FROM THE WOODS to the Medicine Cabinet:

Pharmacognosy: Natural product drugs and how they work

Instructor: Scott C. Hartsel, Ph.D.

Biology or Chemistry 491 , Special Topics for 3 credits in Winterim '00–'01 1:00 PM–4:10 PM

Herbal and other "natural" medicines are occupying an increasingly large niche in U.S. medical expenditures (est. $**27 billion** in 1997). Some work as advertised but many probably do not and even more are unproven either way. Unfortunately U.S. health professionals generally have very little training and expertise in the area of natural product drugs despite the fact that a large fraction of the so-called "Western" pharmaceutical preparations are based on naturally occurring substances. The best example, of course, is that of the antibiotics which are largely fungal or bacterial natural products or derivatives. Thus I think many of you interested in medical research, pharmacy , pharmacological research or the practice of medicine could benefit from a course in ***Pharmacognosy*** (**Gr**. "drug knowledge," *i.e.* the study of drugs of natural origin including plant, animal, fungal or bacterial sources). I will cover the major classes of medicinally active natural products, their structure, origin, biosynthesis and mode of action (where known). So that you may understand the modes of action of natural products from a biological and biochemical perspective, I will spend the first week in a whirlwind introduction of how drugs work. While this course is *not* intended as a comprehensive course in herbal medicine, I will cover some of the more popular current herbal remedies and examine pro and con scientific evidence. Students will help here by giving oral presentations on some aspect of pharmacognosy.

Due to the chemically rigorous and biologically detailed nature of the course, **prerequisites** are Chem 323 (Organic II) and Cell Biology (Biol 302) and/or Biochemistry I (Chem 452) or equivalent courses. This course counts as a Biology *or* Chemistry elective. B/MB majors especially may wish to use this course to fulfill the Biology elective requirement, while Biology majors may use this to finish minor programs in Chemistry. Please sign up for the appropriate course prefix.

Below is a tentative course topical outline for this course. Chapter designations are for the proposed texts, "*Pharmacognosy and Pharmacobiotechnology*", by Robbers, Speedie and Tyler and "*Pills, Potions and Poisons"* by Stone and Darlington.

WINTERIM COURSE

Week 1-How Drugs Work
Selected Chapters from *Pills, Potions and Poisons*

Breathing: allergies, asthma
Painkillers,Rheumatic Diseases
Depression
Digestion
The heart
Infections and Infestations
Cancer
Steroids
Vitamins
Love Potions and Aphrodisiacs
Drugs of recreation and misuse

Weeks 2 and 3-Pharmacognosy
Selected Chapters from *Pharmacognosy and Pharmacobiotechnology*

Chapter 1: Introduction to Pharmacognosy
Chapter 3: Complex Polysaccharides
Chapter 4: Glycosides
Chapter 5: Lipids
Chapter 6: Terpenoids
Chapter 7: Steroids
Chapter 8: Phenylpropanoids
Chapter 9: Alkaloids
Chapter 10: Proteins and Peptides
Chapter 11: Antibiotics