

STUDENT VERSION

MEDICINE PILL

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Abstract: Administration of a medicinal pill in single and multiple doses is modeled.

SCENARIO DESCRIPTION

A medicinal pill, e.g., decongestant or antihistamine, is swallowed by a patient and enters the Gastro-Intestinal Tract (GI-Tract), whereupon it dissolves and then diffuses into the Bloodstream. Finally, the medicine leaves the body through Kidney and Liver removal. See Figure 1.

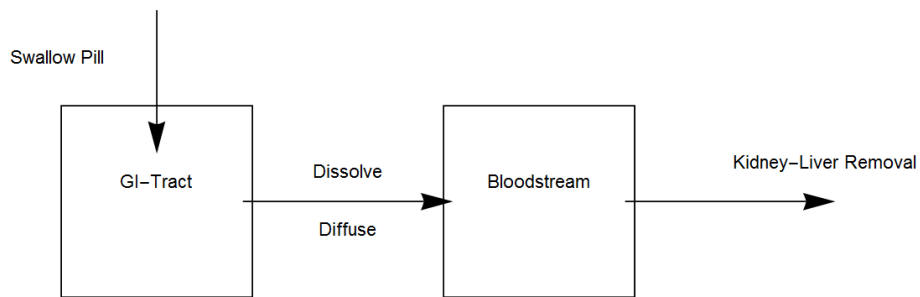


Figure 1. Overview of activity for medicinal pill.

We consider two instances:

- (a) Just one pill with P mg of the medicine is administered.
- (b) A regimen of pills, one per hour, each with P mg of the medicine is administered.

Activities

1. For both (a) and (b) model the amount of medicine in both the GI-tract and the Bloodstream over time in hours. Be sure to make your assumptions clear and relevant.

2. In both cases, describe the amount of medicine in each compartment (GI-Tract and Bloodstream) with a plot based on some numbers you think are reasonable from your understanding of taking medicine, e.g., a doctor says, “Take one every four hours.”
3. Describe the long term behavior of the amount of medicine in each compartment (GI-Tract and Bloodstream).
4. Reflect on the reasonableness of your model results.