



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIO PULMONARY PERFUSION CARE
TECHNOLOGY

COURSE NAME : PRINCIPLES OF PERFUSION TECHNOLOGY I
II YEAR

TOPIC : TUBINGS&CONNECTORS



TUBINGS



Desirable characteristics of tubings:

It should be,

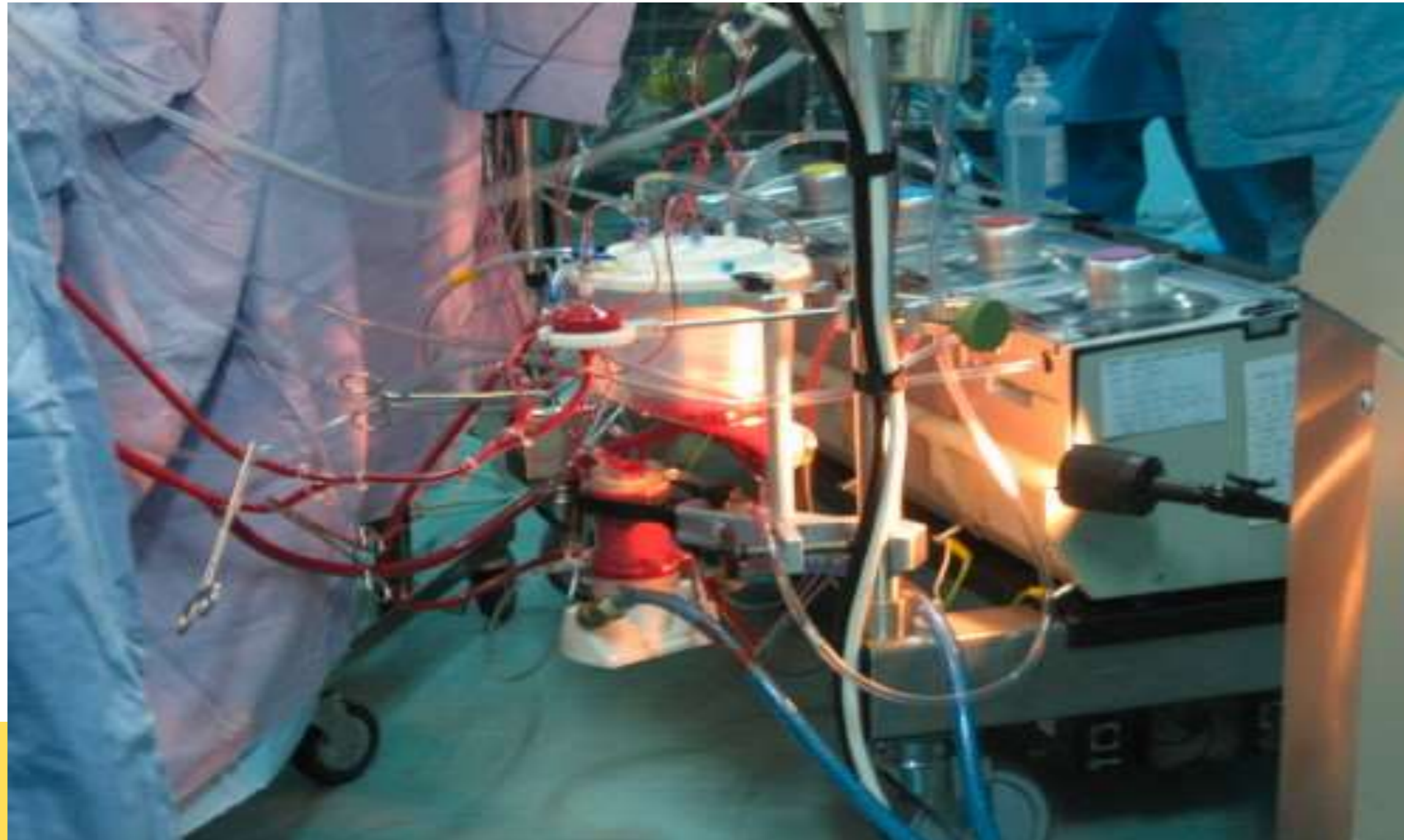
- ***Transparent***
- ***Inert***
- ***Biocompatibility***
- ***Smooth inner surface***
- ***Low spallation rate***
- ***Flexible and kink resistant***
- ***Re expands after compression***
- ***Resists collapse, cracking and rupture***
- ***Tolerance to heat sterilization and blood compatibility***



TUBING MADE UP OF



- The components of CPB circuit is made up of series of tubing made of silicon, latex rubber or PVC.





CHARACTERISTICS OF TUBINGS



- Keeping the tube as short as possible *reduces prime volume, pressure gradients* and blood trauma.
- To *minimize blood trauma*, avoid velocities above 100cm/s and avoid Reynold's number above 1000.

$$Re = \frac{(V \cdot D \cdot \rho)}{\eta}$$

V = Mean Velocity

D = Vessel Diameter

ρ = Blood Density

η = Blood Viscosity



CHARACTERISTICS OF TUBINGS



- ***Connections must be tight*** enough to prevent leakage of blood when exposed to positive pressures and aspiration of air on the venous side.
- ***Binding of heparin*** or other surface modifying agents into inner surface of tubings may improve biocompatibility.
- The connectors are made up of clear ***polycarbonate***
- Connectors should be smooth enough to minimize ***turbulence***



BIOCOMPATIBLE MATERIALS



- ***Biomembrane mimicry:***

Tubings are coated with the derivative of phosphorylcholine (memys, Sorin)

- ***Heparin coated circuits:***

heparin bound to tubings is slowly released into circulation (Duroflo II, Baxter).

heparin is permanently bound covalently to biomaterial surface (Carmeda, Medtronic and Trillium).



BIOCOMPATIBLE MATERIALS



- ***Hybrid surface:***

combination of heparin releasing and heparin immobilized (Bioline, Jostra).

- ***Surface modified additives:***

Terumo Corporation has developed CPB circuits coated with poly 2 methoxy ethylacrylate which has hydrophobic properties and little tendency to react with blood products.