

The Isomers of Some Drugs One Effective and the Other Is Toxic or Ineffective

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Abstract

The human body has the heart, which is Levo, and the gastrointestinal tract, with the liver in the Dextro position. The carbohydrates in our food are Dextro, and the amino acids in our food are Levo; hence, the isomers of compounds taken by humans may be harmful or ineffective. As a result, we will investigate some drugs in which one of its isomers is effective while the other is ineffective, such as Levo and Dextro-Ethambutol, Levo and Dextro-Dopa, Levo and Dextro-Amphetamine, Dextro and Levo-Rabeprazole, Cis and Trans-Platin, R and S-Hexobarbital, R and S-Fluoxetine.

It may be that each isomer has one pharmacological difference from the other isomer, e.g., quinine and quinidine, and R and S-propafenone.

Keywords: Levo, Dextro, R, S, Cis, Trans, Stereo, effective, pharmacological active, toxicity, racemic mixture

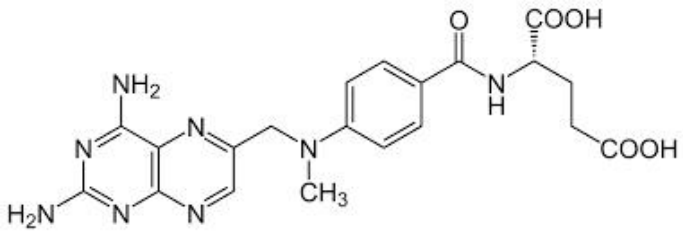
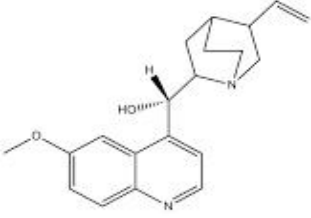
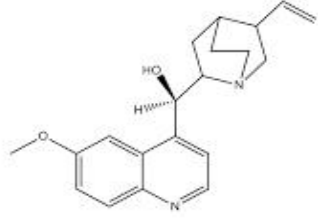
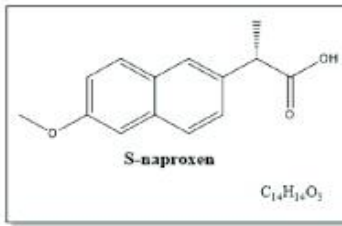
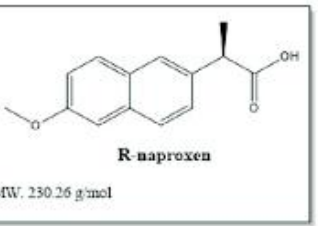
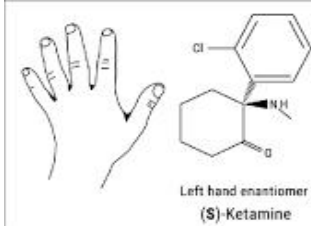
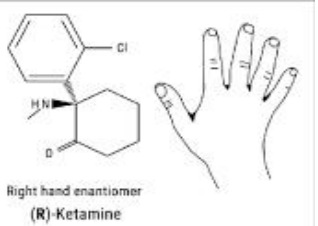
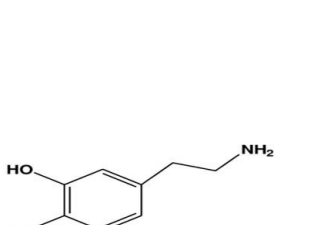
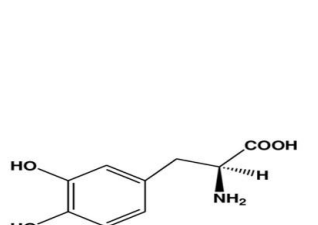

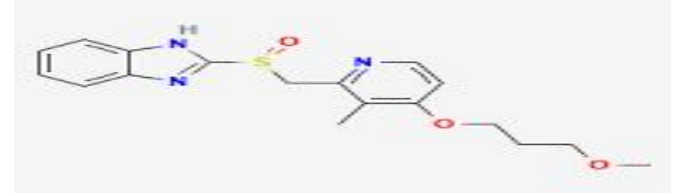
1. Introduction

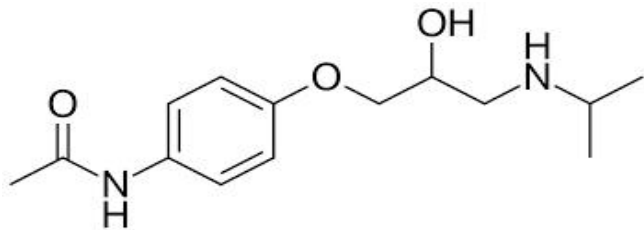
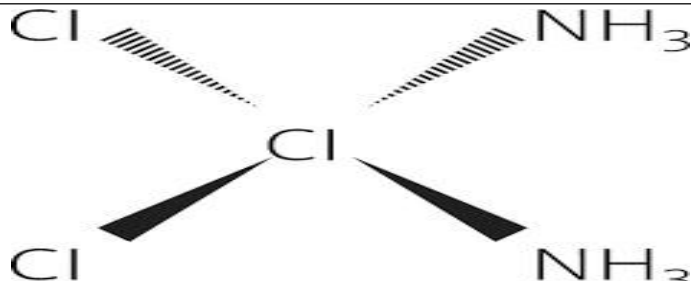
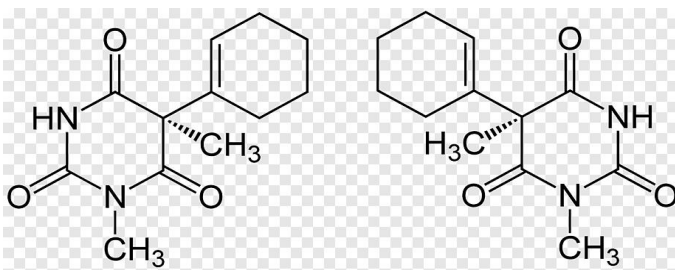
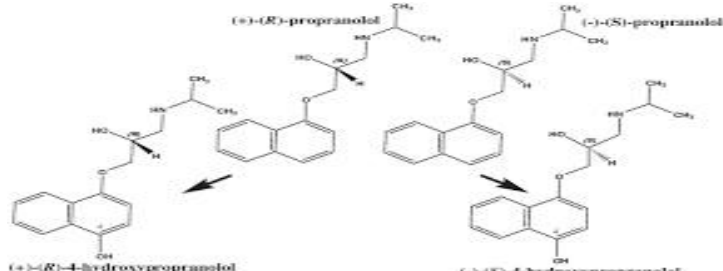
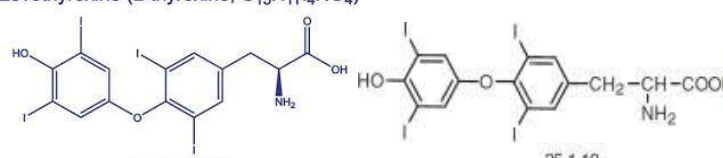
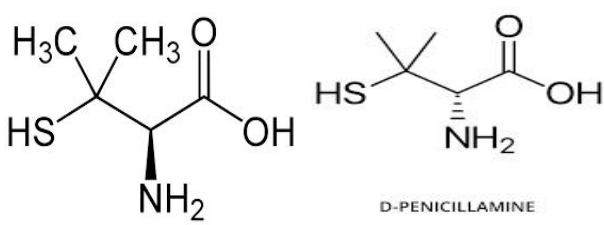
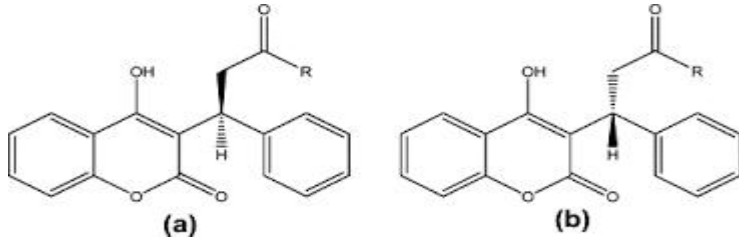
Most of the drugs on the market—nearly more than 60%—are in the form of stereochemical compounds.

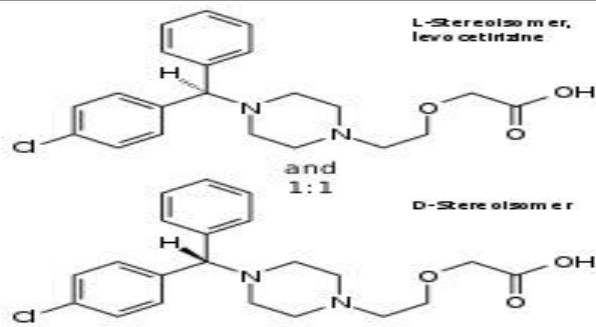
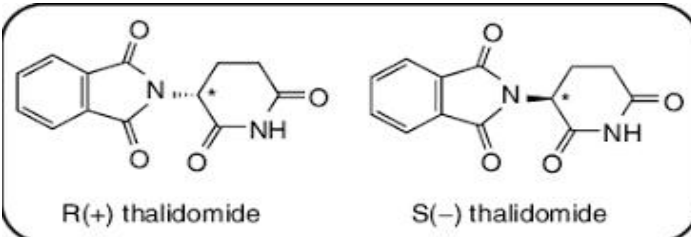
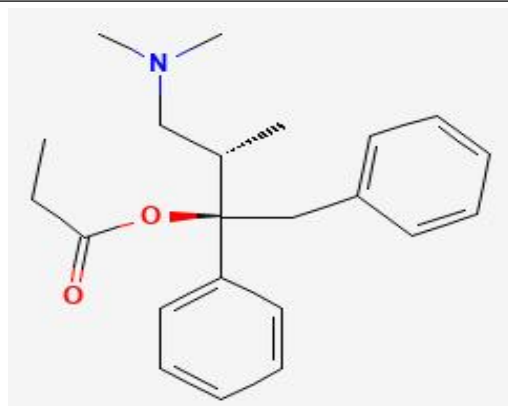
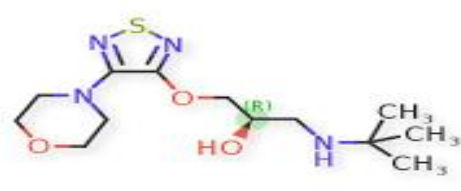
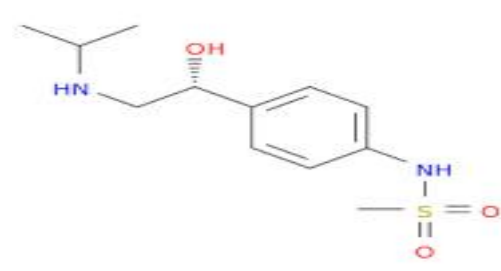
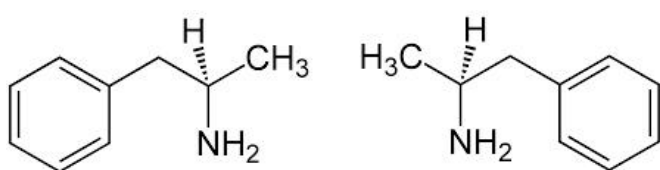
The stereochemistry was a guide for a medicinal chemist in his work to assign the synthesis of organic compounds to contain a chiral carbon, due to the fact that the L-Propranolol is active as a beta-blocker while the Dextro form is inactive, the S-Timolol is an alpha-blocker while the R is a beta-blocker, the L-Sotalol is a beta-blocker while D-Sotalol is inactive, the Propoxyphen 2R 3S is analgesic while 2S 3R is antitussive, R Thalidomide is sedative while the S is

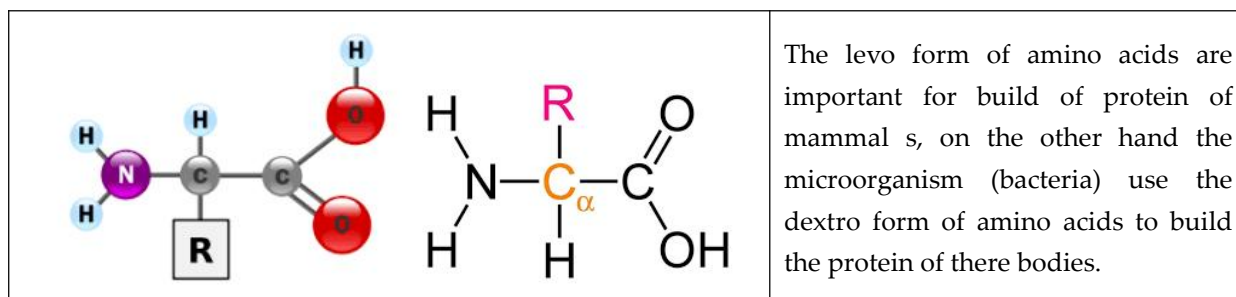
teratogenic, the R form of Naproxen is arthralgic while S form of Naproxen is teratogenic, Levo-cetirizine is more effective than Dextro-cetirizine, Levo-Carnitine is the active form while Dextro is inactive, Levo-Dropropizine is active as an antitussive while the Dextro form is inactive; Levo-Bupivacaine is cardiotoxic while the racemic mixture is safer, S form of citalopram is more active than R form, Levo form of Orphanol is active than Dextro form, Dextro and Beta Methasone is more active than Levo and Alpha form.

2. Chemistry and Pharmacology

	<p>Levo methotrexate is used in market due to is better absorbed than dextro. So the bioavilability is more, hence the levo is used.</p>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Quinidine</p> </div> <div style="text-align: center;">  <p>Quinine</p> </div> </div>	<p>The quinine is alkaloid which used as anti-malarial agent in levo form. While the quinidine also alkaloid used as anti arrhythmic agent used in dextro form.</p>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>S-naproxen</p> </div> <div style="text-align: center;">  <p>R-naproxen</p> </div> </div> <p style="text-align: center;">$C_{14}H_{14}O_3$ MW. 230.26 g/mol</p>	<p>The R form of naproxen is used as arthrolagic (analgesic for pain of joints). While the S form of naproxen is teratogenic.</p>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Left hand enantiomer (S)-Ketamine</p> </div> <div style="text-align: center;">  <p>Right hand enantiomer (R)-Ketamine</p> </div> </div>	<p>The S form is used as general anesthetic agent, and have analgesia analogo sedation and act on NMDA receptor. While the R form of ketamine has action inversely of S form (halothinogenic agent).</p>
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Dopamine</p> <p>Too Polar Cannot cross blood brain barrier</p> </div> <div style="text-align: center;">  <p>Levodopa</p> <p>Non-polar Can cross blood brain barrier</p> </div> </div>	<p>The levo form of dopa used in treatment of parkinsonism where it across the blood brain barrier due to its similar to amino acids and carried by amino acid carrier. While the dextro form of dopa not similar to amino acids which are in levo form. The dextro form of dopa decrease the white blood cells, hence cause infection.</p>
	<p>The levo form of ethambutol used as anti-tuberculosis. While the dextro form of ethambutol is not used where cause blindness.</p>
	<p>The dextro form of rabeprazole is proton pump inhibitor while levo form is inert.</p>

	<p>Practolol is a constitutional isomer of atenolol, but when used cause blindness inspite it has a chiral carbon.</p>
	<p>It's a diastereoisomers or geometrical isomers. The configurational is cis or trans, the cisplatin is used as anti cancer agent used in treat ment of tumor. While the trans form of cisplatin is inert.</p>
	<p>The S form of hexobarbital is absorbed better, hence increase the bioavailability other than the R form so used in psychosis.</p>
	<p>The levo form of propranolol is less bind to blood protein than dextro form (the dextro form of propranolol is confirmed bind to plasma protein so it inactive).</p>
<p>Levothyroxine (L-thyroxine, C₁₅H₁₁I₄NO₄)</p> 	<p>The levo form of thyroxine used in deficiency of thyroxine while the dextro form is hypolipidemic agent. N.B. the thyroxine excreted from thyroid gland is exactly dextro form.</p>
 <p style="text-align: center;">D-PENICILLAMINE</p>	<p>The dextro form of penicillamine is used in treatment of Wilson disease (cystinurea and rheumatoidarthritis) while the levo form cause optic neuritis and incorporated with protein.</p>
 <p style="text-align: center;">(a) (b)</p>	<p>The S form of warfarin used as haemophilic agent because its not bound to albumin while the R form of warfarin it has low value as haemophilic agent due to its bound extensively with albumin.</p>

	<p>The levo cetirizine is less than dextro in distribution, hence take long time than dextro and more effective than dextro.</p>
	<p>Thalidomide R form is sedative while the S form teratogenic (cause phocomelia).</p>
	<p>The 2R 3S propoxyfen is a potent analgesic while the 2S 3R is potent anti tussive agent.</p>
	<p>The R form of timolol is beta-1 blocker while the S form of timolol is alpha blocker.</p>
	<p>The levo form of sotalol is beta-1 blocker while dextro form of sotalol is inactive as beta blocker.</p>
	<p>The dextro form of amphetamine is potent CNS stimulant (used anorexigenic, narcolepsy and attention deficiency in children) while levo form of amphetamine act on cardiovascular system cause increase in heart rate (systolic and diastolic).</p>



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