Young Career Focus: Dr. Jonathan Sperry (University of Auckland, New Zealand)

Background and Purpose. From time to time ***SYNFORM*** 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 ***SYNSTORY*** with a Young Career Focus presents Dr. Jonathan Sperry (University of Auckland, New Zealand).

BIOGRAPHICAL SKETCH

Dr. J. Sperry

Jonathan Sperry obtained his BSc (Hons) (2002) and PhD (2006, Professor Chris Moody) from the University of Exeter (UK). He spent 3.5 years as a postdoctoral researcher with Professor Margaret Brimble at the University of Auckland (New Zealand), before taking up a lectureship at the same institution in 2009, where he is currently a Senior Lecturer and a Rutherford Discovery Fellow.

INTERVIEW

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

Dr. J. Sperry | My research group focuses on three main areas: (1) organic synthesis, with particular emphasis on the total synthesis of alkaloids that possess unprecedented molecular architecture, biomimetic synthesis, C–H functionalization and novel reaction development; (2) medicinal chemistry, focusing on the development of novel antibiotics and small molecules that hinder the tumor metastasis process, and (3) sustainable synthetic processes and the use of biomass-derived building blocks in the construction of important structural motifs.

SYNFORM | *When did you get interested in synthesis?*

Dr. J. Sperry | At secondary school, when my chemistry teacher explained the important role of synthetic chemistry during both World Wars and in particular, Robinson's biomimetic synthesis of tropinone.

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

Dr. J. Sperry | I am optimistic about the future of organic synthesis as it will always play a pivotal role in the natural and technical sciences. Organic synthesis is constantly progressing and recent advances in areas such as organo- and photoredox catalysis, C–H functionalization and flow chemistry have contributed significantly to the ongoing evolution of the field. However, there is room for further innovation and I always enjoy reading reports that address our over-reliance on protecting groups and toxic reagents. Biorenewable syntheses of commodity chemicals that are currently sourced from fossil fuels also draw my attention.

SYNFORM | *Your research group is active in the areas of organic synthesis, medicinal chemistry and green chemistry. Could you tell us more about your research and its aims?*

Dr. J. Sperry | We are currently working on the biomimetic synthesis of the alkaloids yuremamine,[1] dendridine A[2] and sciodole[3] (Figure 1, **A**). In these projects, we have proposed a biosynthesis for each of these natural products, which we are attempting to validate in the laboratory through synthesis. We are also interested in the synthesis of alkaloids using novel synthetic processes, three of which include iheyamine B,[4] bufoserotonin C[5] and spiroindimicin B[6] (Figure 1, **B**). In our medicinal chemistry research, we are involved in the development of novel antibiotics through selective inhibition of the bacterial enzyme pyruvate kinase[7] and we are also exploring ways small molecules can inhibit tumor metastasis processes. Incorporating biomass-derived building blocks during the synthesis of fine and commodity chemicals[8] is also under investigation.

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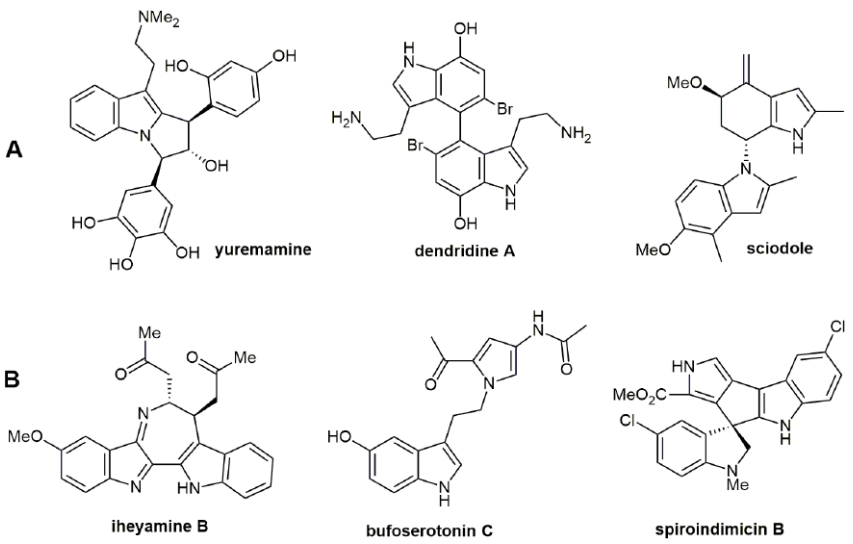
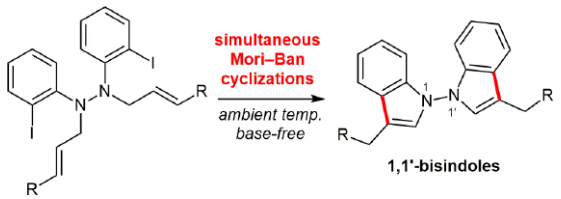


Figure 1

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

Dr. J. Sperry | Developing a general synthetic approach to 1,1′-bisindoles (Scheme 1).[9,10] This new methodology relied on several diallylated hydrazobenzenes undergoing two simultaneous Mori–Ban cyclizations to construct both heterocycles in a single step with minimal N–N bond cleavage. Despite the bisindolization being conducted under reductive conditions, the 'normal' Heck products were obtained, inferring that the β-hydride elimination occurs faster than the reduction step. We also constructed 1,1′-bistryptophan using this methodology, and showed that the 1,1′-bisindole is a sturdy heteroaromatic motif that is capable of surviving lengthy synthetic sequences and a variety of different reaction conditions.



Scheme 1

Matteo Zanda

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