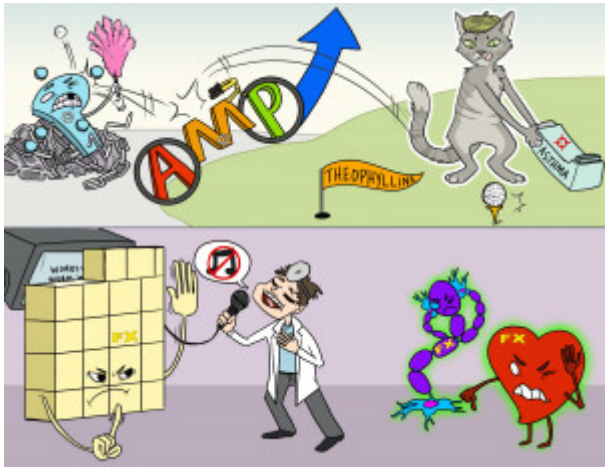
Theophylline

Theophylline is a methylxanthine medication used to treat asthma (and sometimes COPD). This drug is metabolized by cytochrome P-450 and works by inhibiting phosphodiesterase, leading to increased cAMP, which causes bronchodilation. It has a very narrow therapeutic index, so use is often limited and can lead to side effects of cardiotoxicity and neurotoxicity.



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Indications

Asthma
Asthma-inhaler
Theophylline is indicated for use in mild-to-moderate persistent asthma and is sometimes used in conjunction with an inhaled corticosteroid for an exacerbation. Due to its bronchodilatory effects, it has been indicated for COPD and infant apnea.

Mechanism

Inhibits Phosphodiesterase
Phosphorus-P Duster with Inhibiting-chains
This drug is a competitive nonselective phosphodiesterase inhibitor. Phosphodiesterase works to break down cAMP to AMP (increased levels of cAMP lead to bronchodilation). Inhibition of this enzyme also inhibits TNF-a, leukotrienes, and inflammation.

Increases cAMP
Up-arrow cycle-AMP
Inhibition of phosphodiesterase protects cAMP from degradation, increasing its availability. Increased cAMP influences bronchodilation, making this drug useful in asthma and other respiratory conditions.

Side Effects

Cardiotoxicity
Heart with Toxic-green-glow
This drug has a very narrow therapeutic index, and patients taking this medication can develop cardiac abnormalities such as arrhythmia or tachycardia. These effects can manifest due to the adenosine-blocking effects of the drug.

Neurotoxicity
Nerve with Toxic-green-glow
Theophylline has a very narrow therapeutic index, and patients taking this medication can develop CNS symptoms such as dizziness, lightheadedness, irritability, and in severe toxicities, seizure.

Blocks Adenosine Action
Blocking A-dentist-singing
Patients with heart ailments should be considered when prescribing this medication, as Theophylline blocks the A1, A2, and A3 adenosine receptors in the heart. This blockage may cause arrhythmias to occur in patients who were taking adenosine previously.

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