Case Study 2
PHA 5127
Fall 2005

Question 1:

An 50-year-old, male patient was admitted to hospital with gram-negative pneumonia infection, and was given an iv bolus of drug X. (200 mg). The drug concentrations at 2hr and 12hr after initial dose were reported as 7.1mg/L and 1.3mg/L. Assuming the drug follows one compartment body model with first-order elimination, please calculate the total Cl, $AUC_{0-\infty}$, Vd, $t_{1/2}$ for drug X.

Question 2:

70-90% of quinidine is bound to plasma albumin and alpha-1-acid glycoprotein. In patients with chronic liver disease plasma protein binding is decreased by 20%. How will the volume of distribution change? Use a plasma volume of 3 L and the fraction bound in plasma 80% (for normal patients), a tissue volume of 38 L and the fraction unbound in tissue 80% to calculate the volume of distribution in patients with liver disease.

Question 3:

Researchers recently found out that grape fruit juice is CYP3A4 inhibitor. When taking together with grape fruit juice, the intrinsic hepatic clearance (CL int) of drug B is decreased by 20%. Main pharmacokinetic parameters of drug B were listed as following: Hepatic clearance (WITHOUT taking grape fruit juice), CL hep = 10 L / hr. Fraction unbound: fu = 0.4. Please calculate what is the new hepatic clearance, when drug B is taking together with grape fruit juice. Assume the hepatic blood flow is 90 L / hr.

Question 4:

Please answer the following questions with true or false:

a) for high extraction drugs:

1) In case of a increasing fraction unbound, the extraction ratio of the drug stays the same,
2) In case of increased hepatic blood flow, the clearance stays the same

b) for low extraction drugs:

1) In case of increasing fraction unbound, the extraction ratio of the drug stays the same,
2) In case increasing hepatic blood flow, the clearance of the drug stays the same.

.