

PHA 5128
HOMEWORK 5
(Digoxin, Cyclosporine, and Methotrexate)
Spring 2007

1. L.B., a 50-year-old, 75 kg male (C_{pcreat} 1.4mg/dL), has been taking 0.5mg of digoxin tablets orally for his CHF, and at 9:30am on the day of admission, a digoxin plasma concentration of 2.1 μ g/L was measured. He was continued on his outpatient maintenance dose. On the fourth day, just before his morning dose (three doses of digoxin have been administered each day at 9:30am), a second digoxin sample was obtained. Please predict L.B.'s digoxin concentration in the morning of the fourth day.
(3 pts)

2. M.R. is a 60 kg female patient (56 years old, 5'5") to receive methotrexate therapy. Her serum creatinine is 1.6 mg/dL. She was treated with a loading dose (20 mg) followed by an infusion of 25 mg/h over 36 hours. Then she received leucovorin rescue (10 mg/m² q6h) for 48 hr, and a blood sample was taken at 48hr, methotrexate concentration was measured. Please predict this methotrexate concentration, and indicate whether leucovorin rescue should continue or not. (3 pts)

3. A clinical study was performed to assess the effect of Rifampin on the Tacrolimus pharmacokinetics after oral and intravenous administration. The same doses were used in the two phases. A washout period was between two phases. Rifampin is considered to be a first-line agent for the treatment of tuberculosis, and induces CYP3A metabolism and P-gp- mediated transport. The following two PK graphs are from this study. State whether the following statement is TRUE or FALSE? Explain. (3 pts)

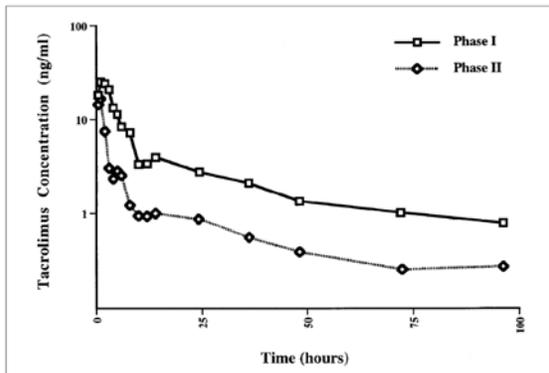


Figure 1. Representative concentration-time curves (whole blood) for oral tacrolimus, before rifampin administration (open squares, phase I), and with rifampin administration (open diamonds, phase II).

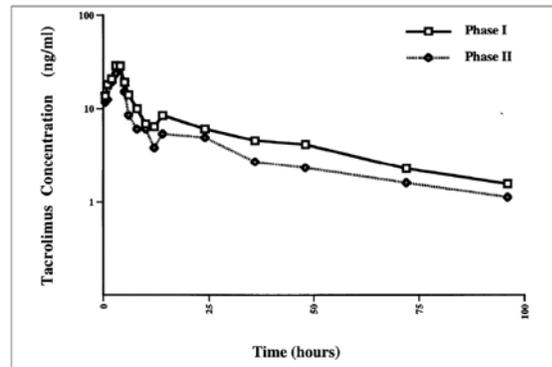


Figure 2. Representative concentration-time curves (whole blood) for intravenous tacrolimus, before rifampin administration (open squares, phase I), and with rifampin administration (open diamonds, phase II).

- A: Tacrolimus could be a substrate of P-gp and CYP3A.
 B: Tacrolimus is eliminated via renal filtration.
 C: Dose regimen needs adjusted for Tacrolimus when co-administration of rifampin.

4. S.H. is a 78 year old liver transplant patient. In the hospital, he received 450 mg one dose of cyclosporin as an iv infusion which resulted in a trough level of 350 ng/ml. After he is discharged, he will continue with oral cyclosporine treatment. What will be the oral dose regimen in order to achieve the same trough level? (1 pt)