CHELATION THERAPY

- Detoxification of metal ion can be achieved by the use of suitable chelating agents.The process is known as Chelation therapy.
- When metals like lead, mercury, and arsenic build up in our body, they can be toxic.
- Chelation therapy is a treatment that uses medicine to remove these metals so they don't make you sick.
- Chelation therapy uses special drugs that bind to metals in our blood. You get the chelating medicine through an intravenous (IV) tube in our arm. It’s also available in pill form.
- Once the drug has attached to the metal, our body removes them both through your urine.

METAL CHELATES AS DRUGS : ($CaNa_2EDTA$)

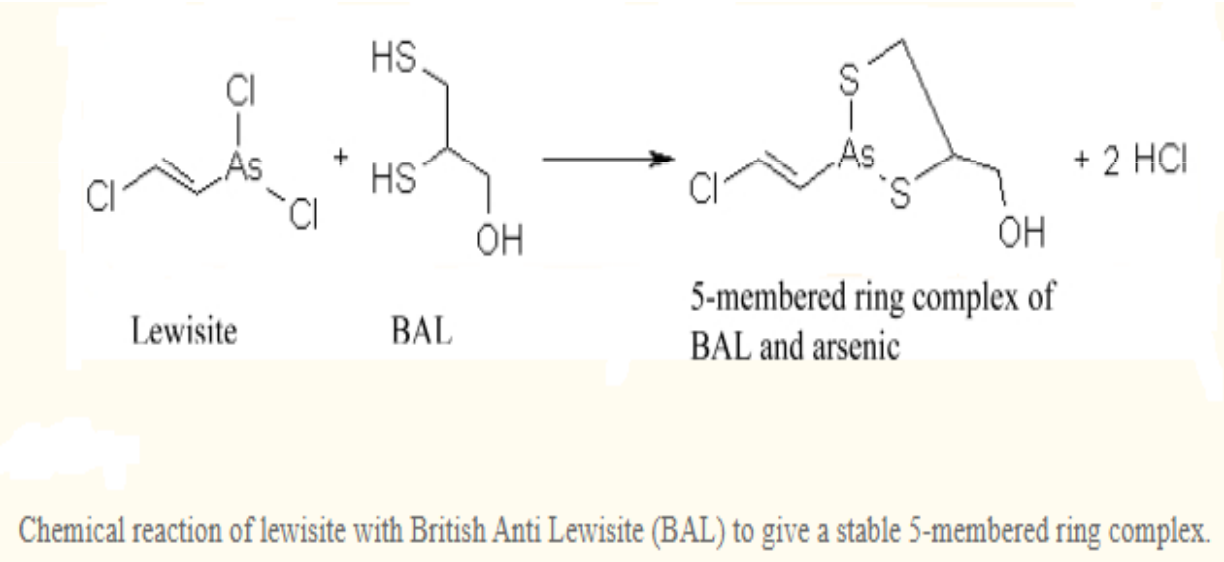
- Calcium Disodium Ethylenediamine Tetra acetic Acid ($CaNa_2EDTA$)
- Calcium disodium ethylenediamine tetra acetic acid ($CaNa_2EDTA$) is the most commonly used chelating agent
- $CaNa_2EDTA$ can be valuable for the treatment of poisoning by metals that have higher affinity for chelating agent than does Ca^{2+}.
- The successful use of $CaNa_2EDTA$ in the treatment of lead poisoning is due, in part, to the capacity of lead to displace calcium from the chelate.
- $CaNa_2EDTA$ was introduced for the treatment of lead poisoning. The Pb-EDTA complex has high stability constant thus $CaNa_2EDTA$ was found to chelate lead from the body fluids, excreting $PbNa_2EDTA$ leaving Ca behind through urine with unreacted $CaNa_2EDTA$.

CHELATING AGENTS AS DRUGS : BAL(BRITISH ANTI LEWSITE)

- 2,3-Dimercaprol (BAL) is a traditional chelating agent developed by British biochemists at Oxford University during World War II.
- BAL has a 3-carbon backbone with two sulphydryl (–SH) groups and a hydroxyl group.
- It has been used clinically since 1949 in arsenic, cadmium and mercury poisoning. It is an oily, clear, colorless liquid with a pungent, unpleasant typical mercaptan smell
- It detoxifies lewisite by forming a five membered stable complex with arsenic.
- In humans and experimental models, the antidotal efficacy of BAL has been shown to be most effective when administered immediately after the exposure.

CHELATING AGENTS AS DRUGS : BAL(BRITISH ANTI LEWSITE)

Besides rapid mobilization of arsenic and mercury from the body, it causes a significant increase in brain deposition of arsenic and mercury compounds.



Chemical reaction of lewisite with British Anti Lewisite (BAL) to give a stable 5-membered ring complex.

GOLD DRUGS

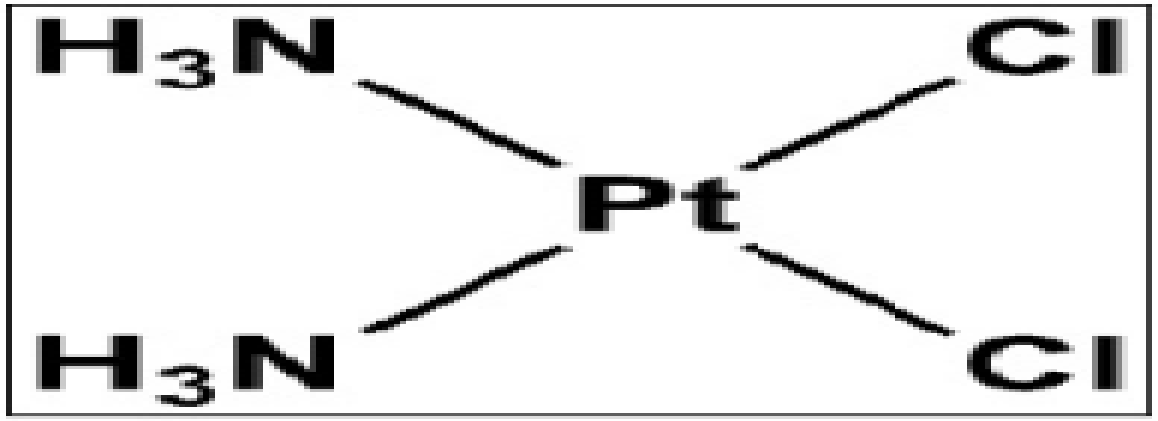
- Complexes of gold (Au) have also been used in chelation therapy.
- Sodium auro thiosulphate Na3[Au(S2O3)2].2H2O is used for the treatment of tuberculosis.
- Potassium auro cyanide K[Au(CN)2] is suitable for the treatment of tuberculosis and syphilis.
- Recently successful model studies on gold therapy have also been reported using phosphine complexes of the type R3PAuCl (R=-Et,-Ph …etc).
- Thus gold drugs are effective in case of inflammation in animals.

CISPLATIN

- Cisplatin is one of the most effective anticancer agents widely used in the treatment of solid tumors. It is generally considered as a cytotoxic drug which kills cancer cells by damaging DNA and inhibiting DNA synthesis.
- Cisplatin is an anti-cancer chemotherapeutic drug and It is given by injection into a vein.
- Cisplatin interferes with DNA replication, which kills the fastest proliferating cancerous cells.
- In cisplatin, one chloride ion is slowly displaced by water to give the aqua complex cis-$[PtCl(NH_3)_2(H_2O)]^+$, in a process termed aquation.
- The primary response to this drug is strong however in later stage, the tumour cell usually initiates the resistance towards cisplatin.

CISPLATIN

- To minimize cisplatin side effects and resistance, combination therapies are used and have proven more effective to defect cancers. Generally some copper transport proteins play a important role in cisplatin resistance.



Cisplatin