

Problem Set #2

- 1) List 5 factors that can influence the dissolution rate of a solid drug particle.
- 2) Compare transmembrane-limited absorption and dissolution rate-limited absorption.
- 3) Estimate V_d for a drug when the volume of plasma and tissue are 5 and 30 L, respectively and the fraction of drug bound in plasma is 0.3 and that bound in tissue is 0.2.
- 4) "Loferin", an antidepressant, was given as a 500 mg iv bolus to J. T., a 15 yr old, 50 kg patient. Upon analyzing the plasma concentration profile, a half-life of 10 hrs was determined for "loferin". When the same dose was given as a tablet to this patient, an AUC of $100 \mu\text{g}\cdot\text{hr}/\text{ml}$ was calculated. Determine the absolute bioavailability for "loferin" in this patient. Assume a V_d of 0.5 L/kg and one-compartment first-order elimination for "loferin".
- 5) Compared to oral route of administration, what are the advantages and disadvantages of the pulmonary route?
- 6) Circle the correct statement:
 - T F For rapidly dissolving drug particles, small differences in the rates of dissolution affect the plasma concentration profile when intestinal permeability is the rate limiting step.
 - T F A concentration gradient is essential for facilitated transport.
 - T F Nitroglycerin can be administered sublingually, transdermally or orally.
 - T F The extent of plasma protein binding of a drug affects how much of the drug is able to diffuse into tissues.
- 7) Use the table shown below to answer the following questions:
 - a) Give the correct order of dissolution rate in the small intestines for drugs A, B, C and D. Assume a pH of 8.0 in the small intestines.
 - b) Give the correct order of diffusion rate through GIT membranes for drugs A, B, C and D. Assume all drugs are in solution.

	A	B	C	D
pKa	Weak acid pKa 5.4	Quaternary amine	Weak base pKa 10	Neutral
Partition coefficient	5	1	10	50