Young Career Focus: Professor Steven Townsend (Vanderbilt University, USA)

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 Professor Steven Townsend (Vanderbilt University, USA).

Biographical Sketch

Prof. S. D. Townsend

Steven Townsend was born and raised in Detroit, Michigan (USA) in 1983. He completed his undergraduate education at Oakland University (USA) in 2005 where he completed 4 years of research working on the synthesis of nucleoside radical precursors with Prof. Amanda Bryant Friedrich. From Oakland, Steve matriculated to Vanderbilt University (USA) where he completed a PhD working toward the total synthesis of bielschowskysin under the mentorship of Prof. Gary Sulikowski. Steve completed his education at Memorial Sloan-Kettering Cancer Center (USA) and Columbia University (USA) with Prof. Sam Danishefsky, where he worked on the total synthesis of erythropoietin, PTHrP, peptide ligation, and Diels–Alder methodology.

Since 2014, Steve has established an independent program at Vanderbilt University where his group leverages organic chemistry to address problems in human health, particularly in the areas of human milk science, antimicrobial agents, and chemotherapeutics. Steve's team has been honored with several awards, including the Sloan Research Fellowship, the Camille Dreyfus Teacher Scholar Award, The David Gin New Investigator Award, the Ruth Kirstein Award for Excellence in Human Milk Science, and the C&E News Talented 12. Steve's dedication to education is also highlighted, by his Jeff Nordhaus Award for Excellence in Undergraduate Teaching.

INTERVIEW

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

Prof. S. D. Townsend Our research team cares about why human beings get sick. Our focus is to contribute new advances to the strategy and tactics of organic synthesis and leverage these advances to cure and prevent illness. Overall, our team is interested in projects that challenge the state of the art, particularly in carbohydrate synthesis.

SYNFORM *When did you get interested in synthesis?*

Prof. S. D. Townsend Although my interest in chemistry was initiated in high school, my interest in synthesis started as a freshman in college. I worked on organic chemistry all four years of my undergraduate career, including the summers. Like most practitioners of the art, I found solace from life's complexities in setting up reactions and running columns. I love the consistent problem solving that synthesis offers. Interestingly, I recently looked at my personal statement for graduate school – a statement that I wrote in August of 2004! It's interesting to analyze yourself at age 21 from the vantage point of being 39 – it was clear that I was going to work on organic synthesis for the rest of my life. While my personal statement briefly mentioned my background and family life, the writing was saturated with poorly drawn schemes (I didn't have ChemDraw) about my project and a listing of my three favorite chemists at the time – Sam Danishefsky, KC Nicolaou, and M. Chistina White! I spoke for an entire paragraph about protecting group manipulations and how I solved a tricky reaction by freshly preparing and purifying every reagent!

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

Prof. S. D. Townsend As a faculty member in organic chemistry, I consider myself as a guardian of the field. My job is to promote inquiry, instill problem solving, and teach the history of organic synthesis. In doing so, I do my part to ensure that we respect organic synthesis as an art with its own basic merit. I also believe that organic synthesis is an enabling science. A central part of its present and future, must be solving problems in other fields. A few years ago, a family member told me that they felt scientists were hustlers – that we don't care about the end user and just want their money for research. In other words, we're one of the few fields that's willing to use tax-payer money but doesn't make all attempts to explain to the public what we do with their money. I think a major role for the future of organic synthesis is to ensure that bring the public into our community and showcase how our advances and discoveries enhance their lives.

SYNFORM *Could you tell us more about your group's areas of research and your aims?*

Prof. S. D. Townsend A major focus over the first 8 years has been human milk science, where we are focused on merging organic chemistry with microbiology to characterize the protective properties of the macromolecules present in mother's milk. Moving forward, we are advancing new projects in the synthesis of antimicrobial agents, chemotherapeutics, and zwitterionic polysaccharides. Each of these projects require that we both master precedent and innovate to drive the field in new directions.

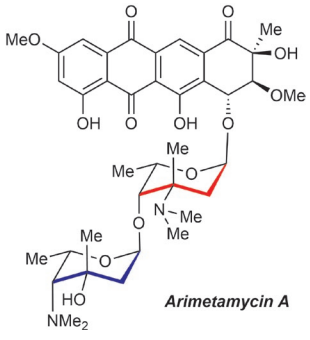

Figure 1 A natural anthracyclin natural product recently synthesized by the Townsend group (*ACS Cent. Sci.* **2021**, *7*, 1327–1337).

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

Prof. S. D. Townsend My greatest contribution to date is the trainees that I've mentored. At the time of this publication, the group will have produced 8 new PhDs. I owe much of my success to the inspiring students who have driven the lab's work, supported me and the program, and lifted me up along the way. I am indebted to them. The lab would not be where it is today without them. Mentoring is a privilege and responsibility that I believe we should all take very seriously and honorably. It is because of the trainees that we've been able to think very differently about what it means to be an organic chemist in the modern world and that, perhaps, is our greatest achievement.

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