assignments for organic chemistry students. Teaching awards won in both semesters.

Outreach Teaching Assistant (May 2012, May 2013)

Volunteered as a teaching assistant for visiting high-school students conducting organic chemistry experiments at the University of Alberta Chemistry Department.

Teaching Assistant (Sept 2010 – May 2011)

Instructed two weekly three-hour organic chemistry lab classes, marked lab reports, midterms and final exams. Teaching awards won in both semesters.