

**Very Brief Notes on:**

**The Clinical Pharmacokinetics of:**

# **Carbamazepine (CBZ)**

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**Prof. Hisham S. Abou-Auda**  
Department of Clinical Pharmacy  
College of Pharmacy  
King Saud University  
<http://faculty.ksu.edu.sa/hisham>

**CARBAMAZEPINE****(CBZ)**

- ◆ Therapeutic Cp = 4–12 mg/L (Sometimes > 9 mg/L produces side effects).
- ◆ F = 0.8
- ◆ S = 1
- ◆ V<sub>d</sub> = 1.4 L/kg (range 0.8-1.9 L/kg)
- ◆ CL = 0.064 L/hr/kg
- ◆ t<sub>1/2</sub> = 15 hrs (single-dose studies --> 30–35 hrs)
- ◆ Completely metabolized by liver (<2% = furine)
- ◆ CL (based on single dose is 1/2 to 1/3 CL based on chronic administration. [**Auto-induction**])

**EXAMPLE 1**

Patient (60 kg) is to be given CBZ. Calculate daily dose that will produce CP<sub>ss</sub> .6 mg/L.

**SOLUTION:**

F = 0.8, S = 1, CL = 0.064×60 = 3.84 L/hr

$$\frac{\text{S.F.D}}{\tau} = \text{CL} \cdot \bar{C}_{ss}$$

L/hr    mg/L    hr/day

$$D = \frac{\text{CL} \cdot \bar{C}_{ss} \cdot \tau}{\text{S.F}} = \frac{3.84 \times 6 \times 24}{1 \times 0.8} = 691.2 \text{ mg} \cong 700 \text{ mg}$$

The usual dose = 200-400 mg/day initially then increased by 200 mg every 7-14 days.

**EXAMPLE 2**

Assume that the dose was increased to 300 mg twice daily and  $\bar{C}_{ss} = 4 \text{ mg/L}$ . What daily dose would be required to achieve new  $\bar{C}_{ss}$  of 6 mg/L?

**SOLUTION:**

S = 1, F = 0.8,  $\bar{C}_{ss} = 4 \text{ mg/L}$ ,  $\tau = 12 \text{ hr}$

Solve for CL

$$\text{CL} = \frac{\text{S.F.D}}{\bar{C}_{ss} \cdot \tau} = \frac{1 \times 0.8 \times 300}{4 \times 12} = 5 \text{ L/hr}$$

$$D = \frac{\text{CL} \cdot \bar{C}_{ss} \cdot \tau}{\text{S.F}} = \frac{5 \times 6 \times 24}{1 \times 0.8} = 900 \text{ mg}$$