EDITORIAL

Winners of the 2018 JA Ōmura Awards for excellence

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The Editorial Board of *The Journal of Antibiotics* has given the 2018 JA Ōmura Award for an original article to an outstanding paper entitled “Novel terpenes generated by heterologous expression of bacterial terpene synthase genes in an engineered *Streptomyces* host” by Yuuki Yamada, Shiho Arima, Tohru Nagamitsu, Kohei Johmoto, Hidehiro Uekusa, Tadashi Eguchi, Kazuo Shin-ya, David E Cane, and Haruo Ikeda [1]. Terpenoid metabolites are medically and agriculturally useful agents, with the vast majority having been isolated from plants or fungi. The discovery of bacterial terpenes has been minimal so far because many of the terpene synthase genes appear to be silent in their host bacteria under standard culture conditions. Bioinformatics searches for the bacterial terpene synthases has been challenging since these genes exhibit low amino acid sequence similar to those from fungi and plants, which has hampered genome mining. In this article, the authors performed a powerful genome mining method using hidden Markov models to carry out Pfam searches of bacterial sequence databases to identify putative bacterial terpene synthases. Importantly, heterologous expression of several of these putative terpene synthase genes in engineered host *Streptomyces avermitilis* SUKA22 led to the discovery of 13 new terpenes, including the linear triquinane sesquiterpenes, which have never been isolated from bacteria or any other source. This exciting genome mining and heterologous expression platform provides an innovative approach to discovering new bioactive terpenes, which have been overlooked by traditional screening methods.

The Editorial Board of *The Journal of Antibiotics* has given the 2018 JA Ōmura Award for a review article to an outstanding review paper entitled “The antibiotic resistance crisis, with a focus on the United States” by Evan Martens and Arnold L Demain [2]. Antibiotic resistance drives the need for new drugs and this review accurately captures the challenges and up-to-date practices currently being employed to tackle the crisis. Reasons for antibiotic resistance and their rapid global spread are discussed, with the large-scale use of antibiotics for growth promotion in intensive farming and the unchecked availability of antibiotics in some developing nations noted as areas for significant concern. The antibiotic resistance crisis is compounded by a drop off in the discovery and development of new antibacterial agents active against these resistant pathogens. This review describes the contribution of mergers in the pharmaceutical industry, low commercial return on investment for new antibiotics compared with other drug classes with longer treatment times, and the need for government support to maintain the antibacterial pipeline.

Potential scientific strategies to overcome the crisis are examined including new ways of modifying old antibiotics, combining antibiotics, adding adjuvant agents that target resistance mechanisms, new approaches to natural product drug discovery including genome mining of unculturable bacteria, and the use of biological agents such as phage lysins and antibody therapeutics.

The review is timely and the trends examined have been reinforced since its publication, in particular the financial struggle companies face to develop and commercialize novel antibacterial agents.

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Compliance with ethical standards

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1. Yamada Y, et al. Novel terpenes generated by heterologous expression of bacterial terpene synthase genes in an engineered *Streptomyces* host. *J Antibiot*. 2015;68:385–94.
2. Martens E, Demain AL. The antibiotic resistance crisis, with a focus on the United States. *J Antibiot*. 2017;70:520–6.

ABOUT THE WINNERS

The medal will be awarded to the first author of Review and Original article, and all of the authors will receive the certificates. Each first author's short biography is as follows.

Review Division; awardee Evan Martens Evan Martens attended Drew University in Madison, NJ from 2007 to 2011 majoring in biology/premedicine with a minor in public health. After completing his junior year, he did microbiology research under the supervision of Prof. Arnold Demain, at the Research Institute for Scientists Emeriti (R.I.S.E) program and published several papers. Upon graduating from Drew in 2011, Evan was employed by Emergency Medical Associates (EMA) in Parsippany, NJ as a medical scribe/clinical information manager at four different hospitals. From 2014 to the beginning of 2017, Evan worked as a drug development biologist and scientific editor/writer for Cemptra, Inc. in Chapel Hill, which was a clinical-stage pharmaceutical company focused on developing antibiotics to meet critical medical needs in the treatment of bacterial infectious diseases. From June 2017 to present, Evan has been working as a medical operations manager for Syneos Health (formerly INC Research/inVentiv Health), a large clinical research organization based in Morrisville, NC. He is currently in the Medical Management and Scientific Services department.

Original article Division; awardee Yuuki Yamada Yuuki Yamada is a biochemist specializing in the field of biosynthesis of secondary metabolites. He received his B.S. (2010) in Pharmaceutical Sciences at Tokyo University of Science, Japan and his Ph.D. (2015) from Kitasato University under the supervision of Prof. Haruo Ikeda. He worked on the genome mining of the bacterial terpene synthases using a profile hidden Markov model and the protein families database. In the same year, he joined the Research and Development Division, NAGASE & CO., LTD as a researcher. His present research focuses on overproduction of the biochemical compounds and enzymes for food additives, cosmetics, or medicines using the *Streptomyces* bacterial strains.