Blood

I. Function

A. Transport

- nutrients
- oxygen/carbon dioxide
- waste

B. Maintaining Homeostasis

- hormones

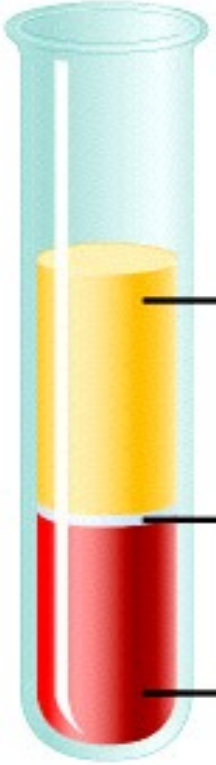
C. Protection

- immune system

II. Composition of blood

A. Plasma

Centrifuged Blood Sample

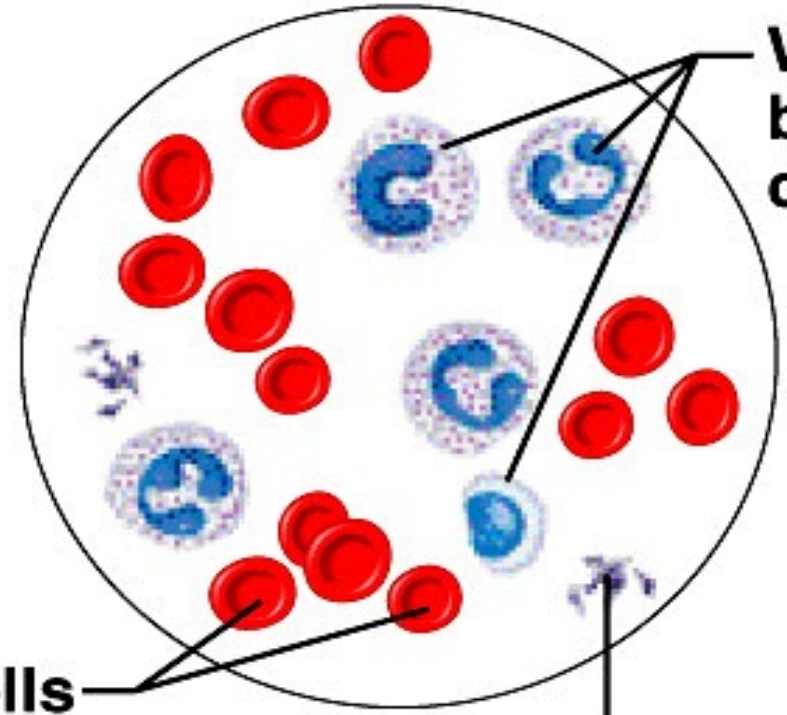


Liquid (plasma)

"Buffy coat" (white blood cells and platelets)

Red blood cells

Peripheral Blood Smear



White blood cells

Red blood cells

Platelets

- 91% water
- 9% suspended material

Proteins:

Albumin – most abundant ->water regulation

Globulins – transport steroid hormones

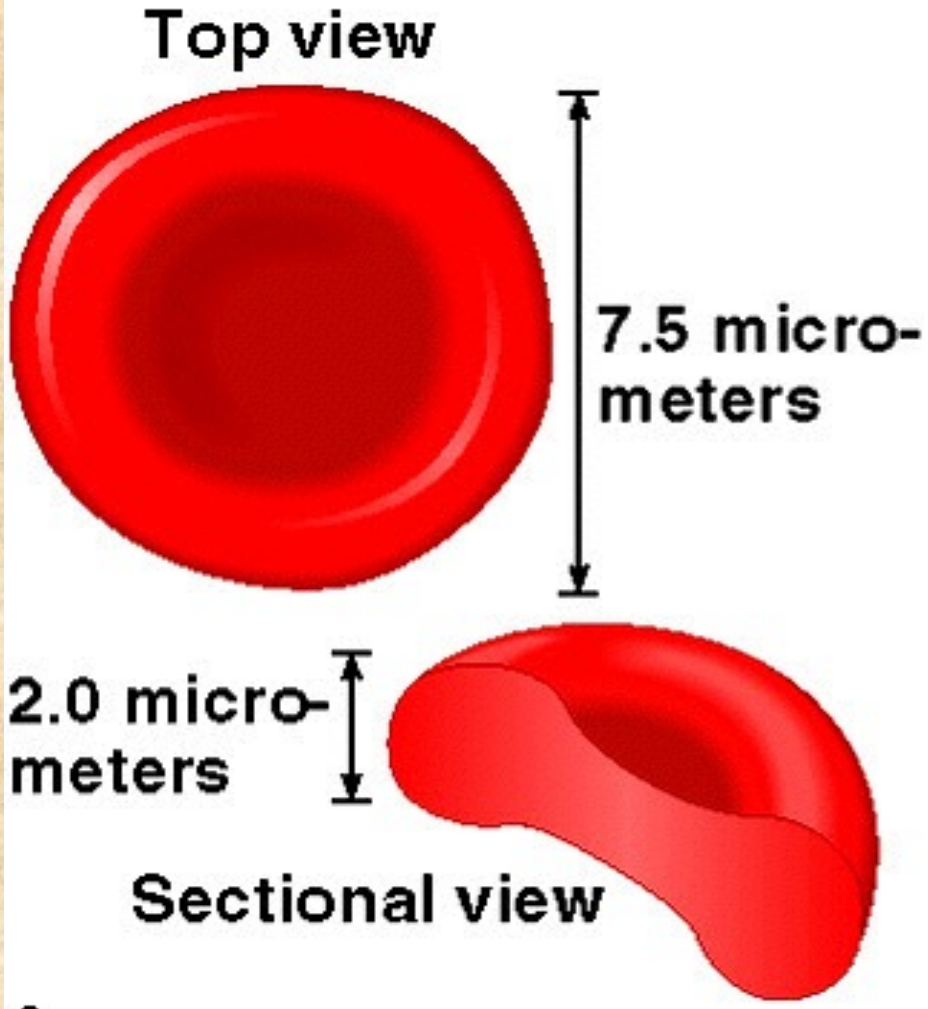
Fibrinogen – formation of clots

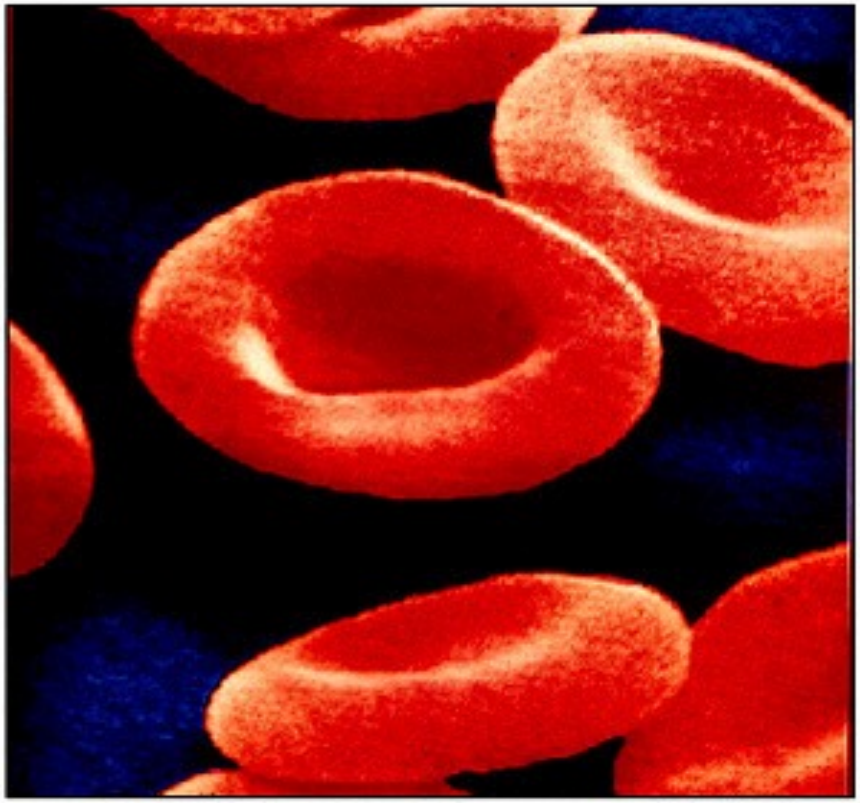
B. Formed elements

Derived from hemocytoblast stem cells

1. Erythrocytes (RBC)

- transports gases
- 1/3 volume hemoglobin





B

- **Production:**

  Erythropoietin from Kidney (liver)

  Red bone marrow

  Iron required

- **RBC cycle**

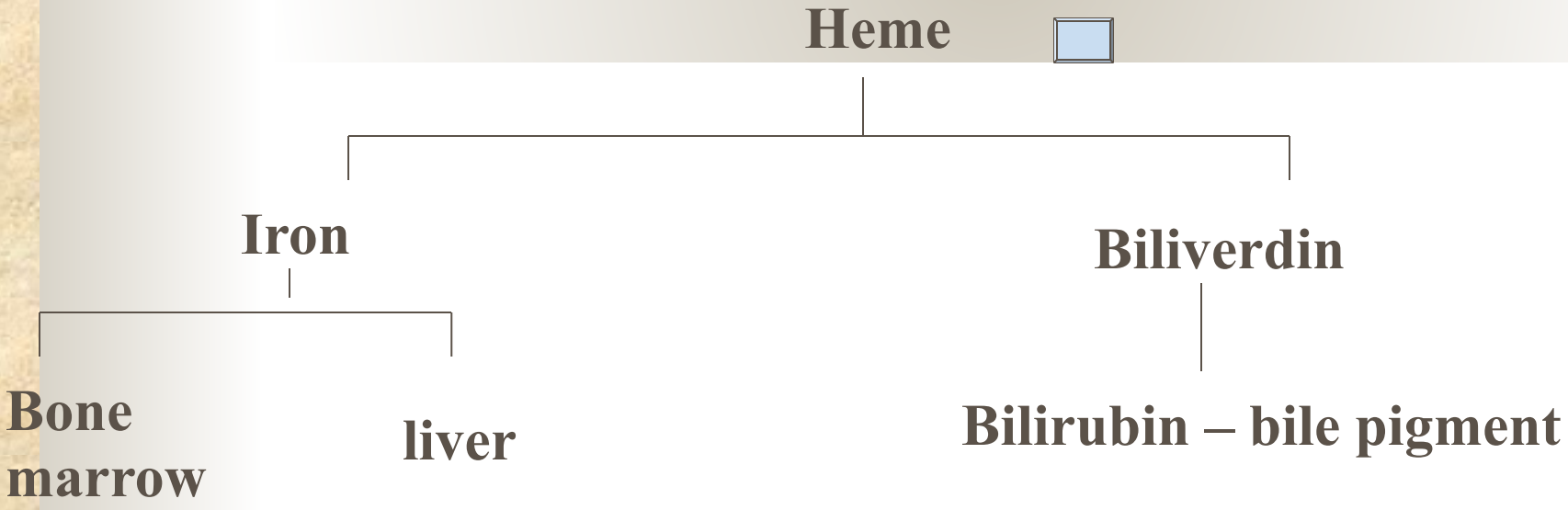
  120 days

  Damaged RBC – liver and spleen

  Macrophages

- **Hemoglobin breakdown**

Heme (iron) **globin (protein)**



2. **Leukocytes (WBC)**

   no hemoglobin/has nucleus

   immune response

   hormones: interleukins and colony-stimulating (CSF)

d. Monocytes

- agranulocyte
- largest WBC
- after 3 days -> macrophages
- phagocytes with lysosomes
- ingests larger objects than Neutrophils

e. Lymphocytes

- agranulocyte
- cells of the immune system
- B cells (antibodies) / T cells immune response

3. **Platelets (Thrombocytes)**

- fragments of megakaryocytes
- hormone: thrombopioetin
- blood clotting/ mend blood vessels

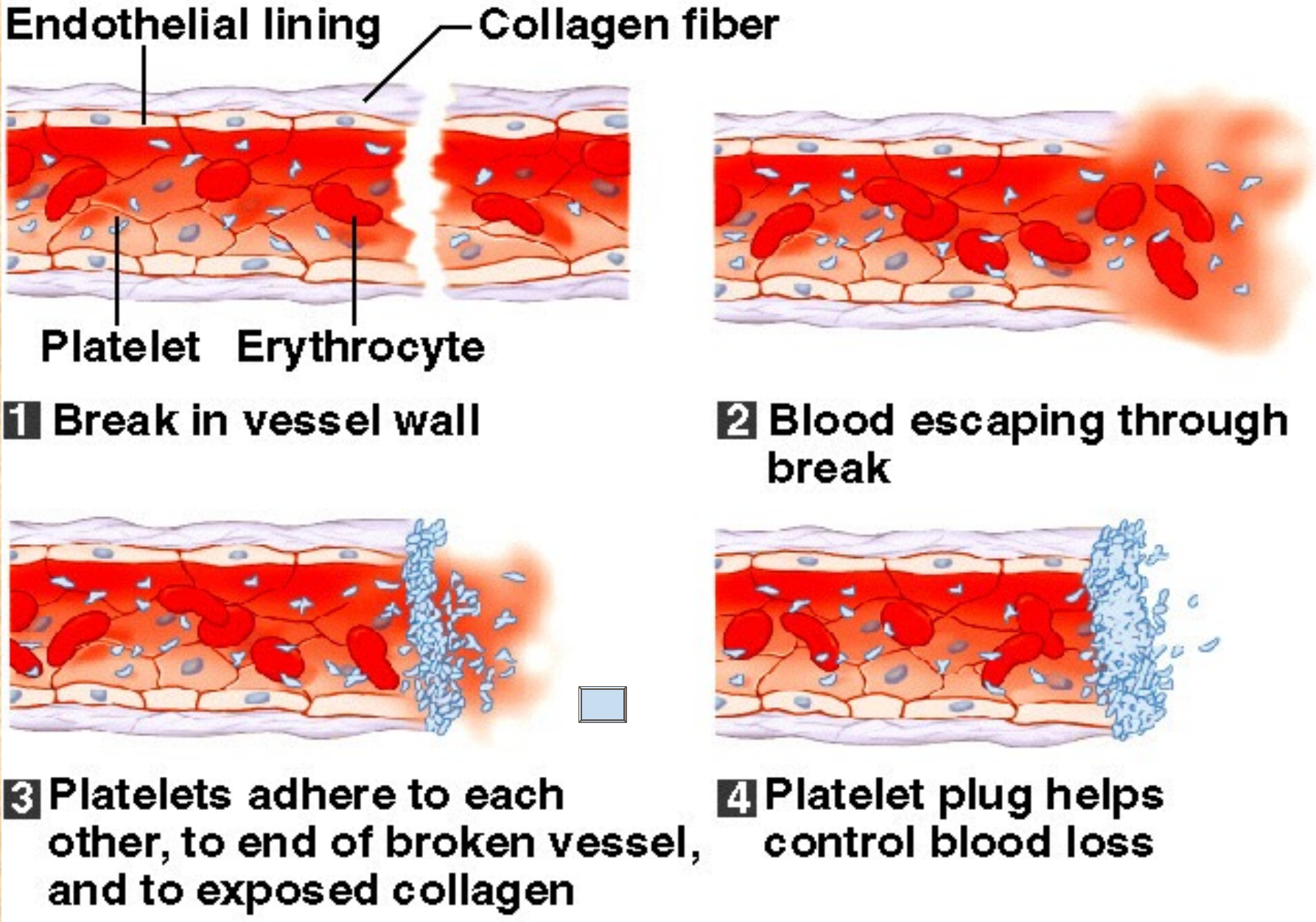
C. Hemostasis

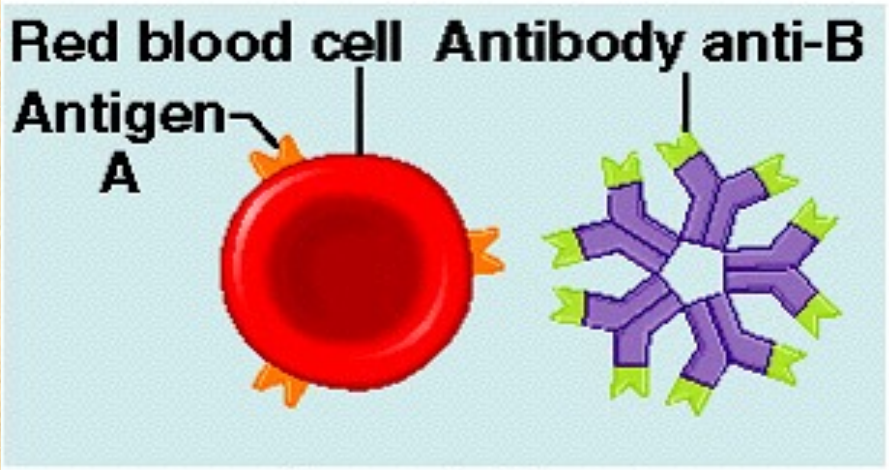
1. Platelet plug

- platelets bind to damaged vessel wall
- release chemical for more platelets
- platelets release serotonin (constriction)

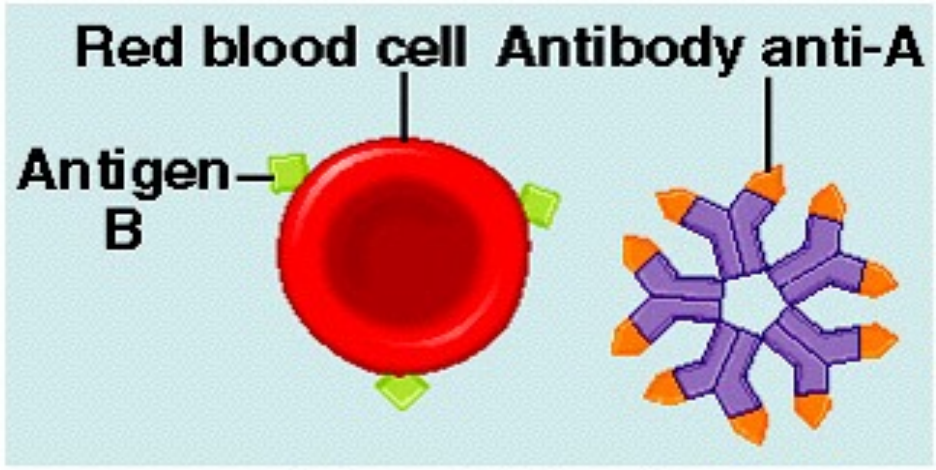
2. Blood clot

- damaged vessel releases Thromboplastin

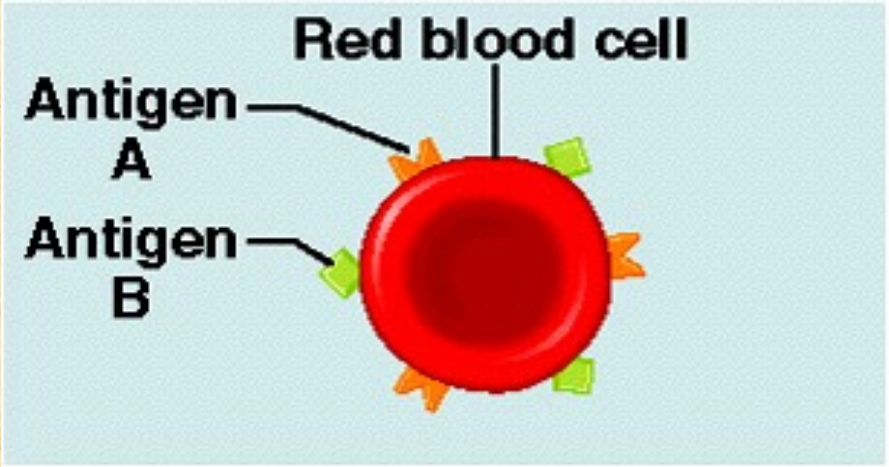




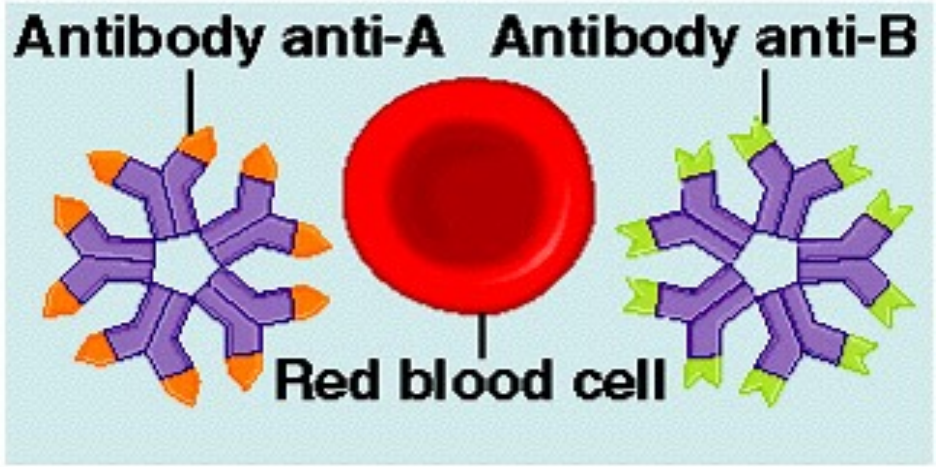
Type A blood



Type B blood

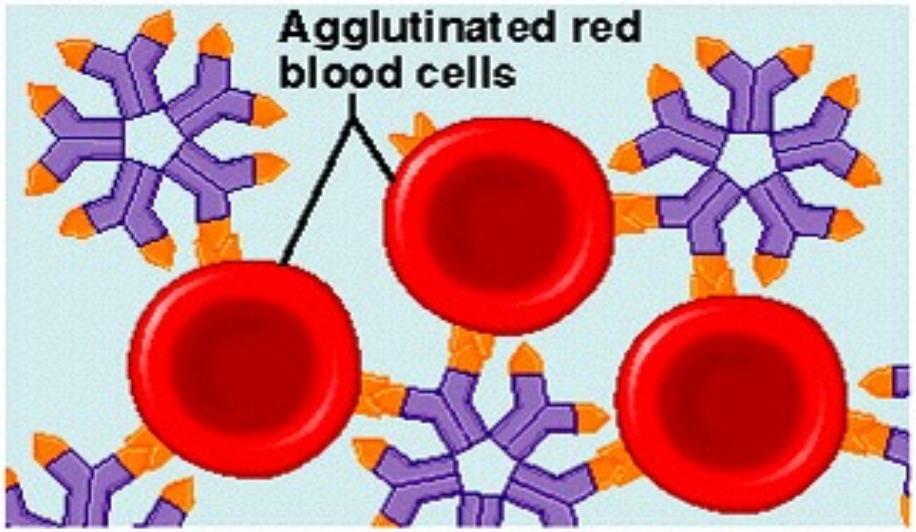


Type AB blood



Type O blood

B



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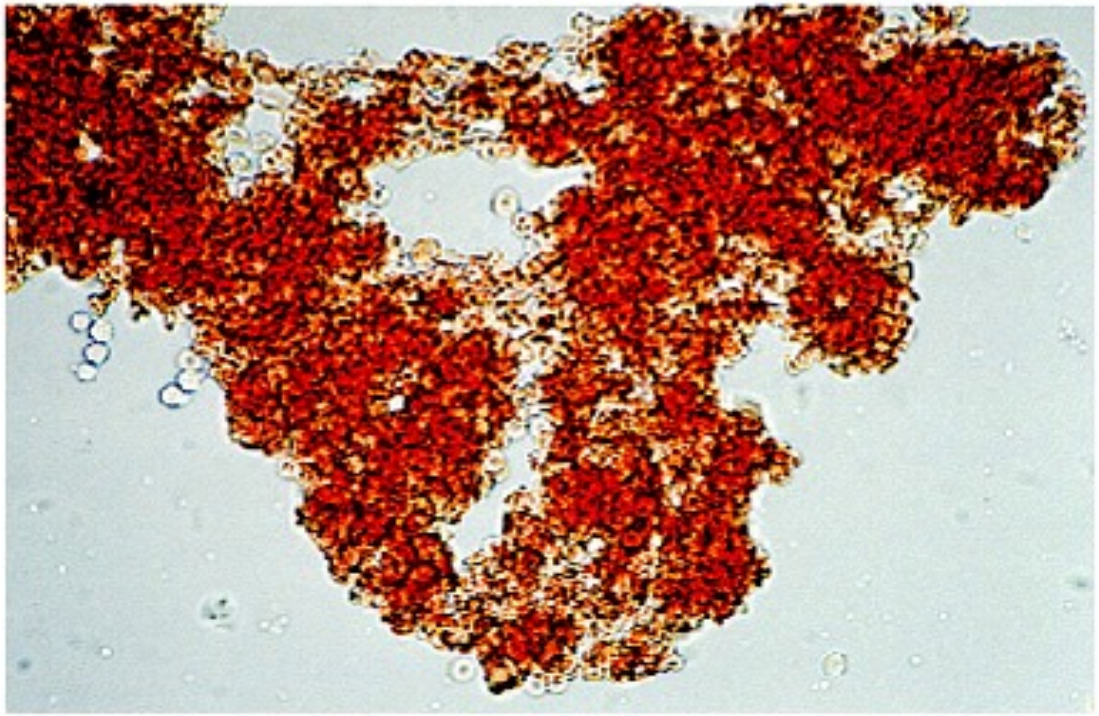

B. Rh blood type

1. Antigens on RBC
   - Rh positive – has antigens
   - Rh negative – no antigens
2. Antibodies against Rh
   - Rh negative individual – antibodies after Rh+ encounter
3. Pregnancy 
   - Rh neg w/Rh+ fetus
   - blood from fetus -> into mother's blood
   - 2nd pregnancy w/Rh+ fetus -> antibodies attack