# Name: Ubaid ullah

# ID: 13994

# BS MLT 6th Semester

# Question: How blood components are separated?

Answer: Centrifugal force is used to separate the components of blood red blood cells, platelets and plasma from each other. The red blood cells precipitate to the bottom of the bag, with the platelets above them, then the white blood cells and the plasma at the very top.

# Basic Blood Components

* Red Blood cells
* Platelets
* Fresh Frozen Plasma (FFP)
* Cryoprecipitated Anti-hemophilic Factor
* Granulocytes

# Whole Blood

* **Component requirments**
  + Stored: 1-6 C
  + Shipping: 1-10 C
  + 21 or 35 days depending on preservative (CPD, CP2D or CPDA-1)

# Red Blood Cells

* **RBCs (frozen)**
  + 5-65 C for 10 years
* **RBCs (deglycerolized or washed)**
  + Good at 1-6 C for 24 hours
* **RBCs (irradiated)**
  + 1-6 C for 28 days

# Platelets

* Important in maintaining hemostasis
* Help stop bleeding and form a platelet plug (primary hemostasis)
* People who need platelets:
  + Cancer patients
  + Bone marrow recipients
  + Postoperative bleeding

# How platelets are processed

* Requires 2 spins:
  + Soft – separates RBCs and WBCs from plasma and platelets
  + heavy
    - platelets in platelet rich plasma (PRP) will be forced to the bottom of a satellite bag
    - 40-60 ml of plasma is expelled into another bag contains platelet concentrate

# Fresh frozen plasma (FFP)

* Plasma that is frozen within 8 hours of donation
  + -18 C or colder for 1 year
* Provides coagulation factor for
  + Bleeding
  + Abnormal clotting due to massive transfusion
  + Patients on warfarin who are bleeding
  + Treatment of TTP and HUS
  + Factor deficiencies
  + DIC when fibrinogen is <100 mg/dl

# Fresh Frozen plasma

* FFP is thawed before transfusion
  + 30-37C waterbath for 30-45 minutes
  + Stored 1-6 C and transfused within 24 hours
  + Needs to be ABO compatible

# Cryoprecipitate

* Cryoprecipitate antihemophilic factor (AHF) or “Cryo” is the precipitated protein portion that results after thawing FFP
* Contains:
  + Con Willebrand’s factor (plt.adhesion)
  + Fibrinogen
    - 150 mg in each unit
* Factor VIII
  + About 80 IU each unit
  + Fibrinonectin

# Cryoprecipitate

* Same storage as FFP (cannot be re-frozen as FF once it is separated): -18 for 1 year
* If thawed, store at room temp 4 hrs
* The leftover plasma is called cryoprecipitate reduced or plasma cryo
  + Good for thrombocytopenic purpura (TTP)
* CRYO is used for
  + 2 treatment for factor VIII deficiency (Hemophilia A)
  + 2 treatment for von Willebrand’s disease
  + Congenital or acquired fibrinogen deficiency
  + FXIII deficiency
* “Fibrin Glue” applied to surgical sites

# Granulocytes

* Neutrophils are the most numerous, involved in phagocytosis of bacteria/fungi
* Although rare, it is useful for infants with bacteremia
* Prepared by hemapheresis
* > 1.0 x 1010
* Maintained at room temp for 24 hours