



Illinois Wesleyan University
Digital Commons @ IWU

John Wesley Powell Student Research
Conference

1999, 10th Annual JWP Conference

Apr 17th, 9:00 AM - 10:00 AM

Studies toward the Total Synthesis of an Organophosphorus Analog of Acetylcholine

Christopher R. Butler
Illinois Wesleyan University

Jeffrey A. Frick, Faculty Advisor
Illinois Wesleyan University

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>

Butler, Christopher R. and Frick, Faculty Advisor, Jeffrey A., "Studies toward the Total Synthesis of an Organophosphorus Analog of Acetylcholine" (1999). *John Wesley Powell Student Research Conference*. 19.

<https://digitalcommons.iwu.edu/jwprc/1999/posters/19>

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.

Poster Presentation 5

**STUDIES TOWARD THE TOTAL SYNTHESIS OF AN
ORGANOPHOSPHORUS ANALOG OF ACETYLCHOLINE**

Christopher R. Butler and Jeffrey A. Frick*

Department of Chemistry, Illinois Wesleyan University

Acetylcholine is a vital neurotransmitter in the human nervous system. It functions in both the cardiac and smooth muscle synapses as well as the neuromuscular skeletal joints. The release of acetylcholine in the muscle cells stimulates the muscle to contraction. The acetylcholine must therefore be broken down quickly following its release to prevent continued contraction which would certainly result in death. Acetylcholine is broken down by the enzyme acetylcholinesterase, (AChE), via a hydrolysis mechanism. This mechanism is somewhat unclear in the involuntary muscles of the human body, and proposed mechanisms have been strongly debated. Organophosphorus (OP) compounds have been used throughout much of the study of the AChE mechanism as inhibitors of the enzyme. The total synthesis of a conformationally constrained OP analog of acetylcholine, combined with enzyme assays with such an analog, would demonstrate further the interaction between the OP inhibitors and AChE, as well as provide greater insight into the mechanism of the acetylcholine hydrolysis. We present a synthetic strategy for this compound and our progress on the synthesis of a model compound.