

NATURAL PRODUCTS AND PHARMACOGNOSY

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The term “natural product” refers to small-molecular-weight organic compounds present in organisms that are biosynthesized for a specific ecological or other specialized role. Hundreds of thousands of different compounds of these types are now known, and they have been reported in the scientific literature mainly from higher plants, terrestrial microbes, and marine and aquatic organisms.

“Pharmacognosy” is a branch of the pharmaceutical sciences referring to the study of naturally occurring drugs. In this seminar, a short history of the development of natural product single-chemical entity drugs will be provided, followed by examples of such compounds from plant, microbial, and marine origin that have been approved by the U.S. FDA for therapeutic use since 2000. Such compounds may be used therapeutically either in their naturally occurring form, or be modified by chemical synthesis.

Laboratory work directed towards the discovery of new anticancer agents from selected organisms has been conducted at Ohio State University with collaborative institutions through the “program project” mechanism. Strategies in working specifically on tropical plants, freshwater cyanobacteria, and filamentous fungi will be discussed, with specific examples of lead bioactive compounds in each case presented.

In the final part of the seminar, various resources providing relevant information that are available in support of graduate education in natural products and pharmacognosy in the United States will be mentioned briefly.



Since 2004, Dr. A. Douglas Kinghorn has held the position of Professor and Jack L. Beal Chair in Natural Products Chemistry and Pharmacognosy at the College of Pharmacy, The Ohio State University (OSU). From 1977-2004, he served on the faculty of the College of Pharmacy of the University of Illinois at Chicago, where he was promoted to Full Professor in 1986. He received Ph.D. (1975) and D.Sc. (1990) degrees from The School of Pharmacy, University of London. Dr. Kinghorn is a former President of both the American Society of Pharmacognosy (ASP; 1990-1991) and the Society for Economic Botany (1991-1992). He received the 2010 Norman R. Farnsworth Research Achievement Award of ASP and the 2020 Egon Stahl Award in Gold from GA (Society for Medicinal Plant and Natural Product Research), both for lifetime contributions to natural products research. In April 2016, Dr. Kinghorn was the recipient of a Distinguished Scholar Award of The Ohio State University.



He has authored or co-authored over 560 peer-reviewed research articles, review articles, and book chapters, and has edited or co-edited 30 scientific volumes. Since 1980, he has served as Principal Investigator of many projects supported by both the U.S. National Institutes of Health (NIH) and private industry. Currently, Dr. Kinghorn is Principal Investigator of a program project award from the U.S. National Cancer Institute, NIH, entitled “Discovery of Anticancer Agents of Diverse Natural Origin” (P01CA125066; 2007-2025). His major research interests are on the isolation, structural characterization, and biological evaluation of small organic molecules from higher plants, particularly those with potential use as antimicrobial, cancer chemotherapeutic, and sweetness-modifying agents. Dr. Kinghorn has served as Major and/or Thesis Advisor/Committee Chair to 50 graduate students and has also directly supervised about 70 postdoctoral students and visiting scholars. He is the former Editor-in-Chief of the *Journal of Natural Products* (1994-2019), and is currently Emeritus Editor, and has been Series Editor-in-Chief of the book series “*Progress in the Chemistry of Organic Natural Products*” (Springer Nature, Cham, Switzerland) since 2008.