**Colloids**

Intravascular volume expanders

Plasma derived
- Human albumen
- FFP
- Plasma protein fraction, eg cryoprecipitate
- Immunoglobulin

Semi-synthetic
- Gelatins
- Dextrans
- Hydroxyethyl starches

**Human albumen**

500mls 4%: volume expander
100mls 20%: albumen replacement, fluid compartment manipulation in hypovolaemic state

Merits
- 5 year shelf life at 4°C
- Possibly limits free radical damage

Limits
- Expensive to collect and store
- Adverse reactions, including anaphylaxis
- Potential for infectious disease transmission (nvCJD)

Evidence base
- SAFE trial -> overall no all-cause 28 day mortality benefit to 4% Albumen over 0.9% saline in volume resuscitation of critically ill patients.
- Trend to increased mortality for TBI patients, that increases with severity
- Trend to improved mortality in septic patients
- Albumen < 27g/L is a marker for increased mortality in critically ill patients, however correcting it does not improve mortality

**Gelatins**

Hydrolysed bovine collagen
- Gelofusin: succinylated gelatin
- Haemaccel: urea-linked gelatin-polygeline. High calcium content

Merits
- Stable, long shelf-life
- Relatively inexpensive
- Volume expander effect 90-120 minutes
- Least impact on haemostasis

Limits
- Adverse reactions in 0.5%, including anaphylaxis
- Potential for infectious disease transmission, eg nvCJD

**Dextrans**

Sucrose + L.mesenteroides bacteria -> Dextran polymer,
+ acid hydrolase + alcohol fractionation -> Dextran fractions

Most commonly used:
- Dextran 70: plasma expander
-Dextran 40: used in neuro, vascular and plastic surgery

Merits
- Stable, long shelf life
- Plasma expander effect 6 hours

Limits
- Anaphylactogenic
- Anticoagulant, pro-fibrinolytic, anti-platelet, esp > 1.5g/kg (can be used clinically)
- Dextran 40 contraindicated in shock due to links to ARF

**Hydroxyethyl starches**

Derived from sorghum or maize D-glucose

C2:C6 substitution ratio directly proportional to duration of plasma expander effect and to degree of anticoagulant effect
- USA uses hetastarches (ratio 0.6-0.7)
- UK uses pentastarches (ratio 0.5)
- Europe uses tetrastarches (ratio 0.4)
- Usually electrolyte (0.9% saline) or lactate balanced.

Merits
- Stable, long shelf life
- Minimum duration of expander effect is 6 hours

Limits
- Anaphylactogenic
- Anticoagulant, antiplatelet effect

**Hypertonic solutions**

Available as crystalloids and colloids
- Have been used with benefit in burns, trauma and cerebral oedema
- Overall role as yet unclear. One USA study shows benefit, one Australian study shows no benefit. US multicentre trial ongoing
- Limited to single dose for now

**Perfluorocarbons and HBOCs**

Actions:
- Plasma expansion
- NO scavenging -> vasoconstriction
- O2 carrier

Linear Hb-O2 dissociation curve

One beneficial study. One study terminated early due to excess mortality. One study with excess cardiac morbidity.

**Other plasma derived products**

See "Blood components" chapter

References
- Intensive care manual. T.Oh. 5th Ed.