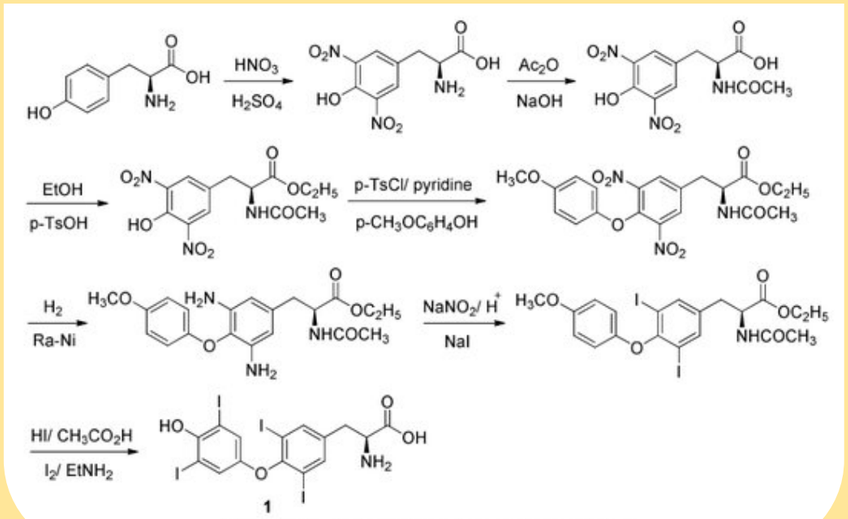
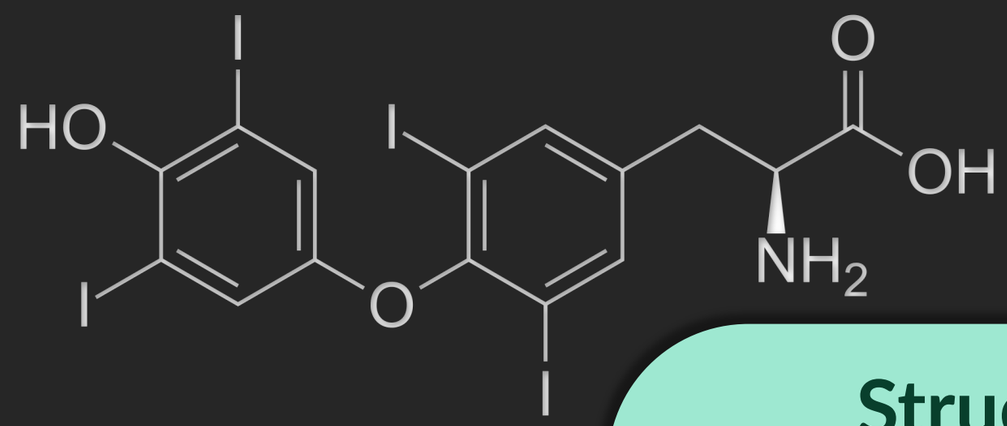
Levothyroxine

Synthesis

Levothyroxine, although differently named, is identical to naturally occuring thyroxine, since both have the same ”levo”-chirality. The naming conventions are only there to differentiate between synthesised and naturally occuring thyroxine



Scheme 1. Synthesis of Levothyroxine (**1**)



Structure

Levothyroxine (L-Thyroxine) has a chirality which is levorotary (see *Fig. 1*). It’s functional groups are carboxylic groups, hydroxy-groups, an amine group and a dibenzyloxy-group. It also contains some Iodines.

It’s an organic molecule, consisting mostly of carbon and hydrogen, but with other common organic functional groups as well.

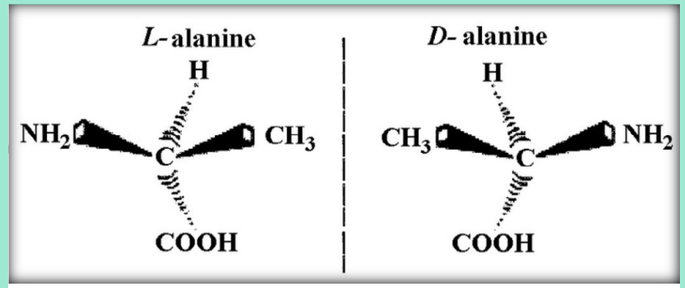


Fig 1. Levo– vs. Dextrorotary enantiomers of Alanine

Usage

Levothyroxine is primarily used to treat patients without Thyroxine (T_4) suffering from *hypothyroidism* — i.e. thyroid hormone deficiency.

The synthesis of L-thyroxine is a quite complicated process involving many oxidations and reductions in series.

Side Effects

L-thyroxine is not to be administered to people who are pregnant or are generally above the age of 50. The reason for this is that thyroid hormone raises the heart’s demand for oxygen, and causes increased heart rate. Increased heart rate may have implications later in life.