2014

Focalin XR: Dexmethylphenidate Hydrochloride

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Recommended Citation
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What does the drug do?
Works on the cerebral cortex with a mild stimulant effect. Causes mild CNS and respiratory stimulation with potency between amphetamines and caffeine. Effects more prominent on mental activities than on motor activities. Also suppresses appetite.

Generic Name:
Dexmethylphenidate Hydrochloride

Trade Names:
Focalin XR, Concerta, Daytrana, Metadate CD, Metadate ER, Methylin, Methylin ER, Ritalin, Ritalin LA, Ritalin SR

Chemical Names and Formula:
d-threo-Form (αR, 2R)-α-Phenyl-2-piperidine-acetic acid methyl ester; dexmethylphenidate d-threo-hydrochloride, dexmethylphenidate hydrochloride
C₁₄H₁₉NO₂·HCl

How is the drug taken?
Orally, swallowed whole, 30-45 min before meals and before 6 pm to avoid insomnia. Some of the capsules can be sprinkled on food. Absorbed by the GI tract, peak effect in 1.9 hours. Effects continue for 3-6 hours. In sustained release, 8 hours. Also available in a transdermal patch.

Classification:
Cerebral stimulant

Uses:
1. Used in adjunctive therapy to treat symptoms of attention deficit disorder in children and adults. Also used to treat narcolepsy and in veterinary medicine to treat canine behavioral problems. Unlabeled use to treat depression.

Metabolized primarily to d-α-phenyl-piperidine acetic acid (also known as d-ritalinic acid) by de-esterification (removing ester groups from it). For all forms, the body eliminates the drug in urine.

Calculation of Molar Mass:

Element | MM | # | Total |
---|---|---|---|
Carbon | 12.0 g/mole | 14 | 168.00 g/mole |
Hydrogen | 1.0 g/mole | 19 | 19.0 g/mole |
Nitrogen | 14.0 g/mole | 1 | 1.0 g/mole |
Oxygen | 16.0 g/mole | 2 | 32.0 g/mole |
Chlorine | 35.5 g/mole | 1 | 35.5 g/mole |
MM of dexmethylphenidate | | | 269.77 g/mole |

Water solubility:
1.82 e-01 g/L (insoluble)

However, according to all sources, dexmethylphenidate hydrochloride is freely soluble, but a solubility figure on dexmethylphenidate with hydrochloride does not seem to be available. HCl is polar (and thus water soluble) so it is possible that the addition of the HCl makes dexmethylphenidate hydrochloride soluble.

References:

Molecules per chosen dose:
5 mg: 6 mg C₁₄H₁₉NO₂·HCl / 5 mg C₁₄H₁₉NO₂·HCl / 11 mg C₁₄H₁₉NO₂·HCl
10 mg: 12 mg C₁₄H₁₉NO₂·HCl / 22 mg C₁₄H₁₉NO₂·HCl
20 mg: 24 mg C₁₄H₁₉NO₂·HCl / 44 mg C₁₄H₁₉NO₂·HCl
5 mg: 5 mg C₁₄H₁₉NO₂·HCl / 3 mg C₁₄H₁₉NO₂·HCl

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CHE106-04