Goldenseal Drug Interactions
John R. Horn, PharmD, FCCP, and Philip D. Hansten, PharmD

Goldenseal appears to inhibit some cytochrome P450 (CYP) drug-metabolizing isozymes, CYP3A4, CYP2D6, and probably CYP2C9. Because CYP3A4 metabolizes more drugs than any other isozyme, there is a potential for numerous interactions with goldenseal. Available clinical evidence suggests that goldenseal does not inhibit CYP1A2 or CYP2E1, and the lack of an effect of goldenseal on digoxin pharmacokinetics suggests that it does not affect the transporter, P-glycoprotein (ABCB1).1

CYP3A4 Inhibition
Pharmacokinetic studies of midazolam and cyclosporine in healthy subjects show that berberine (or goldenseal) is a CYP2C9 inhibitor. Although the effect of CYP2C9 inhibition on the efficacy of losartan is not clear, inhibitors of CYP2C9 are known to increase warfarin response, thus potentially increasing the bleeding risk if doses are not adjusted. Although the effect of goldenseal on CYP2C9 requires more study, one should assume that goldenseal can increase warfarin response until clinical studies of the combination are performed. Other CYP2C9 substrates that might interact with goldenseal include phenytoin as well as several oral anti-diabetic agents.

Summary
Goldenseal is one of the few herbal products for which we have credible clinical information on its interactive properties. The most important of these properties is the ability of goldenseal to inhibit CYP3A4, because so many drugs are CYP3A4 substrates and some of these drugs have substantial toxicity.

The evidence for CYP2D6 inhibition by goldenseal is also substantial, although a limited number of drugs are CYP2D6 substrates. The ability of goldenseal to inhibit CYP2C9 is still under study, but if it proves to be real, one would expect adverse interactions with warfarin and other CYP2C9 substrates. 

Available clinical evidence suggests that goldenseal does not inhibit CYP1A2 or CYP2E1.