Half life of medicines

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The study of pharmacokinetics includes absorption, distribution, metabolism and excretion. While learning about the metabolism and excretion of drugs from the body (clearance) it is likely that you will also learn about half life. The half life of a drug is the time taken for the plasma concentration to reduce by half. This is important because it gives us an indication of how long it will take for a medicine to be eliminated from the body.

If clearance is impaired due to liver or renal impairment, the half life will be prolonged and, unless the dose is reduced or the dose interval extended, toxicity could occur.
Try the following questions to test your understanding of half life.

QUESTION 1
Drug A has a half life of 6 hours. It reaches a peak plasma concentration of 120 mg/ml after a single dose. What will the plasma concentration be after 24 hours?
60 mg/L
30 mg/L
15 mg/L
7.5 mg/L
3.7 5mg/L

What will the plasma concentration be after FIVE half lives?

How long will it take the plasma concentration to fall to 15 mg/L?

QUESTION 2
Imagine a scenario where your patient is now less able to eliminate Drug A from the body due to renal impairment. The half life of drug A has increased to 12 hours for this patient.

The peak plasma concentration of Drug A remains 120 mgL, as before. What will be the plasma concentration after 24 hours?

How long will it take the plasma concentration to fall to 15 mg/L?