



Selected fungal natural products with antimicrobial properties

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Abstract

Natural products are an invaluable source of new drugs as they constitute more than two-thirds of clinically used antibiotics and 50% of anticancer drugs. Fungi produce many secondary metabolites which display high bioactivity. For example, toxic ergot alkaloids produced by filamentous fungi growing on rye poisoned thousands of people and livestock throughout the Middle Ages. However, their later medicinal applications, followed by the discovery of the first class of antibiotics, penicillins and other drugs of fungal origin, such as peptidic natural products, terpenoids or polyketides, have altered the historically negative reputation of fungal "toxins". The development of new antimicrobial drugs is currently a major global challenge, mainly due to antimicrobial resistance phenomena. Therefore, the structures, biosynthesis and antimicrobial activity of selected fungal natural products will be presented.

Biography

Dorota Jakubczyk received her MS in chemistry in 2009 at Adam Mickiewicz University Poznań, Poland. She received her PhD in 2012 from Karlsruhe Institute of Technology under the direction of Prof. Dr Stefan Bräse. She was working as postdoctoral research associate in Sarah O'Connor's group at the John Innes Centre, studying ergot alkaloid biosynthesis. Dr. Jakubczyk has completed her second post doc in Kira Weissman's laboratory working on the structural biology of megaenzymes. Currently, she holds a position of an assistant professor at the Department of Molecular Probes and Prodrugs at the Institute of Bioorganic Chemistry (IBCH PAS), Poznań, Poland.

Publications

- 1) Jakubczyk D., Francois D. Selected Fungal Natural Products with Antimicrobial Properties. *Molecules* (2020), 25, 911: 1-18.
- 2) Jakubczyk D., Caputi L., Stevenson C. E. M., Lawson D. M., O'Connor S. E. Structural characterization of EasH (*Aspergillus japonicus*) – an oxidase involved in cycloclavine biosynthesis. *Chem. Commun.* (2016) 52: 14306-14309.
- 3) Jakubczyk D., O'Connor S. E. Privileged scaffolds in medicinal chemistry: Design, synthesis, evaluation. *The Royal Society of Chemistry* (2016) Chapter 14: Ergot Alkaloids.
- 4) Jakubczyk D., Caputi L., Hatsch A., Nielsen C. A. F., Diefenbacher M., Klein J., Molt A., Schroeder H., Cheng J. Z., Naesby M., O'Connor S. E. Discovery and reconstitution of the cycloclavine biosynthetic pathway — enzymatic formation of a cyclopropyl group. *Angew. Chem. Int. Ed.* (2015) 54: 5117 –5121.
- 5) Jakubczyk D., Cheng J. Z., O'Connor S. E. Biosynthesis of the ergot alkaloids. *Nat. Prod. Rep.* (2014) 31: 1328-1338