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AND BLOOD COMPONENTS

## 1. INTRODUCTION:

Blood is a complex mixture of plasma (the liquid component), white blood cells, red blood cells, and platelets. Plasma is 90 percent water and constitutes about 55 percent of blood volume. Plasma can be fractionated or separated into derivatives/products. These include albumin (the chief protein constituent), fibrinogen (responsible in part, for the clotting of blood), globulins (including antibodies), and other clotting factors. Blood components used in modern day practice include, apart from whole blood, a variety of other products, like red blood cell components,

platelet concentrates, and plasma. Blood component transfusion has been considered to be a safe and low risk procedure. In the last few decades there has been recognition of hazards of transfusion of blood and its products. It is no longer considered to be a low or no risk procedure, and consequently an increasing need for stricter guidelines for transfusing blood products has been recognized, not just to check infections, but also to minimize other side effects of transfusion.

## 2. PHYSIOLOGY OF BLOOD:

[ HYPERLINK  
"http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=8"  
\o "Edit section: Cardiovascular system" edit ] Cardiovascular system  
HYPERLINK  
"http://en.wikipedia.org/wiki/File:Diagram\_of\_the\_human\_heart\_(cropped).svg" INCLUDEPICTURE "mhtml:file:///G:\Blood%20-%20Wikipedia,%20the%20free%20encyclopedia.mht!http://upload.wikimedia.org/wikipedia/commons/thumb/e/e5/Diagram\_of\_the\_human\_heart\_%28cropped%29.svg/220px-Diagram\_of\_the\_human\_heart\_%28cropped%29.svg.png" \\*  
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Blood is circulated around the body through HYPERLINK  
"http://en.wikipedia.org/wiki/Blood\_vessel" \o "Blood vessel" blood vessels by the pumping action of the HYPERLINK  
"http://en.wikipedia.org/wiki/Heart" \o "Heart" heart .  
In humans, blood is pumped from the strong HYPERLINK  
"http://en.wikipedia.org/wiki/Left\_ventricle" \o "Left ventricle" left ventricle of the heart through HYPERLINK  
"http://en.wikipedia.org/wiki/Artery" \o "Artery" arteries to peripheral HYPERLINK "http://en.wikipedia.org/wiki/Tissue\_(biology)" \o "Tissue (biology)" tissues and returns to the right HYPERLINK  
"http://en.wikipedia.org/wiki/Atrium\_(heart)" \o "Atrium (heart)" atrium of the heart through HYPERLINK  
"http://en.wikipedia.org/wiki/Vein" \o "Vein" veins .  
It then enters the right HYPERLINK  
"http://en.wikipedia.org/wiki/Ventricle\_(heart)" \o "Ventricle (heart)" ventricle and is pumped through the HYPERLINK  
"http://en.wikipedia.org/wiki/Pulmonary\_artery" \o "Pulmonary artery" pulmonary artery to the HYPERLINK "http://en.wikipedia.org/wiki/Lung"\o "Lung" lungs and returns to the left atrium through the HYPERLINK  
"http://en.wikipedia.org/wiki/Pulmonary\_vein" \o "Pulmonary vein" pulmonary veins .  
Blood then enters the left ventricle to be circulated again. Arterial blood carries oxygen from inhaled air to all of the cells of the body, and HYPERLINK "http://en.wikipedia.org/wiki/Venous\_blood" \o "Venous blood" venous blood carries carbon dioxide, a waste product of HYPERLINK "http://en.wikipedia.org/wiki/Metabolism" \o "Metabolism" metabolism by HYPERLINK "http://en.wikipedia.org/wiki/Cell\_(biology)" \o "Cell (biology)" cells , to the lungs to be exhaled.  
However, one exception includes pulmonary arteries, which contain the most deoxygenated blood in the body, while the pulmonary veins contain oxygenated blood.  
Additional return flow may be generated by the movement of HYPERLINK  
"http://en.wikipedia.org/wiki/Skeletal\_muscle" \o "Skeletal muscle" skeletal muscles , which can compress veins and push blood through the valves in veins toward the HYPERLINK  
"http://en.wikipedia.org/wiki/Right\_atrium" \o "Right atrium" right atrium .  
[ HYPERLINK  
"http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=9"  
\o "Edit section: Production and degradation of blood cells" edit ]  
Production and degradation of blood cells

The various cells of blood are made in the [HYPERLINK](http://en.wikipedia.org/wiki/Bone_marrow)  
"http://en.wikipedia.org/wiki/Bone\_marrow" \o "Bone marrow" bone marrow  
in a process called [HYPERLINK](http://en.wikipedia.org/wiki/Hematopoiesis)  
"http://en.wikipedia.org/wiki/Hematopoiesis" \o "Hematopoiesis"  
hematopoiesis , which includes [HYPERLINK](http://en.wikipedia.org/wiki/Erythropoiesis)  
"http://en.wikipedia.org/wiki/Erythropoiesis" \o "Erythropoiesis"  
erythropoiesis , the production of red blood cells; and [HYPERLINK](http://en.wikipedia.org/wiki/Myelopoiesis)  
"http://en.wikipedia.org/wiki/Myelopoiesis" \o "Myelopoiesis"  
myelopoiesis , the production of white blood cells and platelets.  
During childhood, almost every human bone produces red blood cells; as  
adults, red blood cell production is limited to the larger bones: the  
bodies of the vertebrae, the breastbone (sternum), the ribcage, the  
pelvic bones, and the bones of the upper arms and legs.  
In addition, during childhood, the [HYPERLINK](http://en.wikipedia.org/wiki/Thymus)  
"http://en.wikipedia.org/wiki/Thymus" \o "Thymus" thymus gland, found  
in the [HYPERLINK](http://en.wikipedia.org/wiki/Mediastinum) "http://en.wikipedia.org/wiki/Mediastinum" \o  
"Mediastinum" mediastinum , is an important source of [HYPERLINK](http://en.wikipedia.org/wiki/Lymphocytes)  
"http://en.wikipedia.org/wiki/Lymphocytes" \o "Lymphocytes"  
lymphocytes .  
The proteinaceous component of blood (including clotting proteins) is  
produced predominantly by the [HYPERLINK](http://en.wikipedia.org/wiki/Liver)  
"http://en.wikipedia.org/wiki/Liver" \o "Liver" liver , while hormones  
are produced by the [HYPERLINK](http://en.wikipedia.org/wiki/Endocrine_gland)  
"http://en.wikipedia.org/wiki/Endocrine\_gland" \o "Endocrine gland"  
endocrine glands and the watery fraction is regulated by the  
[HYPERLINK](http://en.wikipedia.org/wiki/Hypothalamus) "http://en.wikipedia.org/wiki/Hypothalamus" \o "Hypothalamus"  
hypothalamus and maintained by the [HYPERLINK](http://en.wikipedia.org/wiki/Kidney)  
"http://en.wikipedia.org/wiki/Kidney" \o "Kidney" kidney .  
Healthy [HYPERLINK](http://en.wikipedia.org/wiki/Erythrocytes) "http://en.wikipedia.org/wiki/Erythrocytes" \o  
"Erythrocytes" erythrocytes have a plasma life of about 120 days before  
they are degraded by the [HYPERLINK](http://en.wikipedia.org/wiki/Spleen)  
"http://en.wikipedia.org/wiki/Spleen" \o "Spleen" spleen , and the  
[HYPERLINK](http://en.wikipedia.org/wiki/Kupffer_cell) "http://en.wikipedia.org/wiki/Kupffer\_cell" \o "Kupffer cell"  
Kupffer cells in the liver. The liver also clears some proteins,  
lipids, and [HYPERLINK](http://en.wikipedia.org/wiki/Amino_acid) "http://en.wikipedia.org/wiki/Amino\_acid" \o  
"Amino acid" amino acids . The kidney actively secretes waste products  
into the [HYPERLINK](http://en.wikipedia.org/wiki/Urine) "http://en.wikipedia.org/wiki/Urine" \o "Urine"  
urine .  
[ [HYPERLINK](http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=10)  
"http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=10"  
\o "Edit section: Oxygen transport" edit ] Oxygen transport  
[HYPERLINK](http://en.wikipedia.org/wiki/File:Oxyhaemoglobin_dissociation_curve.png)  
"http://en.wikipedia.org/wiki/File:Oxyhaemoglobin\_dissociation\_curve.png"  
INCLUDEPICTURE "mhtml:file:///G:/\Blood%20-%20Wikipedia,%20the%20free%20encyclopedia.mht!http://upload.wikimedia.org/wikipedia/commons/thumb/8/8a/Oxyhaemoglobin\_dissociation\_curve.png/220px-Oxyhaemoglobin\_dissociation\_curve.png" \\* MERGEFORMATINET

Basic hemoglobin saturation curve. It is moved to the right in higher  
acidity (more dissolved carbon dioxide) and to the left in lower acidity  
(less dissolved carbon dioxide)  
About 98.5% of the [HYPERLINK](http://en.wikipedia.org/wiki/Oxygen) "http://en.wikipedia.org/wiki/Oxygen" \o  
"Oxygen" oxygen in a sample of arterial blood in a healthy human  
breathing air at sea-level pressure is chemically combined with the Hgb.  
About 1.5% is physically dissolved in the other blood liquids and not  
connected to Hgb. The [HYPERLINK](http://en.wikipedia.org/wiki/Hemoglobin)  
"http://en.wikipedia.org/wiki/Hemoglobin" \o "Hemoglobin" hemoglobin  
molecule is the primary transporter of oxygen in [HYPERLINK](http://en.wikipedia.org/wiki/Mammals)  
"http://en.wikipedia.org/wiki/Mammals" \o "Mammals" mammals and many  
other species (for exceptions, see below).

Hemoglobin has an oxygen binding capacity of between 1.36 and 1.37 ml O<sub>2</sub> per gram Hemoglobin, which increases the total [Blood oxygen capacity](#) blood oxygen capacity seventyfold, compared to if oxygen solely was carried by its solubility of 0.03 mL O<sub>2</sub> per liter blood per mmHg [Partial pressure](#) partial pressure of oxygen (approximately 100 mmHg in arteries).

With the exception of [Pulmonary artery](#)

"[Pulmonary artery](#)" \o "Pulmonary artery" pulmonary and [Umbilical artery](#)

"[Umbilical artery](#)" \o "Umbilical artery" umbilical arteries and their corresponding veins, [Artery](#)

"[Artery](#)" arteries carry oxygenated blood away from the [Heart](#)

"[Heart](#)" \o "Heart" heart and deliver it to the body via [Arteriole](#)

"[Arteriole](#)" arterioles and [Capillary](#)

"[Capillary](#)" \o "Capillary" capillaries, where the oxygen is consumed; afterwards, [Venule](#)

"[Venule](#)" \o "Venule" venules, and [Vein](#)" \o "Vein" veins carry deoxygenated blood back to the heart.

Under normal conditions in adult humans at rest, hemoglobin in blood leaving the lungs is about 98–99% saturated with oxygen, achieving an oxygen delivery of between 950 – 1150 mL/min to the body.

In a healthy adult at rest, oxygen consumption is approximately 200 – 250 mL/min, and deoxygenated blood returning to the lungs is still approximately 75% (70 to 78%) saturated.

Increased oxygen consumption during sustained exercise reduces the oxygen saturation of venous blood, which can reach less than 15% in a trained athlete; although breathing rate and blood flow increase to compensate, oxygen saturation in arterial blood can drop to 95% or less under these conditions.

Oxygen saturation this low is considered dangerous in an individual at rest (for instance, during surgery under anesthesia). Sustained hypoxia (oxygenation of less than 90%), is dangerous to health, and severe hypoxia (saturation of less than 30%) may be rapidly fatal.

A [Fetus](#) fetus, receiving oxygen via the [Placenta](#)

"[Placenta](#)" \o "Placenta" placenta, is exposed to much lower oxygen pressures (about 21% of the level found in an adult's lungs), and, so, fetuses produce another form of hemoglobin with a much higher affinity for oxygen ([Carbamino](#)

"[Fetal hemoglobin](#)" \o "Fetal hemoglobin" hemoglobin F) in order to function under these conditions.

[ [Edit section: Carbon dioxide transport](#) ] Carbon dioxide transport

When blood flows through capillaries, carbon dioxide diffuses from the tissues into the blood. Some carbon dioxide is dissolved in the blood. A part of CO<sub>2</sub> reacts with hemoglobin and other proteins to form [Carbamino](#)

"[Carbamino](#)" carbamino compounds. The remaining carbon dioxide is converted to [Bicarbonate](#)

"[Bicarbonate](#)" bicarbonate and [Hydrogen ion](#)

"[Hydrogen ion](#)" hydrogen ions through the action of RBC [Carbonic anhydrase](#)" \o "Carbonic anhydrase" carbonic anhydrase .

Most carbon dioxide is transported through the blood in the form of bicarbonate ions.

HYPERLINK "http://en.wikipedia.org/wiki/Carbon\_dioxide" \o "Carbon dioxide" Carbon dioxide (CO<sub>2</sub>), the main HYPERLINK "http://en.wikipedia.org/wiki/Cellular\_waste\_product" \o "Cellular waste product" cellular waste product is carried in blood mainly dissolved in HYPERLINK "http://en.wikipedia.org/wiki/Blood\_plasma" \o "Blood plasma" plasma, in equilibrium with HYPERLINK "http://en.wikipedia.org/wiki/Bicarbonate" \o "Bicarbonate" bicarbonate (HCO<sub>3</sub><sup>-</sup>) and HYPERLINK "http://en.wikipedia.org/wiki/Carbonic\_acid" \o "Carbonic acid" carbonic acid (H<sub>2</sub>CO<sub>3</sub>). 86-90% of CO<sub>2</sub> in the body is converted into HYPERLINK "http://en.wikipedia.org/wiki/Carbonic\_acid" \o "Carbonic acid" carbonic acid, which can quickly turn into bicarbonate, the chemical equilibrium being important in the pH HYPERLINK "http://en.wikipedia.org/wiki/Buffering\_agent" \o "Buffering agent" buffering of plasma. Blood HYPERLINK "http://en.wikipedia.org/wiki/PH" \o "PH" pH is kept in a narrow range (pH between 7.35 and 7.45).

[ HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=12" \o "Edit section: Transport of hydrogen ions" edit ] Transport of hydrogen ions

Some oxyhemoglobin loses oxygen and becomes deoxyhemoglobin. Deoxyhemoglobin binds most of the hydrogen ions as it has a much greater affinity for more hydrogen than does oxyhemoglobin.

[ HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=14" \o "Edit section: Thermoregulation" edit ] Thermoregulation Blood circulation transports HYPERLINK "http://en.wikipedia.org/wiki/Heat" \o "Heat" heat throughout the body, and adjustments to this flow are an important part of HYPERLINK "http://en.wikipedia.org/wiki/Thermoregulation" \o "Thermoregulation" thermoregulation. Increasing blood flow to the surface (e.g., during warm weather or strenuous exercise) causes warmer skin, resulting in faster heat loss. In contrast, when the external temperature is low, blood flow to the extremities and surface of the skin is reduced and to prevent heat loss and is circulated to the important organs of the body, preferentially.

3. COLOR:

[ HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=18" \o "Edit section: Hemoglobin" edit ] Hemoglobin HYPERLINK "http://en.wikipedia.org/wiki/File:Bleeding\_finger.jpg" INCLUDEPICTURE "mhtml:file:///G:\Blood%20-%20Wikipedia,%20the%20free%20encyclopedia.mht!http://upload.wikimedia.org/wikipedia/commons/thumb/e/e6/Bleeding\_finger.jpg/220px-Bleeding\_finger.jpg" \\* MERGEFORMATINET

Capillary blood from a bleeding finger

HYPERLINK "http://en.wikipedia.org/wiki/File:Bloodbags.jpg" INCLUDEPICTURE "mhtml:file:///G:\Blood%20-%20Wikipedia,%20the%20free%20encyclopedia.mht!http://upload.wikimedia.org/wikipedia/commons/thumb/e/e7/Bloodbags.jpg/220px-Bloodbags.jpg" \\* MERGEFORMATINET

Venous blood collected during blood donation

Hemoglobin is the principal determinant of the color of blood in vertebrates. Each molecule has four heme groups, and their interaction with various molecules alters the exact color.

In <http://en.wikipedia.org/wiki/Vertebrate> \o "Vertebrate" vertebrates and other hemoglobin-using creatures, arterial blood and capillary blood are bright red, as oxygen imparts a strong red color to the heme group.

Deoxygenated blood is a darker shade of red; this is present in veins, and can be seen during [http://en.wikipedia.org/wiki/Blood\\_donation](http://en.wikipedia.org/wiki/Blood_donation) \o "Blood donation" blood donation and when venous blood samples are taken.

Blood in [HYPERLINK](#)

"[http://en.wikipedia.org/wiki/Carbon\\_monoxide\\_poisoning](http://en.wikipedia.org/wiki/Carbon_monoxide_poisoning)" \o "Carbon monoxide poisoning" carbon monoxide poisoning is bright red, because [http://en.wikipedia.org/wiki/Carbon\\_monoxide](http://en.wikipedia.org/wiki/Carbon_monoxide) \o "Carbon monoxide" carbon monoxide causes the formation of [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Carboxyhemoglobin>" \o "Carboxyhemoglobin" carboxyhemoglobin . In [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Cyanide>" \o "Cyanide" cyanide poisoning, the body cannot utilize oxygen, so the venous blood remains oxygenated, increasing the redness.

While hemoglobin-containing blood is never blue, there are several conditions and diseases wherein the color of the heme groups make the skin appear blue.

If the heme is oxidized, [HYPERLINK](#)

"<http://en.wikipedia.org/wiki/Methaemoglobin>" \o "Methaemoglobin" methaemoglobin , which is more brownish and cannot transport oxygen, is formed. In the rare condition [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Sulphhemoglobinemia>" \o "Sulphhemoglobinemia" sulphhemoglobinemia , arterial hemoglobin is partially oxygenated, and appears dark red with a bluish hue ( [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Cyanosis>" \o "Cyanosis" cyanosis ). Veins in the skin appear blue for a variety of reasons only weakly dependent on the color of the blood. Light scattering in the skin, and the visual processing of color play roles as well.

[ [HYPERLINK](#) "<http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=19>" \o "Edit section: Hemocyanin" edit ] Hemocyanin The blood of most [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Mollusks>" \o "Mollusks" mollusks - including [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Cephalopods>" \o "Cephalopods" cephalopods and [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Gastropods>" \o "Gastropods" gastropods - as well as some [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Arthropods>" \o "Arthropods" arthropods , such as [HYPERLINK](#) "[http://en.wikipedia.org/wiki/Horseshoe\\_crab](http://en.wikipedia.org/wiki/Horseshoe_crab)" \o "Horseshoe crab" horseshoe crabs , is blue, as it contains the copper-containing protein hemocyanin at concentrations of about 50 grams per liter. Hemocyanin is colorless when deoxygenated and dark blue when oxygenated. The blood in the circulation of these creatures, which generally live in cold environments with low oxygen tensions, is grey-white to pale yellow, and it turns dark blue when exposed to the oxygen in the air, as seen when they bleed. This is due to change in color of [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Hemocyanin>" \o "Hemocyanin" hemocyanin when it is oxidized. Hemocyanin carries oxygen in [HYPERLINK](#) "[http://en.wikipedia.org/wiki/Extracellular\\_fluid](http://en.wikipedia.org/wiki/Extracellular_fluid)" \o "Extracellular fluid" extracellular fluid , which is in contrast to the intracellular oxygen transport in mammals by hemoglobin in RBCs.

#### 4. FUNCTION:

Blood performs many important functions within the body including: Supply of [HYPERLINK](#) "<http://en.wikipedia.org/wiki/Oxygen>" \o "Oxygen" oxygen to tissues (bound to [HYPERLINK](#)

"<http://en.wikipedia.org/wiki/Hemoglobin>" \o "Hemoglobin" hemoglobin , which is carried in red cells)  
Supply of nutrients such as HYPERLINK  
"<http://en.wikipedia.org/wiki/Glucose>" \o "Glucose" glucose ,  
HYPERLINK "[http://en.wikipedia.org/wiki/Amino\\_acids](http://en.wikipedia.org/wiki/Amino_acids)" \o "Amino acids" amino acids , and HYPERLINK "[http://en.wikipedia.org/wiki/Fatty\\_acids](http://en.wikipedia.org/wiki/Fatty_acids)" \o "Fatty acids" fatty acids (dissolved in the blood or bound to  
HYPERLINK "[http://en.wikipedia.org/wiki/Blood\\_proteins](http://en.wikipedia.org/wiki/Blood_proteins)" \o "Blood proteins" plasma proteins (e.g., HYPERLINK  
"[http://en.wikipedia.org/wiki/Blood\\_lipid](http://en.wikipedia.org/wiki/Blood_lipid)" \o "Blood lipid" blood lipids ))  
Removal of waste such as HYPERLINK  
"[http://en.wikipedia.org/wiki/Carbon\\_dioxide](http://en.wikipedia.org/wiki/Carbon_dioxide)" \o "Carbon dioxide" carbon dioxide , HYPERLINK "<http://en.wikipedia.org/wiki/Urea>" \o "Urea" urea , and HYPERLINK "[http://en.wikipedia.org/wiki/Lactic\\_acid](http://en.wikipedia.org/wiki/Lactic_acid)" \o "Lactic acid" lactic acid  
Immunological functions, including circulation of HYPERLINK  
"[http://en.wikipedia.org/wiki/White\\_blood\\_cells](http://en.wikipedia.org/wiki/White_blood_cells)" \o "White blood cells" white blood cells , and detection of foreign material by HYPERLINK  
"<http://en.wikipedia.org/wiki/Antibodies>" \o "Antibodies" antibodies  
HYPERLINK "<http://en.wikipedia.org/wiki/Coagulation>" \o "Coagulation" Coagulation , which is one part of the body's self-repair mechanism (blood clotting after an open wound in order to stop bleeding)  
Messenger functions, including the transport of HYPERLINK  
"<http://en.wikipedia.org/wiki/Hormones>" \o "Hormones" hormones and the signaling of HYPERLINK "[http://en.wikipedia.org/wiki/Tissue\\_\(biology\)](http://en.wikipedia.org/wiki/Tissue_(biology))" \o "Tissue (biology)" tissue damage  
Regulation of body HYPERLINK "<http://en.wikipedia.org/wiki/PH>" \o "PH" pH  
Regulation of core HYPERLINK  
"[http://en.wikipedia.org/wiki/Body\\_temperature](http://en.wikipedia.org/wiki/Body_temperature)" \o "Body temperature" body temperature  
HYPERLINK "<http://en.wikipedia.org/wiki/Hydraulics>" \o "Hydraulics" Hydraulic functions

## 5. BLOOD REQUIREMENT OF INDIA:

Population: 106 Crores  
Hosp. Bed strength: 0.8 Millions  
Total No. of Blood Banks: 1500  
Component Sep. Units: 36  
Total Blood Requirement: 7.5 million units  
Available quantity: 4.0 Million units  
Shortage: 3.5 million units

## 6. PREPARATION OF COMPONENTS:

### 7. BLOOD COMPONENTS:

Over a period of years, FDA has progressively strengthened the overlapping safeguards that protect patients from unsuitable blood and blood products:

Blood donors are now asked specific and very direct questions about risk factors that could indicate possible infection with a transmissible disease. This "up-front" screening eliminates approximately 90 percent of unsuitable donors.

FDA requires blood centers to maintain lists of unsuitable donors to prevent the use of collections from them.

Blood donations are tested for seven different infectious agents. In addition to strengthening these safeguards, FDA has significantly increased its oversight of the blood industry:

FDA inspects all blood facilities at least every two years, and "problem" facilities are inspected more often.

Blood establishments are now held to quality standards comparable to those expected of pharmaceutical manufacturers.

While a blood supply with zero risk of transmitting infectious disease may not be possible, the blood supply is safer than it has ever been. As biological products, blood and blood products are likely always to carry an inherent risk of infectious agents. Therefore, zero risk may be unattainable. The role of FDA is to drive that risk to the lowest level reasonably achievable without unduly decreasing the availability of this life saving resource.

BLOOD COMPONENTS PLASMA DERIVATIVES RBC CONCENTRATE ALBUMIN PLATELET CONC. PLASMA PROTEIN FRACTION (PPF) PLATELET RICH PLASMA FACTOR VIII CONC. FRESH FROZEN PLASMA FIBRINOGEN CRYOPRECIPITATE IMMUNOGLOBULINS GRANULOCYTE CONCENTRATE OTHER COAGULATION FACTORS Normally, 7-8% of human body weight is from blood. In adults, this amounts to 4.5-6 quarts of blood. This essential fluid carries out the critical functions of transporting oxygen and nutrients to our cells and getting rid of carbon dioxide, ammonia, and other waste products. In addition, it plays a vital role in our immune system and in maintaining a relatively constant body temperature. Blood is a highly specialized tissue composed of more than 4,000 different kinds of components. Four of the most important ones are red cells, white cells, platelets, and plasma. All humans produce these blood components--there are no populational or regional differences.

#### Red Cells

INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\red\_cells.jpg"  
/\* MERGEFORMATINET

Human erythrocytes or "red cells" (cell diameter about .0003 inches) Red cells, or erythrocytes, are relatively large microscopic cells without nuclei. In this latter trait, they are similar to the primitive

[HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "prokaryotic" prokaryotic cells of bacteria.

Red cells normally make up 40-50% of the total blood volume.

They transport oxygen from the lungs to all of the living tissues of the body and carry away carbon dioxide.

The red cells are produced continuously in our bone marrow from [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "stem\_cells" stem cells at a rate of about 2-3 million cells per second.

Hemoglobin is the gas transporting [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "proteins" protein molecule that makes up 95% of a red cell. Each red cell has about 270,000,000 iron-rich hemoglobin molecules.

People who are anemic generally have a deficiency in red cells, and subsequently feel fatigued due to a shortage of oxygen.

The red color of blood is primarily due to oxygenated red cells. Human fetal hemoglobin molecules differ from those produced by adults in the number of amino acid chains.

Fetal hemoglobin has three chains, while adults produce only two. As a consequence, fetal hemoglobin molecules attract and transport relatively more oxygen to the cells of the body.

#### Red cell concentrate

- Description - 150-250ml
- Hb - 20gm%
- Hematocrit: 55% - 75%
- Indication- Rept. of RBC in anemia
- A/c blood loss
- Administration- Same as whole blood
- Additional N. saline by Y. tube (if needed)

- Storage- 2o-6oC in BB refrigerator

#### RBC Concentrate Indications

- severe anaemia < 7.5 gm %
- Haemolytic anaemia
- Aplastic anaemia
- chronic renal disease with anaemia

#### White Cells

White cells, or leukocytes, exist in variable numbers and types but make up a very small part of blood's volume--normally only about 1% in healthy people. Leukocytes are not limited to blood.

They occur elsewhere in the body as well, most notably in the spleen, liver, and lymph glands. Most are produced in our bone marrow from the same kind of stem cells that produce red blood cells.

Others are produced in the thymus gland, which is at the base of the neck. Some white cells (called lymphocytes) are the first responders for our immune system.

They seek out, identify, and bind to alien protein on [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "bacteria" bacteria , [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "virus" viruses , and [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "fungi" fungi so that they can be removed.

Other white cells (called granulocytes and macrophages) then arrive to surround and destroy the alien cells. They also have the function of getting rid of dead or dying blood cells as well as foreign matter such as dust and asbestos.

Red cells remain viable for only about 4 months before they are removed from the blood and their components recycled in the spleen.

Individual white cells usually only last 18-36 hours before they also are removed, though some types live as much as a year.

There are actually many specialized sub-types of them that participate in different ways in our immune responses.

#### Whole blood

- Unseparated blood-350ml & 49ml anticoagulant
- Hb - 12gm% (aprox)
- Hematocrit - 35% - 45%
- No functional platelets
- No labile coagulation Frs
- Stored at 2-6oC in BB refrigerator

#### Whole Blood Transfusion indications

- Actively bleeding patients
- Hypovolemia (blood loss > 25 %)
- Exchange transfusion

#### Platelets

INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\red\_platelet\_white\_cells.jpg" \\* MERGEFORMATINET Erythrocyte (left), thrombocyte (center), and leukocyte (right)  
Platelets, or thrombocytes, are cell fragments without nuclei that work with blood clotting chemicals at the site of wounds.  
They do this by adhering to the walls of blood vessels, thereby plugging the rupture in the [HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm"](http://anthro.palomar.edu/blood/glossary.htm) \l "vascular" vascular wall.  
They also can release coagulating chemicals which cause clots to form in the blood that can plug up narrowed blood vessels.

Thirteen different blood clotting factors, in addition to platelets, need to interact for clotting to occur.

They do so in a cascading manner, one factor triggering another. Hemophiliacs lack the ability to produce either blood factor 8 or 9.

Recent research has shown that platelets help fight infections by releasing proteins that kill invading bacteria and some other microorganisms. In addition, platelets stimulate the immune system. Individual platelets are about 1/3 the size of red cells. They have a lifespan of 9-10 days. Like the red and white blood cells, platelets are produced in bone marrow from stem cells.

#### Platelet concentrate

- Option- 50-60ml plasma
- $55 \times 10^9$  platelets (at least)
- $<2 \times 10^9$  RBC
- $<0.12 \times 10^9$  RBC

Storage: at 20°C - 24°C for 3 days in platelet agitator/incubator

Indications: Thrombocytopenia platelet fn defects

Dose: 1 unit PC/10kg wt

Admn: As soon as possible Completed within 4 hrs

ABO compatible (as far as possible)

#### Platelet Concentrate / Platelet Rich Plasma

Indications

- Platelet count < 20,000 / cu mm
- DIC
- Massive transfusion
- Platelet function defect

#### Plasma:

Plasma is the relatively clear, yellow tinted water (92+%), sugar, fat, protein and salt solution which carries the red cells, white cells, and platelets.

Normally, 55% of our blood's volume is made up of plasma. As the heart pumps blood to cells throughout the body, plasma brings nourishment to them and removes the waste products of HYPERLINK

"<http://anthro.palomar.edu/blood/glossary.htm>" \l "metabolism" metabolism .

Plasma also contains blood clotting factors, sugars, HYPERLINK "<http://anthro.palomar.edu/blood/glossary.htm>" \l "lipid" lipids , vitamins, minerals, HYPERLINK

"<http://anthro.palomar.edu/blood/glossary.htm>" \l "hormones" hormones , HYPERLINK "<http://anthro.palomar.edu/blood/glossary.htm>" \l "enzyme" enzymes , HYPERLINK "<http://anthro.palomar.edu/blood/glossary.htm>" \l "antibodies" antibodies , and other HYPERLINK

"<http://anthro.palomar.edu/blood/glossary.htm>" \l "proteins" proteins . It is likely that plasma contains some of every protein produced by the body--approximately 500 have been identified in human plasma so far.

Fresh Frozen Plasma (FFP)

Desptu- 150-250ml

- Contains stable coag. Frs, Alb, Ig
- Fr VIII (70% of normal fresh blood), fibrinogen

Storage - At 25°C & colder - 1yr

Indications- Rept. Of multiple Cl. Frs

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L i v e r d i s e a s e , D I C , W a r f a r i n - ð

D o s e - 1 5 m l / k g

Admn - ABO compatible (No compatibility test reqd)  
- Use immediately after thawing  
- Completed within 6 Hrs  
Precaution - A/c allergic Rns

Fresh Frozen Plasma Indications  
"Multiple coagulation factor def. Eg.  
Liver dis., dic, dilutional coagulopathy  
•reversal of coumarin drug effect  
•antithrombin def. (cong. Or acquired)  
•immunodef. Syndrome  
•open heart surgery

Cryo precipitate

Desption - Prepared from FFP  
About ½ of Fr VIII & fibrinogen (of FFP)  
Fr. VIII - 80-100 IU/pack  
Fibrinogen - 150-300mg/pack  
Store - At 25°C or colder for 1yr

Indications - Fr VIII, IX, XIII, VWF Defy  
Fibrinogen deficiency  
Admn- ABO compatible  
(No compatibility test reqd)  
As soon as possible after thawing  
(infused within 6 Hs)

#### CRYOPRECIPITATE

- FACTOR VIII 80-100 UNITS /CONC.
- FIBRINOGEN 150-250 UNITS/ CONC.
- Von Willibrand's fr. 40-70 % original FFP
- INDICATIONS
- HAEMOPHILIA-A
- Von Willebrand's disease
- CONG. / ACQ. FIBRINOGEN DEFICY.

#### 8. AGGLUTINATION:

Sometimes when the blood of two people is mixed together, it clumps or forms visible islands in the liquid plasma--the red cells become attached to one another. This is agglutination.

INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\normal\_blood.gif" \\* MERGEFORMATINET  
INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\agglutinated\_blood.gif" \\* MERGEFORMATINET  
Unagglutinated blood smear

Agglutinated blood When different types of blood are mixed within the body, the reaction can be a bursting of the red cells as well as agglutination.

Different types of blood are recognized on the molecular level and sometimes rejected by being destroyed and ultimately filtered out by the kidneys in order to expel them from the body along with urine. In the case of a transfusion mistake, there can be so much of the wrong type of blood in the system that it can result in kidney failure and death.

This is due to the fact that when the kidneys try to filter the blood, they essentially become clogged as they are overwhelmed and cease being effective filters. Additionally, there is a rapid depletion of blood clotting factors which causes bleeding from every body orifice.

In the United States, about 1 in 12,000 units of whole blood transfused is given to the wrong person. Depending on the blood types of the donor and the recipient, this can result in death or no problems at all. The compositional difference between blood types is in the specific kinds of antigens found on the surface of the red cells. Antigens are relatively large protein molecules that provide the biological signature of an individual's blood type.

INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\antigens.gif" \\* MERGEFORMATINET

(not actual shape or size of antigens) Within blood, there are substances called antibodies which distinguish particular antigens from others, causing bursting or agglutination of the red cells when alien antigens are found. The antibodies bind to the antigens. In the case of agglutination, the antibodies "glue" together the antigens from different red cells thereby sticking the red cells together (as shown below on the right).

Antibodies seeking specific antigens Antibodies agglutinating red cells

INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\antibody\_antigen\_interaction\_1.gif" \\* MERGEFORMATINET  
INCLUDEPICTURE "G:\\Human Blood Blood Components\_files\\antibody\_antigen\_interaction\_2.gif" \\* MERGEFORMATINET

(not actual shape or size of antigens and antibodies) As agglutination proceeds, millions of red cells are glued together into clumps. This is not the same thing as clotting. When agglutination occurs, the blood mostly remains liquid. With clotting, however, it does not.

The specific types of antigens on our red blood cells determine our blood types. There are [HYPERLINK](#) "http://anthro.palomar.edu/blood/table\_of\_human\_blood\_groups.htm" 29 known human blood systems , or groups, for which each of us can be typed. As a result, there is one or more antigens for each of these blood groups. Since many of these blood systems also are found in apes and monkeys, it is likely that they evolved prior to the time that we became a separate species.

## 9. WHITE CELL ANTIBODIES:

The blood type antigen-antibody interaction is one of many similar recognition-rejection phenomena in our bodies.

Infectious microorganisms, such as viruses, also carry foreign antigens which stimulate the production of white cell antibodies (lymphocytes) that attack the antigens by binding to them as a way of getting rid of the invading parasites.

Once stem cells in our bone marrow produce antibodies to identify a specific alien antigen, we have the ability to produce them more quickly and in larger numbers. This results in the development of a long-term active immunity to future invasions of the same kind of alien antigen. This is the key to successful vaccination for viruses and some other microorganisms that invade our bodies.

White cell antibodies are also responsible for recognizing and rejecting alien body tissues, or, more accurately, the antigens on their cells. This is the main reason that organ transplants were most often unsuccessful in the past until the creation of drugs that can suppress the immune system and thereby prevent organ rejection. The immune system that is responsible is called the human leukocyte antigen (HLA) system. This is by far the most [HYPERLINK](#)

"http://anthro.palomar.edu/blood/glossary.htm" \l "polymorphism" polymorphic of all known human genetic systems--there are more than 100 antigens on tissue cells in humans resulting in approximately 30,000,000

possible HLA HYPERLINK "http://anthro.palomar.edu/blood/glossary.htm" \l "genotype" genotypes . The chances of two unrelated people having the same HLA genotypes is very slim. Subsequently, HLA incompatibility between organ donors and recipients are common.

## 10. MEDICAL TREATMENTS:

### Blood products

Blood for transfusion is obtained from human donors by HYPERLINK "http://en.wikipedia.org/wiki/Blood\_donation" \o "Blood donation" blood donation and stored in a HYPERLINK "http://en.wikipedia.org/wiki/Blood\_bank" \o "Blood bank" blood bank . There are many different HYPERLINK "http://en.wikipedia.org/wiki/Blood\_type" \o "Blood type" blood types in humans, the HYPERLINK "http://en.wikipedia.org/wiki/ABO\_blood\_group\_system" \o "ABO blood group system" ABO blood group system , and the HYPERLINK "http://en.wikipedia.org/wiki/Rhesus\_blood\_group\_system" \o "Rhesus blood group system" Rhesus blood group system being the most important. Transfusion of blood of an incompatible blood group may cause severe, often fatal, complications, so HYPERLINK "http://en.wikipedia.org/wiki/Crossmatching" \o "Crossmatching" crossmatching is done to ensure that a compatible blood product is transfused.

Other blood products administered HYPERLINK "http://en.wikipedia.org/wiki/Intravenous" \o "Intravenous" intravenously are platelets, blood plasma, cryoprecipitate, and specific coagulation factor concentrates.  
[ HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=27" \o "Edit section: Intravenous administration" edit ] Intravenous administration

Many forms of medication (from HYPERLINK "http://en.wikipedia.org/wiki/Antibiotic" \o "Antibiotic" antibiotics to HYPERLINK "http://en.wikipedia.org/wiki/Chemotherapy" \o "Chemotherapy" chemotherapy ) are administered intravenously, as they are not readily or adequately absorbed by the digestive tract. After severe acute blood loss, liquid preparations, generically known as plasma expanders, can be given intravenously, either solutions of salts (NaCl, KCl, CaCl<sub>2</sub> etc.) at physiological concentrations, or colloidal solutions, such as dextrans, HYPERLINK "http://en.wikipedia.org/wiki/Human\_serum\_albumin" \o "Human serum albumin" human serum albumin , or fresh frozen plasma. In these emergency situations, a plasma expander is a more effective life-saving procedure than a blood transfusion, because the metabolism of transfused red blood cells does not restart immediately after a transfusion.

### Time limits for infusion

Start infusion Complete infusion Whole blood / Red cells Within 30mts of taking from refrigerator Within 4 hrs Platelet concentrate Immediately Within 20 mts FFP or cryoppt Immediately Within 20 mts  
[ HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=32" \o "Edit section: Cultural and religious beliefs" edit ] 11. CULTURAL AND RELIGIOUS BELIEFS:

Due to its importance to life, blood is associated with a large number of beliefs. One of the most basic is the use of blood as a symbol for family relationships through birth/parentage; to be "related by blood" is to be related by ancestry or descendancy, rather than marriage. This bears closely to HYPERLINK "http://en.wikipedia.org/wiki/Bloodline" \o "Bloodline" bloodlines , and sayings such as " HYPERLINK "http://en.wikipedia.org/wiki/Blood\_is\_thicker\_than\_water" \o "Blood is

"thicker than water" "blood is thicker than water" and " [HYPERLINK "http://en.wikipedia.org/wiki/Bad\\_blood"](http://en.wikipedia.org/wiki/Bad_blood) \o "Bad blood" "bad blood", as well as " [HYPERLINK "http://en.wikipedia.org/wiki/Blood\\_brother"](http://en.wikipedia.org/wiki/Blood_brother) \o "Blood brother" "Blood brother". Blood is given particular emphasis in the Jewish and Christian religions because [HYPERLINK "http://en.wikipedia.org/wiki/Leviticus"](http://en.wikipedia.org/wiki/Leviticus) \o "Leviticus" Leviticus 17:11 says "the life of a creature is in the blood." This phrase is part of the Levitical law forbidding the drinking of blood or eating meat with the blood still intact instead of being poured off.

[ [HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=33"](http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=33) \o "Edit section: Indigenous Australians" edit ] Indigenous Australians In many [HYPERLINK "http://en.wikipedia.org/wiki/Indigenous\\_Australians"](http://en.wikipedia.org/wiki/Indigenous_Australians) \o "Indigenous Australians" indigenous Australian Aboriginal peoples' traditions, [HYPERLINK "http://en.wikipedia.org/wiki/Ochre"](http://en.wikipedia.org/wiki/Ochre) \o "Ochre" ochre (particularly red) and blood, both high in [HYPERLINK "http://en.wikipedia.org/wiki/Iron"](http://en.wikipedia.org/wiki/Iron) \o "Iron" iron content and considered [HYPERLINK "http://en.wikipedia.org/wiki/Maban"](http://en.wikipedia.org/wiki/Maban) \o "Maban" Maban , are applied to the bodies of dancers for ritual.

Lawlor comments that blood employed in this fashion is held by these peoples to attune the dancers to the invisible energetic realm of the Dreamtime. Lawlor then connects these invisible energetic realms and [HYPERLINK "http://en.wikipedia.org/wiki/Magnetic\\_fields"](http://en.wikipedia.org/wiki/Magnetic_fields) \o "Magnetic fields" magnetic fields , because iron is [HYPERLINK "http://en.wikipedia.org/wiki/Magnetism"](http://en.wikipedia.org/wiki/Magnetism) \o "Magnetism" magnetic .

[ [HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=34"](http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=34) \o "Edit section: European paganism" edit ] European paganism Among the [HYPERLINK "http://en.wikipedia.org/wiki/Germanic\\_tribe"](http://en.wikipedia.org/wiki/Germanic_tribe) \o "Germanic tribe" Germanic tribes (such as the [HYPERLINK "http://en.wikipedia.org/wiki/Anglo-Saxons"](http://en.wikipedia.org/wiki/Anglo-Saxons) \o "Anglo-Saxons" Anglo-Saxons and the [HYPERLINK "http://en.wikipedia.org/wiki/Norsemen"](http://en.wikipedia.org/wiki/Norsemen) \o "Norsemen" Norsemen ), blood was used during their sacrifices; the [HYPERLINK "http://en.wikipedia.org/wiki/Bl%C3%B3t"](http://en.wikipedia.org/wiki/Bl%C3%B3t) \o "Blót" Blóts . The blood was considered to have the power of its originator, and, after the butchering, the blood was sprinkled on the walls, on the statues of the gods, and on the participants themselves. This act of sprinkling blood was called blóedsian in [HYPERLINK "http://en.wikipedia.org/wiki/Old\\_English\\_language"](http://en.wikipedia.org/wiki/Old_English_language) \o "Old English language" Old English , and the terminology was borrowed by the [HYPERLINK "http://en.wikipedia.org/wiki/Roman\\_Catholic\\_Church"](http://en.wikipedia.org/wiki/Roman_Catholic_Church) \o "Roman Catholic Church" Roman Catholic Church becoming to bless and blessing

[ [HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=35"](http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=35) \o "Edit section: Judaism" edit ] Judaism In [HYPERLINK "http://en.wikipedia.org/wiki/Judaism"](http://en.wikipedia.org/wiki/Judaism) \o "Judaism" Judaism , blood cannot be consumed even in the smallest quantity ([HYPERLINK "http://en.wikipedia.org/wiki/Leviticus"](http://en.wikipedia.org/wiki/Leviticus) \o "Leviticus" Leviticus 3:17 and elsewhere); this is reflected in Jewish [HYPERLINK "http://en.wikipedia.org/wiki/Diet\\_\(nutrition\)"](http://en.wikipedia.org/wiki/Diet_(nutrition)) \o "Diet (nutrition)" dietary laws ( [HYPERLINK "http://en.wikipedia.org/wiki/Kashrut"](http://en.wikipedia.org/wiki/Kashrut) \o "Kashrut" Kashrut ). Blood is purged from [HYPERLINK "http://en.wikipedia.org/wiki/Meat"](http://en.wikipedia.org/wiki/Meat) \o "Meat" meat by [HYPERLINK "http://en.wikipedia.org/wiki/Salting\\_\(food\)"](http://en.wikipedia.org/wiki/Salting_(food)) \o "Salting (food)" salting and soaking in water.

[ [HYPERLINK "http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=36"](http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=36) \o "Edit section: Christianity" edit ] Christianity Some Christian churches, including [HYPERLINK "http://en.wikipedia.org/wiki/Roman\\_Catholic\\_Church"](http://en.wikipedia.org/wiki/Roman_Catholic_Church) \o "Roman Catholic

Church" Roman Catholicism , HYPERLINK  
"http://en.wikipedia.org/wiki/Eastern\_Orthodox\_Church" \o "Eastern Orthodox Church" Eastern Orthodoxy , HYPERLINK  
"http://en.wikipedia.org/wiki/Oriental\_Orthodoxy" \o "Oriental Orthodoxy"  
Oriental Orthodoxy , and the HYPERLINK  
"http://en.wikipedia.org/wiki/Assyrian\_Church\_of\_the\_East" \o "Assyrian Church of the East" Assyrian Church of the East teach that, when consecrated, the Eucharistic wine HYPERLINK  
"http://en.wikipedia.org/wiki/Transubstantiation" \o "Transubstantiation"  
actually becomes the blood of HYPERLINK  
"http://en.wikipedia.org/wiki/Jesus" \o "Jesus" Jesus for worshippers to drink. Thus in the consecrated wine, Jesus becomes spiritually and physically present. This teaching is rooted in HYPERLINK  
"http://en.wikipedia.org/wiki/The\_Last\_Supper" \o "The Last Supper" the Last Supper , as written in the four gospels of the HYPERLINK  
"http://en.wikipedia.org/wiki/Bible" \o "Bible" Bible , in which Jesus stated to his HYPERLINK "http://en.wikipedia.org/wiki/Twelve\_Apostles" \o "Twelve Apostles" disciples that the bread that they ate was his body, and the wine was his blood. "This cup is the new testament in my blood, which is shed for you." ( HYPERLINK  
"http://en.wikisource.org/wiki/Bible\_(King\_James)/Luke" \l "22:20" \o  
"s:Bible (King James)/Luke" Luke 22:20 ).  
[ HYPERLINK  
"http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=37"  
\o "Edit section: Islam" edit ] Islam  
Consumption of food containing blood is forbidden by HYPERLINK  
"http://en.wikipedia.org/wiki/Islamic\_dietary\_laws" \o "Islamic dietary laws" Islamic dietary laws . This is derived from the statement in the HYPERLINK "http://en.wikipedia.org/wiki/Qur%27an" \o "Qur'an" Qur'an , sura HYPERLINK "http://en.wikipedia.org/wiki/Al-Ma%27ida" \o "Al-Ma'ida" Al-Ma'ida (5:3): "Forbidden to you (for food) are: dead meat, blood, the flesh of swine, and that on which has been invoked the name of other than Allah."  
Blood is considered as unclean and in Islam cleanliness is part of the faith, hence there are specific methods to obtain physical and ritual status of cleanliness once bleeding has occurred. Specific rules and prohibitions apply to HYPERLINK  
"http://en.wikipedia.org/wiki/Menstruation" \o "Menstruation"  
menstruation , postnatal bleeding and irregular vaginal bleeding.  
[ HYPERLINK  
"http://en.wikipedia.org/w/index.php?title=Blood&action=edit&section=39"  
\o "Edit section: Chinese and Japanese culture" edit ] Chinese and Japanese culture  
In Chinese popular culture, it is often said that if a man's nose produces a small flow of blood, he is experiencing sexual desire. This often appears in HYPERLINK "http://en.wikipedia.org/wiki/China" \o "China" Chinese-language and HYPERLINK  
"http://en.wikipedia.org/wiki/Hong\_Kong" \o "Hong Kong" Hong Kong HYPERLINK "http://en.wikipedia.org/wiki/Film" \o "Film" films as well as in HYPERLINK "http://en.wikipedia.org/wiki/Japan" \o "Japan" Japanese culture parodied in HYPERLINK  
"http://en.wikipedia.org/wiki/Anime" \o "Anime" anime and HYPERLINK  
"http://en.wikipedia.org/wiki/Manga" \o "Manga" manga . Characters, mostly males, will often be shown with a HYPERLINK  
"http://en.wikipedia.org/wiki/Epistaxis" \o "Epistaxis" nosebleed if they have just seen someone HYPERLINK  
"http://en.wikipedia.org/wiki/Nude" \o "Nude" nude or in little clothing, or if they have had an erotic thought or fantasy; this is based on the idea that a male's blood pressure will spike dramatically when aroused.

## 12. CONCLUSION:

CBER works closely with other parts of the Public Health Service (PHS) to identify and respond to potential threats to blood safety, to develop safety and technical standards, to monitor blood supplies and to help industry promote an adequate supply of blood and blood products.

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ANTIBODIES	10. MEDICAL TREATMENTS	11. [ <a href="#">HYPERLINK</a>	" <a href="http://en.wikipedia.org/w/index.php?title=Blood&amp;action=edit&amp;section=32">http://en.wikipedia.org/w/index.php?title=Blood&amp;action=edit&amp;section=32</a> "	\o "Edit section: Cultural and religious beliefs" edit ]	CULTURAL AND		
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SEMINAR ON  
"BLOOD AND BLOOD COMPONENTS"

Submitted to  
Madam.Mrs.Jasmine  
Reader in Nursing  
MTPG & RIHS

Submitted by  
Ms. Suriyadevi. R

Submitted on: 20.10.2011

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 w a r n i n g b o x ! G dh ፩ ፩ -Dà MÆ  
 ፩yŷyÀ B\* CJ aJ ph b þO , b  
 5o  
 s u c c e s s b o x ! H dh ፩ ፩ -D€ MÆ  
 ፩YŷY B\* CJ aJ ph , þO ' ,  
 5o  
 m w - i n f o b o x T I dh ፩ ፩ \$d  
 %d  
 &d  
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 NÆ ፩□  
 OÆ ፩□  
 PÆ ፩□  
 QÆ ፩□  
 H þO ç H

5o m w - i n f o b o x - l e f t J dh ፩ ፩ J þO ² J  
 5o m w - i n f o b o x -  
 r i g h t K dh ፩ ፩ J þO Â J  
 5o  
 p r e v i e w n o t e L dh ፩ ፩ B\* phI ፩ þO ḥ ፩  
 5o  
 v i s u a l c l e a r M dh ፩ ፩ , þO â ,  
 5o  
 t a b l e p a g e r T N dh ፩ ፩ \$d %d &d 'd NÆ a a a  
 OÆ a a a PÆ a a a QÆ a a a F þO ḥ F  
 5o  
 t a b l e p a g e r \_ n a v O dh ፩ ፩ F þO F  
 5o  
 m w - a j a x - l o a d e r P dh ፩ ፩ J þO J  
 5o m w - s m a l l -  
 s p i n n e r Q dh ፩ ፩ f þO " f  
 5o m w - h e l p - f i e l d -  
 h i n t R dh ፩ ፩ < •>\* B\* CJ aJ ph E- ፩ þO 2 ፩  
 5o m w - h e l p - f i e l d -  
 d a t a e S dh ፩ ፩ \$d %d &d 'd -D` MÆ  
 ýÖöý NÆ ]Éô OÆ ]Éô PÆ ]Éô QÆ ]Éô < þO B <  
 5o t i p s y T dh ፩ ፩ CJ aJ þO R  
 5o  
 t i p s y - i n n e r e U dh ፩ ፩ %d &d 'd -D` MÆ  
 ýÖöý NÆ ]Éô OÆ ]Éô PÆ ]Éô QÆ ]Éô  
 B\* ph ፩ þO b ፩  
 5o  
 t i p s y - a r r o w V dh ፩ ፩ 0 þO r 0  
 5o l t r W dh ፩ ፩ \ þO , \  
 5o d i f f - c u r r e n t v e r s i o n -  
 t i t l e X dh ፩ ፩ 2 þO ' 2  
 5o d i f f Y dh ፩ ፩ Ž þO ¢ Ž  
 5o t o c e Z dh ፩ ፩ \$d %d &d 'd -D MÆ  
 ýùùù NÆ a a a OÆ a a a PÆ a a a QÆ a a a CJ aJ ¢ þO ²  
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 D MÆ  
 ýùùù NÆ a a a OÆ a a a PÆ a a a QÆ a a a a\$ CJ aJ a þO  
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 u s e r m e s s a g e i \ dh ፩ ፩ \$d %d  
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 ýùùù NÆ a a a OÆ a a a PÆ a a a QÆ a a a < þo â <  
 5o c e n t e r ^ \$ dh ፩ ፩ a\$ < þo ḥ <  
 5o s m a l l \_ dh ፩ ፩ CJ aJ > þo >  
 5o  
 l i n k - h t t p s ` dh ፩ ፩ @ þO @  
 5o  
 l i n k - m a i l t o a dh ፩ ፩ : þO " :  
 5o l i n k - f t p b dh ፩ ፩ : þO 2 :  
 5o l i n k - i r c c dh ፩ ፩ > þo B >  
 5o  
 l i n k - a u d i o d dh ፩ ፩ > þo R >

5o  
 l i n k - v i d e o      e   dh      ɔð   ɔð      D þO   b D  
 5o  
 l i n k - d o c u m e n t      f   dh      ɔð   ɔð      J þO   r J  
 5o  
 r e d i r e c t t e x t      g   dh      ɔð   ɔð      CJ\$ aJ\$ æ þO   ,   œ  
 5o  
 t o c c o l o u r s   e h   dh      ɔð   ɔð   \$d      %d      &d      'd      -D   MÆ  
 ýùùù   NÆ a a a   OÆ a a a   PÆ a a a   QÆ a a a   CJ aJ Z þO   ,  
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 n a v b o x - t i t l e   ' i   \$   dh      ɔð   ɔð   -D@   MÆ  
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 5o      n a v b o x - a b o v e b e l o w   ' j   \$   dh      ɔð   ɔð   -  
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 ýÝÝý   a\$   ` þO   ^`  
 5o  
 n a v b o x - g r o u p   ' k   \$   dh      ɔð   ɔð   -D@   MÆ  
 ýÝÝý   a\$   5 •\ •H þO   Â H  
 5o      n a v b o x   ! l   dh      ɔð   ɔð   -D   MÆ  
 ýÝÝý   Z þO   Ò Z  
 5o      n a v b o x - s u b g r o u p   ! m   dh      ɔð   ɔð   -D   MÆ  
 ýýýý   @ þO   â @  
 5o  
 n a v b o x - l i s t      n   dh      ɔð   ɔð      R þO   ò R  
 5o  
 n a v b o x - e v e n   ! o   dh      ɔð   ɔð   -D   MÆ  
 ý÷÷÷   L þO   L  
 5o  
 c o l l a p s e b u t t o n      p   \$   dh      ɔð   ɔð   a\$   > þO   >  
 5o      n a v b a r   q   dh      ɔð   ɔð   CJ aJ þO   "  
 5o      i n f o b o x   e r   dh      ɔð   ɔð   \$d      %d      &d      'd      -  
 D   MÆ  
 ýùùù   NÆ a a a   OÆ a a a   PÆ a a a   QÆ a a a   B\* CJ aJ ph  
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 m e s s a g e b o x   e s   dh      ɔð   ɔð   \$d      %d      &d      'd      -D   MÆ  
 ýùùù   NÆ a a a   OÆ a a a   PÆ a a a   QÆ a a a   d þO   B d  
 5o      h i d d e n s t r u c t u r e   ! t   dh      ɔð   ɔð   -DE   MÆ  
 ý ý      B\* phý   > þO   R >  
 5o      r e l l i n k   u   dh      ɔð   ɔð   6 •] •> þO   b >  
 5o      d a b l i n k   v   dh      ɔð   ɔð   6 •] •@ þO   r @  
 5o  
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 5o      g e o - d m s      x   dh      ɔð   ɔð   8 þO   ' 8  
 5o      g e o - d e c      y   dh      ɔð   ɔð   J þO   ɔ J  
 5o  
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 5o      g e o - m u l t i -  
 p u n c t   {   dh      ɔð   ɔð   < • < þO   Â <  
 5o      l o n g i t u d e   |   dh      ɔð   ɔð   : þO   ò :  
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 5o      t e m p l a t e -  
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PÆ a a a  
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 b r e a d c r u m b  
 € øð øð CJ OJ QJ ^J aJ > þo >  
 5o e d i t l i n k      • dh øð øð < • > þo " >  
 5o  
 t h u m b i m a g e , dh øð øð R þo 2 R  
 5o t a b l e p a g e r \_ c o l \_ l i n k s f dh øð øð  
 f þo B f  
 5o - t a b l e p a g e r \_ c o l \_ i m g \_ d e s c r i p t i o n  
 " dh øð øð : þo R :  
 5o t o c t i t l e ... dh øð øð D þo b D  
 5o  
 s t a n d a r d - t a l k      † dh øð øð 4 þo r 4  
 5o i m b o x      ‡ dh øð øð < þo , <  
 5o t o c n u m b e r      ^ dh øð øð : þo ' :  
 5o s e l f l i n k      % dh øð øð > þo ¢ >  
 5o  
 w p b - h e a d e r      Š dh øð øð @ þo ^ @  
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 w p b - o u t s i d e      < dh øð øð 4 þo Â 4  
 5o a m b o x      @ dh øð øð : þo ò :  
 5o m e t a d a t a      • dh øð øð 4 þo â 4  
 5o t m b o x      ž dh øð øð B þo ò B  
 5o  
 h i s t o r y - u s e r      • dh øð øð @ þo @  
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 p r i n t f o o t e r      • dh øð øð @ þo @  
 5o  
 d i f f - o t i t l e      ' dh øð øð @ þo " @  
 5o  
 d i f f - n t i t l e      ' dh øð øð @ þo 2 @  
 5o  
 d i f f - l i n e n o      " dh øð øð > þo¢ A >  
 5o t e x h t m l      CJ OJ QJ ^J aJ o( , þo¢ Q ,  
 5o c o m m e n t 6 •] •2 þo¢ a 2  
 5o c h a n g e d b y      CJ aJ F þo¢ q F  
 5o h i s t o r y - d e l e t e d      6 □7 □] □ph^ ^ ^ F þo¢ •  
 F  
 5o m w - r e v d e l u n d e l - l i n k      CJ aJ 2 þo¢ '  
 2  
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 5o  
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5o d e l e t e d 1 6 □7 □] □ph^□ D pO "

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h  
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¥ dh ☩ ☩ B pO b

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B  
 5o t o c t i t l e 2 § § dh ☩ ☩ a\$ N pO ,

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 5o  
 e d i t s e c t i o n 1 " dh ☩ ☩

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 aJ  
 N pO '

N  
 5o  
 e d i t s e c t i o n 2 © dh ☩ ☩

< •CJ aJ N pO ¢

N  
 5o  
 e d i t s e c t i o n 3 ^ dh ☩ ☩

< •CJ aJ N pO ^

N  
 5o  
 e d i t s e c t i o n 4 « dh ☩ ☩

< •CJ aJ F pO Â

F  
 5o  
 e d i t s e c t i o n 5 ¬ dh ☩ ☩ < • N pO ò

N  
 5o  
 e d i t s e c t i o n 6 - dh ☩ ☩

< •CJ- aJ- J pO â

J  
 5o  
 t o c t o g g l e 1 ® dh ☩ ☩

< •CJ aJ J pO ò

J  
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 t o c t o g g l e 2 - dh ☩ ☩

< •CJ aJ F pO

F  
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 p r i n t f o o t e r 1 ° dh ☩ ☩ < • \ pO

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ŸÝÝŷ a\$ b pO "

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 5o  
 n a v b o x - g r o u p 1 ' ^ \$ dh ☩ ☩ -D@ MÆ

f      ýææý      a\$      5 •\ •f      þO      2  
 5o      n a v b o x - a b o v e b e l o w 1      '      \$      dh      ð ð -  
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 N      5o      c o l l a p s e b u t t o n 2      '      \$      dh      ð ð a\$      8 þO  
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 8      5o      n a v b a r 1      µ      dh      ð ð      æ þO      b  
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 s t a n d a r d -  
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 ýøê°      NÆ ÀÀ•      OÆ ÀÀ•      PÆ ÀÀ•      QÆ ÀÀ•      6 þO      r  
 6      5o      i m b o x 1      · dh      ð ð      6 þO      ,  
 6      5o      i m b o x 2      , dh      ð ð      6 þO      '  
 6      5o      t m b o x 1      ¹ dh      ð ð      B þO      ¢  
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 5o  
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|     |                |                |                |     |     |                |                |                |                |     |     |     |     |
|-----|----------------|----------------|----------------|-----|-----|----------------|----------------|----------------|----------------|-----|-----|-----|-----|
| ~   | 0              | €              | €              | ~   | 0   | €              | €              | ~              | 0              | €   | €   | ~   | 0   |
| €   | €              | ~              | €              | €   | ~   | +              | 0              | €              | €              | ~   | +   | ~   | ~   |
| 0   | 0              | €              | €              | ~   | +   | 0              | €              | €              | ~              | +   | ~   | ~   | ~   |
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| ~   | ~              | 0              | € <sup>1</sup> | ~   | 0   | ~              | 0              | € <sup>1</sup> | ~              | 0   | ~   | ~   | -   |
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| 0   | 0              | € <sup>1</sup> | €              | ~   | -   | 0              | € <sup>1</sup> | ~              | € <sup>1</sup> | ~   | -   | ~   | -   |
| 0   | 0              | € <sup>1</sup> | €              | ~   | -   | 0              | € <sup>1</sup> | ~              | € <sup>1</sup> | ~   | -   | ~   | -   |
| ~   | € <sup>1</sup> | ~              | €              | (   | 0   | €              | €              | ~              | ~              | .   | ~   | .   | .   |
| 0   | €□             | ~              | .              | 0   | €□  | ~              | 0              | €□             | ~              | .   | ~   | .   | .   |
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| 0   | €              | €              | (              | 0   | €   | €              | ~              | 0              | €              | ~   | 0   | €x5 | ~   |
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| €x5 | ~              | 0              | €x5            | ~   | 0   | €x5            | ~              | 0              | €x5            | ~   | 0   | €x5 | ~   |
| ~   | /              | 0              | €x5            | ~   | 0   | ~              | 0              | €x5            | ~              | 0   | ~   | /   | /   |
| 0   | €x5            | ~              | /              | 0   | €x5 | ~              | 0              | €x5            | ~              | 0   | ~   | /   | /   |
| 0   | €x5            | ~              | /              | 0   | €x5 | ~              | 0              | €x5            | ~              | 0   | ~   | /   | /   |
| 0   | €x5            | (              | 0              | €   | €   | ~              | 0              | €              | €              | ~   | 0   | €~@ | ~   |
| ~   | 0              | €~@            | ~              | 0   | €~@ | ~              | 0              | €~@            | ~              | 0   | ~   | 0   | 0   |
| €~@ | ~              | 0              | €~@            | ~   | 0   | €~@            | ~              | 0              | €~@            | ~   | \$  | ~   | 0   |
| 0   | €~@            | ~              | \$             | 0   | €~@ | ~              | 0              | €~@            | ~              | \$  | ~   | \$  | ~   |
| 0   | €~@            | ~              | \$             | 0   | €~@ | ~              | 0              | €~@            | ~              | \$  | ~   | \$  | ~   |
| 0   | €~@            | ~              | \$             | 0   | €~@ | ~              | 0              | €~@            | ~              | \$  | ~   | \$  | ~   |
| 0   | €~@            | ~              | \$             | 0   | €~@ | ~              | 0              | €~@            | ~              | \$  | ~   | \$  | ~   |
| 0   | €~@            | ~              | \$             | 0   | €~@ | ~              | 0              | €~@            | ~              | \$  | ~   | \$  | ~   |
| ~   | Í0             | ~              | €~@            | ~   | Í0  | ~              | Í0             | ~              | €~@            | ~   | Í0  | ~   | €~@ |
| €~@ | ~              | Í0             | ~              | Í0  | ~   | €~@            | ~              | Í0             | ~              | €~@ | ~   | Í0  | ~   |
| ~   | Í0             | ~              | €~@            | ~   | Í0  | ~              | €~@            | ~              | Í0             | ~   | €~@ | ~   | €~@ |
| 0   | €              | €              | ~              | 0   | €~@ | ~              | 0              | €~@            | ~              | ~   | ~   | ~   | ~   |
| 0   | €~@            | ~              | 0              | €~@ | ~   | 0              | €~@            | ~              | ~              | ~   | ~   | ~   | ~   |
| 0   | €~@            | ~              | 0              | €~@ | ~   | 0              | €~@            | ~              | ~              | ~   | ~   | ~   | ~   |
| 0   | €~@            | ~              | ~              | ~   | ~   | ~              | ~              | ~              | ~              | ~   | ~   | ~   | ~   |
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| Ð   | ©              | 0              | €~@            | Ð   | TM  | 0              | €~@            | ©              | 0              | €~@ | Ô   | ~   | €~@ |
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