

Young Career Focus: Dr. Andrew L. Lawrence (University of Edinburgh, UK)

Background and Purpose. SYNFORM regularly meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This Young Career Focus presents Dr. Andrew L. Lawrence (University of Edinburgh, UK).

Biographical Sketch



Dr. A. L. Lawrence

Andy Lawrence completed his undergraduate studies at the University of Oxford (UK) in 2006 and subsequently obtained a DPhil in 2010 under the supervision of Professor Sir Jack Baldwin and Dr. Rob Adlington. Andy then moved to Australia to spend two years as a postdoctoral researcher with Professor Mick Sherburn at the Australian National University (ANU) in Canberra. In 2012, Andy secured an Australian Research Council Fellowship, which allowed him to begin his independent academic career at the ANU. In 2013, he moved back to the UK for a Lectureship at the University of Edinburgh, where he is now Senior Lecturer. Andy has been awarded a 2016 Thieme Chemistry Journals Award and the 2017 RSC Hickinbottom Award.

INTERVIEW

SYNFORM *What is the focus of your current research?*

Dr. A. L. Lawrence We are interested in developing and improving the science and art of organic synthesis. Our research effort is primarily focused on the total synthesis of natural products, developing new synthetic methodology, and exploring new strategies and concepts in chemical synthesis.

SYNFORM *When did you get interested in synthesis?*

Dr. A. L. Lawrence My earliest interest in synthesis goes all the way back to my first year of undergraduate studies at St. John's College, Oxford (UK). I was very fortunate to be tutored by Professor George Fleet, a masterful teacher of organic chemistry. During this early exposure to classic organic chemistry (aldol chemistry, Grignard reagents, electrophilic additions to alkenes, etc.) it became apparent to me that the opportunities for creativity and discovery, even when one knows just a limited number of reactions, are limitless.

SYNFORM *What do you think about the modern role and prospects of organic synthesis?*

Dr. A. L. Lawrence In my opinion, organic synthesis is as important now as it has ever been. The field is continually evolving and it is hard to predict how it will look in the future, but the synthesis of organic compounds will always be important. I feel strongly, however, that the synthesis community must resist the urge to justify our existence solely through the applications of the molecules we make (medicines, functional materials, etc.). That is not to say we should not embrace applied synthesis and cross-disciplinary research, we absolutely should! But we should ensure that the importance of organic synthesis as a science in its own right, worthy of study for the pursuit of new knowledge and understanding, is broadly com-

municated to the wider scientific community. Otherwise, the belief that organic synthesis is a 'solved problem' will erroneously grow within the scientific community. In terms of the future of organic synthesis, areas that I think are particularly exciting all revolve around the concept of generating and harnessing complexity, both on the single molecule level and in systems.

SYNFORM Your research group is active in the area of total synthesis of complex natural molecules. Could you tell us more about your research and its aims?

Dr. A. L. Lawrence I am interested in the total synthesis of natural products for many reasons, ranging from the potential applications of the target molecules to the esoteric challenge posed by their complex architectures. However, I feel justifications along these lines really don't do justice to how important natural products are. I think Prelog said it best when he stated "Natural products are the result of three billion years of development of the living world, and they have survived the natural selection process over a long period of evolution. I am convinced they always carry a message, which it is our job to decipher".¹ This is how I think about our total synthesis research, we are trying to decipher the hidden messages encoded within the structures of these products of evolution. For example, we are currently interested in how and why symmetry is broken in

the biosynthesis of various natural products. By investigating and mimicking these natural processes in vitro we hope to make important discoveries concerning how the breaking of symmetry can be better exploited in synthesis.

SYNFORM What is your most important scientific achievement to date and why?

Dr. A. L. Lawrence My view on what our most important contribution is changes all the time; when I talk to one of my co-workers, their passion and enthusiasm convinces me that their most recent work is the most important...until of course I talk to the next co-worker. But in terms of our published work, I think we have made some important contributions in the areas of cycloaddition chemistry (Figure 1a),^{2,3} redox catalysis (Figure 1b),^{4,5} and domino reaction sequences (Figure 1c).⁵⁻⁹

Matthew Farnish

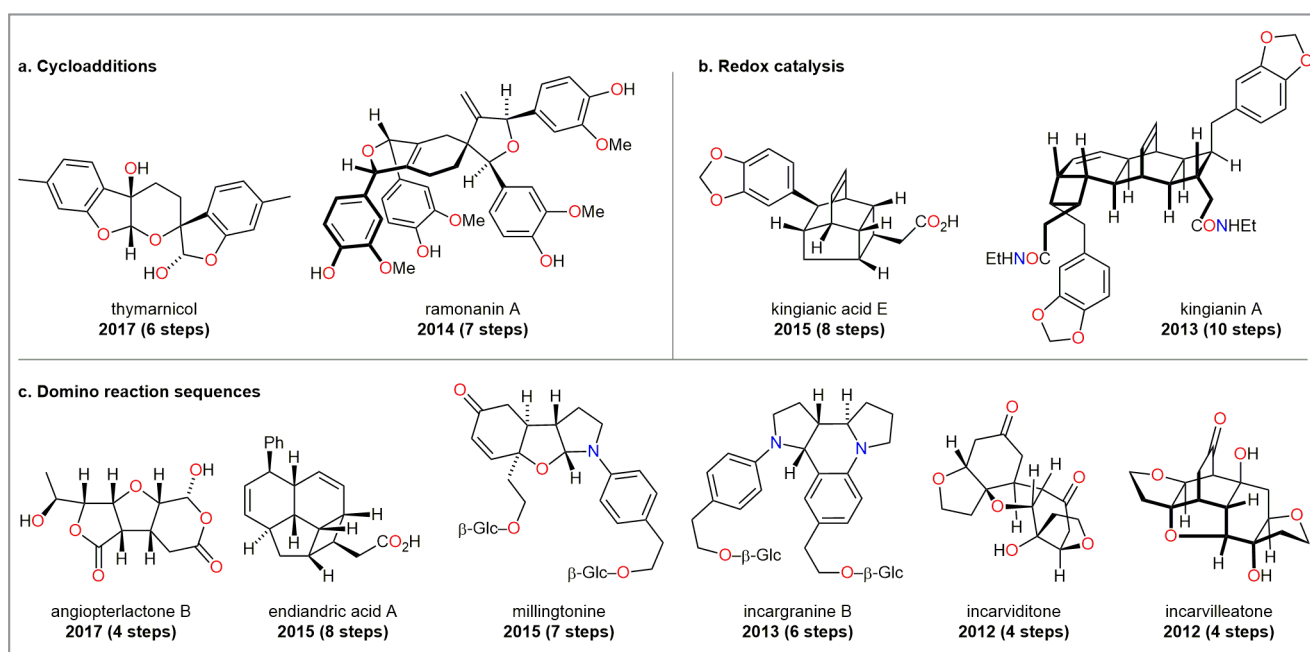


Figure 1 Natural product targets synthesized by the Lawrence group

REFERENCES

- (1) (a) V. Prelog *Naturwiss. Rundsch.* **1985**, 38, 259;
(b) A. Eschenmoser *Angew. Chem. Int. Ed.* **2011**, 50, 12412.
- (2) I. De Silvestro, S. L. Drew, G. S. Nichol, F. Duarte, A. L. Lawrence *Angew. Chem. Int. Ed.* **2017**, DOI: 10.1002/anie.201701481R1.
- (3) R. S. Harvey, E. G. Mackay, L. Roger, M. N. Paddon-Row, M. S. Sherburn, A. L. Lawrence *Angew. Chem. Int. Ed.* **2015**, 54, 1795.
- (4) S. L. Drew, A. L. Lawrence, M. S. Sherburn *Angew. Chem. Int. Ed.* **2013**, 52, 4221.
- (5) S. L. Drew, A. L. Lawrence, M. S. Sherburn *Chem. Sci.* **2015**, 6, 3886.
- (6) P. D. Brown, A. C. Willis, M. S. Sherburn, A. L. Lawrence *Org. Lett.* **2012**, 14, 4537.
- (7) P. D. Brown, A. C. Willis, M. S. Sherburn, A. L. Lawrence *Angew. Chem. Int. Ed.* **2013**, 52, 13273.
- (8) P. D. Brown, A. L. Lawrence *Angew. Chem. Int. Ed.* **2016**, 55, 8421.
- (9) M. I. Thomson, G. S. Nichol, A. L. Lawrence, *Org. Lett.* **2017**, DOI: 10.1021/acs.orglett.7b00929.