

Faculty Advisor: Howard Hendrickson, Ph.D.

2009 Voldeng Fellowship Proposal

2009 Pharmaceutical Sciences Research Fellowship Proposal

Title: *Clinical pharmacokinetics of isoquinoline alkaloids following oral administration of goldenseal.*

Much of the population considers herbal supplements, also called dietary supplements, safe because they come from nature. Goldenseal (*Hydrastis canadensis*) is one the most popular herbs sold in America. Although not officially recognized as effective, Goldenseal is a popular remedy for canker sores, sore throat, and upper respiratory infections. It also has a long-standing history as a remedy for urinary tract infections, vaginal infections, and infectious diarrhea, and has also been used for indigestion and premenstrual syndrome. Applied externally, it is used to treat wounds and skin and eye infections. Certain compounds in Goldenseal, particularly berberine, have glucose-lowering and hypolipidemia effects in humans.

A recent search of PubMed indicates that there are no controlled clinical trials demonstrating the efficacy of goldenseal in humans. Anecdotal evidence is available if one looks at the history of its use by native Americans and early North American pioneers.<sup>2</sup>

My laboratory, in collaboration with Dr. Bill Gurley's group, is interested in the disposition of the "active" components of goldenseal in humans following oral administration of standardized goldenseal. The work will focus on the determination of the absorption and elimination characteristics of hydrastine and berberine. **We hypothesize that goldenseal is a safe and effective treatment**

**for dyslipidemia in humans.** Successful completion of this work will provide useful pharmacokinetic data on the disposition of hydrastine and berberine following oral administration of goldenseal in humans for the first time.

In the laboratory, the research fellow will focus on conducting bioanalytical studies in order to quantitate hydrastine, berberine and their metabolites in serum samples that have been previously collected. The fellow will have the opportunity to gain hands-on experience with advanced analytical instrumentation (i.e., liquid chromatography, mass spectrometry). The fellow will also gain practical experience in how to deal with pharmacokinetic datasets from humans. The fellow will work directly with the faculty adviser and other members of the research team.

1. Yifei Zhang, Xiaoying Li, Dajin Zou, Wei Liu, Jialin Yang, Na Zhu, Li Huo, Miao Wang, Jie Hong, Peihong Wu, Guoguang Ren, and Guang Ning Treatment of Type 2 Diabetes and Dyslipidemia with the Natural Plant Alkaloid Berberine, *J Clin Endocrinol Metab*, 2008, 93:2559 –2565

2. McKenna DJ, Plotnikoff GA. Goldenseal (*Hydrastis canadensis*). *Encyclopedia of Dietary Supplements*. 2005:297-308.