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# Cymbalta

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# CYMBALTA

Trade Name<sup>1</sup>:

Cymbalta

Chemical Name<sup>1</sup>:

Duloxetine Hydrochloride

Chemical Formula<sup>2</sup>:

$C_{18}H_{19}NOS \cdot HCl$

Uses<sup>1</sup>:

Duloxetine Hydrochloride is used to treat major depression, generalized anxiety, fibromyalgia, diabetic peripheral neuropathy.

Unlabeled Uses<sup>1</sup>:

"Stress urinary incontinence"

Availability of Cymbalta<sup>1</sup>:

20mg, 30mg, 60mg capsules

Dosing and Molar Mass<sup>1</sup>:

In the treatment of major depression a person may be prescribed a 40mg dose, divided into 20mg taken twice a day, so 40mg/2 = 20mg

Images<sup>3</sup>:



Dose to Molecules<sup>2</sup>:

20mg \* 297g/mol of  $C_{18}H_{19}NOS \cdot HCl$  \*  $6.02 \times 10^{23}$  =  $12 \times 297$ g/mol of  $C_{18}H_{19}NOS \cdot HCl$  \*  $6.02 \times 10^{23}$  =  $3.58 \times 10^{24}$  molecules/20mg

Dose to Tablets:

20mg = 1 capsule  
40mg (1 capsule/20mg) = 2 capsules

Water Solubility<sup>2</sup>:

Slightly water soluble  
pKa in DMF-water (66:34): 9.6 solubility in water.

Classification<sup>1</sup>:

Antidepressant; SNRI  
(serotonin norepinephrine re-uptake inhibitor)

Route & Dosage<sup>1</sup>:

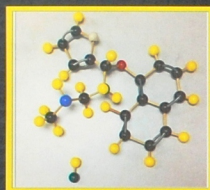
Smallest dosage : 20mg

(Duloxetine Hydrochloride)<sup>1</sup>

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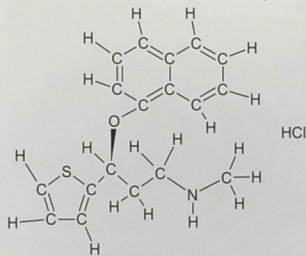


## Molar Mass of Duloxetine Hydrochloride

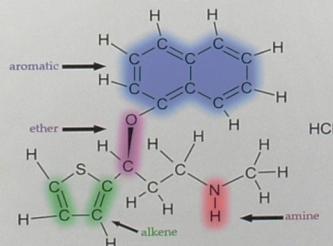
18 mol C (12.0 g/mol C) = 216 g  
19 mol H (1.0 g/mol H) = 19 g  
1 mol N (14.0 g/mol N) = 14 g  
1 mol O (16.0 g/mol O) = 16 g  
1 mol S (32.1 g/mol S) = 32.1 g  
1 mol H (1.0 g/mol H) = 1 g  
1 mol Cl (35.5 g/mol Cl) = 35.5 g

216 g + 19 g + 14 g + 16 g + 32.1 g + 1 g + 35.5 g = **333.6 g**

Expanded structural formula of Cymbalta



Functional Groups of Cymbalta<sup>4</sup>



Functional Group	Hydrophobic or Hydrophilic?	Acidic or Basic?
Aromatic	Hydrophobic	N/A
Amine	Hydrophilic	Basic
Ether	Hydrophilic	Neutral
Alkene	Hydrophobic	N/A

Processing of Cymbalta in the Body<sup>1</sup>:

Duloxetine works as an enzyme inhibitor. This means it binds to enzymes in order to decrease their activity and prevent them from catalyzing and becoming more active.

Breakdown of Cymbalta in the Body<sup>1</sup>:

Duloxetine is metabolized in the liver.

How the Body Disposes of Cymbalta<sup>1</sup>:

The body eliminates Duloxetine through the excretion of urine (70%) and feces (20%).

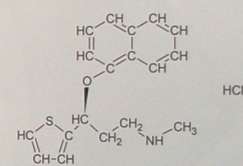
Half Life of Cymbalta<sup>1</sup>:

8-17 hour half life,  
12 hour half life average

Body's Processing of Cymbalta<sup>1</sup>:

Duloxetine hydrochloride is taken orally (PO, per os)

Condensed structural formula of Cymbalta



Molar mass rounded to no decimal places: 334 g

Literature value for molar mass<sup>2</sup>: 297.42g

The molar mass and literature value are different because I rounded differently than The Merck Index did.

## Works Cited

1. Wilson, R.A.; Shuman, M.T.; Shukla, R.K. Duloxetine Hydrochloride - *Parent Novel Drug Guide 2019*, Pearson Education, Inc. Upper Saddle River, NJ, 2019; pp919-921.
2. O'Neil, M.J.; Heckelman, D.E.; Koth, C.; Russo, K.J., Eds. *The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals 15th ed.*; The Royal Society of Chemistry: Cambridge, UK, 2013; 3113 Duloxetine.
3. *Merck Index Online*. Duloxetine Hydrochloride. <https://www.merckindex.com/entry/duloxetine-hydrochloride>. Accessed Oct 21, 2023.
4. Tashirohiki, Kana C. *Chemistry: An Introduction to General, Organic and Biological Chemistry*. Upper Saddle River (N.J.): Pearson Prentice Hall, 2012. Print.