



2021-2022 POCC Lecture Series

November 18, 2021, 7:30 PM

Virtual reception to start prior to the seminar at 7 PM

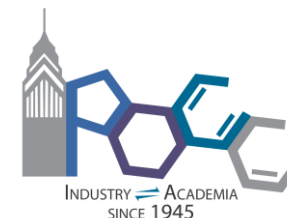
Prof. Dirk Trauner

New York University

An Efficient Synthesis of Tetrodotoxin

Virtual Seminar by Zoom ([LINK](#))

The Philadelphia Organic
Chemist's Club



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Abstract: Tetrodotoxin (TTX) is an indispensable probe in neuroscience, a biosynthetic and ecological enigma, and one of the most celebrated targets of synthetic chemistry. Here, we present a stereoselective synthesis of TTX that proceeds in 22 steps starting from a readily available glucose derivative. The central cyclohexane ring of TTX and its α -tertiary amine moiety was established via the intramolecular 1,3-dipolar cycloaddition of a nitrile oxide, followed by alkynyl addition to the resultant isoxazoline. After some carefully chosen protecting group manipulations, a ruthenium-catalyzed hydroxylactonization set the stage for the formation of its dioxo-adamantane core. Installation of the guanidine, oxidation of a primary alcohol, and late-stage epimerization of the resultant aldehyde gave a mixture of TTX and anhydro TTX. Our synthesis represents one of the most effective of TTX reported to date and could give ready access to biologically active derivatives.

Bio: Dirk Trauner was born and raised in Linz, Austria, studied biology and chemistry at the University of Vienna, and received his Master's degree in chemistry from the Free University, Berlin. He then pursued a Ph.D. in chemistry under the direction of Prof. Johann Mulzer, with whom he moved to the University of Frankfurt and then back to Vienna. Subsequently, he became a postdoctoral fellow with Prof. Samuel J. Danishefsky at the Memorial Sloan-Kettering Cancer Center. After two years in NYC, Dr. Trauner joined the Department of Chemistry at the University of California, Berkeley, where he rose through the ranks to become an Associate Professor of chemistry and a member of the Lawrence Berkeley National Laboratory. In the summer of 2008, he moved to the University of Munich, where he served as a Professor of Chemical Biology and Chemical Genetics. In March of 2017 he returned to the U.S. to become the Janice Cutler Chair of Chemistry at New York University. He also holds a position as an Adjunct Professor of Neuroscience at the NYU Langone Medical School. He is a member of the Leopoldina Academy of Sciences and the Austrian Academia of Sciences, and a recipient of the Otto Bayer Award, the Emil Fischer Medal, an ACS Cope Scholar Award, and a Sloan Fellowship. The broad objective of Prof. Trauner's research is to demonstrate the awesome power of chemical synthesis and to use it toward the precision control of biological pathways.

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