

MUCOPOLYSACCHARIDES

- **Mucopolysaccharides are long chains of sugar molecules. They are called glycosaminoglycans or glucosamine containing polysaccharides.**
- **Chitin found in Algae, mushrooms also known as the mucopolysaccharide containing N-acetylglucosamines.**
- **PYROGENs are also polysaccharides carrying of the metabolic products of some bacteria.**

MUCOPOLYSACCHARIDES

A gel like substance found in;

- Body cells
- Mucous secretions
- Synovial fluids

**HEPARIN: GLUCOSAMINE + GLUCURONIC ACID
ESTER FORM with H_2SO_4**

Found in liver, lung, gut, arters as sodium salt.

- **100 g liver contain ----- 7,5 mg HEPARINE**
- **Isolation: Heparine obtain from the lungs of beef**



HEPARINUM, HEPARIN

- Lungs of beef + water ----- 6 h macerate
- 2% NaOH +3,6% $(\text{NH}_4)_2\text{SO}_4$ added-----waited in 50°C ' for 1 hour
- Temperature increases 70°C and filtered
Filtrate+diluted H_2SO_4 ... pH 2,5----raw
HEPARIN precipitate
- Filtered and washed-----remove fats
- Mixture with absolute EtOH
- Heparine purified

HEPARINUM (TP), HEPARIN

- Dissolve in alkali solution, adjust to PH 5 with acetic acid and cadmium
- Filtrate+acetone----- HEPARIN precipitate
- **HEPARIN** grey coloured hygroscopic powder

HEPARINUM, HEPARIN

- **Assay:** activity measured comparing reference
- **Activity of 0.0077 mg reference substance =1 IU**
- **Measuring the coagulation of sheep plasma**

HEPARINUM, HEPARIN

- coagulation:
- **1st phase:** occurrence of activated **TROMBOPLASTINE**
- **2 st phase:** **TROMBIN** occurrence from **PROTROMBINE** with the effect of tromboplastine)
- **3 nd phase:** **FIBRINE** occurrence from **FIBRINOGEN** with the aid of **TROMBIN** and **Ca⁺⁺**
- **4 th phase:** **LYSIS** of **FIBRINE** with the aid of **fibrinolizine**
- **Heparin blockes the coagulation in the 2nd phase**

HEPARINUM, HEPARIN

- **The most important mucopolysaccharide used in pharmaceutical industry.**
- Anticoagulant
- to prevent coagulation in blood transfusion
- The heparin polysaccharide chain is degraded in the gastric acid administered IV or SC.
- Heparin should not be given IM danger of hematoma formation.
- **Heparine is also used in arteriosclerosis as sublingual tablet**

HEPARINUM (TF), HEPARIN

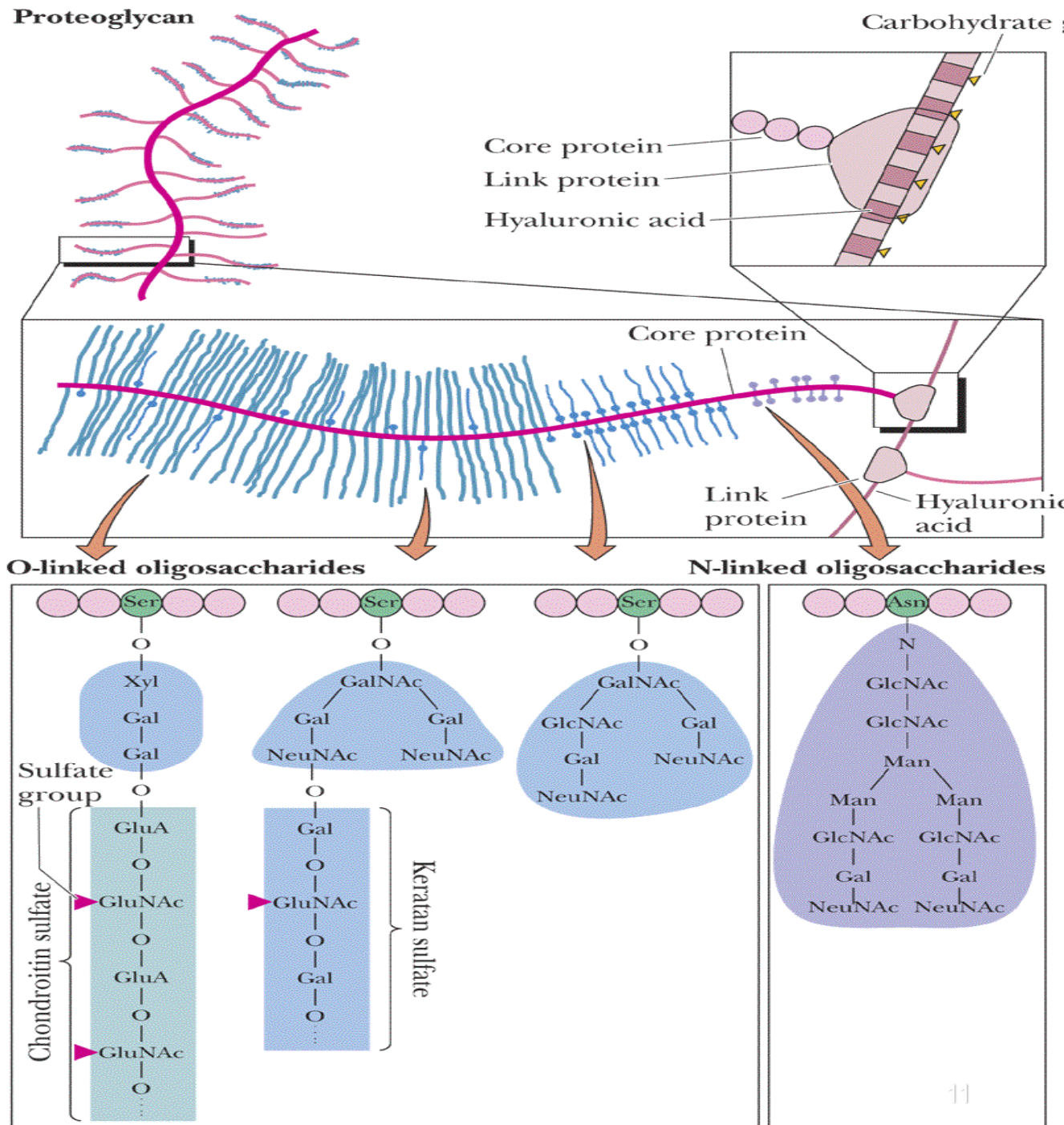
- PHARMACEUTICS OF HEPARINE
- **CALCIPARIN**
- **LIQUEMINE**
- **FRAGMINE**
- **CLEXANA**
- **FRAXIPARINE**
- **FLUXUM**

HYALURONIC ACID

- Hyaluronic acid is a mucopolysaccharide which is present in animal tissues.
- It further holds cells together in a jellylike matrix and serves as a lubricant and shock-absorber in joints.

N-acetylglucosamine+D-glucuronic acid

Hyaluronate:
material used to
cement the cells
into a tissue



Hyaluronic acid derivatives

- several products are used in the management of osteoarthritis symptoms
 - Hyalagan and Synvisc
- **HYALGIN-----Ester of hyaluronic acid+Ca alginate**
- **JALOSKIN-----Ester of hyaluronic acid**



- Other products are used as ophthalmic surgical adjuncts in cataract treatment, intraocular lens implantation, corneal transplant and retinal attachment surgery (Healon, Amvisc, AMO Vitrax)
- First and second degree of burns treatment
- Treatment of the leaky wounds