HISTORY OF MEDICINE
CARDIOVASCULAR SYSTEM

OLLI
Spring 2018
Janice Ott
Galen  129-199AD
Believed blood moved through invisible pores in the septum
Ibn Sina = Avicenna
980-1037 AD
Heart has 3 chambers
Wrist pulse
Intubation
Ibn al-Nafis  Egypt 1242
First to correctly describe connection between pulmonary and heart
Michael Servetus 1511-1553
Fought against intolerance of Renaissance
Burned in effigy by Catholics and in the flesh by Protestants.
Wrote many treatises, including one on pathway of pulmonary circulation
More religious than medical
Vesalius 1542
spent time refuting Galen

Colombo 1545
spent life refuting Vesalius

Girolamo Fabrici 1574
valves in veins
William Harvey  1578-1657
Educated in Padua
Physician in England
Physician to James I, Charles I
1628 published *An Anatomical Treatise on the Motion of the Heart and Blood in Animals*
W. Harvey and King Charles I
1628 William Harvey
One-way blood flow
One-way valves – revolutionary
Vivisection (dogs), dissection
Understood motion of heart
Systole vs diastole
Schematic drawings of an artery and vein showing comparative thicknesses of the three coats: outer coat (tunica adventitia), muscle coat (tunica media), and lining of endothelium (tunica intima). Note that the muscle and outer coats are much thinner in veins than in arteries and that veins have valves.
Human Heart

- Aorta
- Pulmonary trunk
- Left atrium
- Pulmonary veins
- Left ventricle
- Right atrium
- Right ventricle
- Superior vena cava
- Inferior vena cava
Pulmonary Circulation

- Left pulmonary artery
- Aortic arch
- Pulmonary trunk
- Right pulmonary artery
- Three lobar arteries to right lung
- Pulmonary veins
- Right atrium
- Right ventricle
- Left ventricle
- Air-filled alveolus of lung
- Gas exchange
- Two lobar arteries to left lung
- Pulmonary veins
- Left atrium
Marcello Malpighi  1661
saw capillaries
ARTERIES
- Spurting blood
- Pulsating flow
- Bright red color

VEINS
- Steady, slow flow
- Dark red color

CAPILLARIES
- Slow, even flow
Electrocardiogram
Augustus Waller 1887
First to record electricity
Willem Einthoven 1901
First one 600 pounds,
2 rooms, 5 operators
First stethoscope
Laennec 1816
Defibrillator
sinoatrial node
Claude Beck 1947
CPR
Peter Safar  1956
Mannequin Resusci Anne
Artificial Pacemaker
Paul Zoll 1952
Angioplasty
Narrow arteries from Atherosclerosis
Stents  1986
Heart transplant
First needed vascular suturing and heart lung machine
First successful South Africa
Christiaan Barnard 1967
Lived for 18 days, died from pneumonia
Robert Jarvik 1982
First permanent artificial heart
Liver 1963
Lung 1963
Hand 1964
Pancreas 1966
Heart 1967
Face 2005
TRANSFUSION
Richard Lower 1666

1\textsuperscript{st} transfusion dog $>$ dog
1667 First successful blood transfer between animal and man, sheep too many deaths, illegal
James Blundell  1829
First successful blood transfusion recorded
Husband > wife after birth
Early transfusions led to Kidney damage and death

Problems:

1. blood clotted
2. severe reactions
3. death
1900

Karl Landsteiner
Austrian
A, B, O
Nobel Prize
Later AB found
Later Rh
<table>
<thead>
<tr>
<th>Erythrocytes</th>
<th>Antigen A</th>
<th>Antigen B</th>
<th>Antigens A and B</th>
<th>Neither antigen A nor B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td>Anti-B antibodies</td>
<td>Anti-A antibodies</td>
<td>Neither anti-A nor anti-B antibodies</td>
<td>Both anti-A and anti-B antibodies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blood type</th>
<th>Type A</th>
<th>Type B</th>
<th>Type AB</th>
<th>Type O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocytes</td>
<td>Erythrocytes with type A surface antigens and plasma with anti-B antibodies</td>
<td>Erythrocytes with type B surface antigens and plasma with anti-A antibodies</td>
<td>Erythrocytes with both type A and type B surface antigens, and plasma with neither anti-A nor anti-B antibodies</td>
<td>Erythrocytes with neither type A nor type B surface antigens, but plasma with both anti-A and anti-B antibodies</td>
</tr>
<tr>
<td>Blood being tested</td>
<td>Serum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>----------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type AB (contains agglutinogens A and B)</td>
<td>Anti-A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anti-B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RBCs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type B (contains agglutinogen B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type A (contains agglutinogen A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type O (contains no agglutinogens)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.
1912
Roger Lee
universal donor
universal recipient
1916
citrate-glucose solution
store blood
1926
Red Cross
First blood transfusion service
Still great prejudice
Hitler: only Aryan blood
Louisiana crime to give
“black” blood to white
WWII separated white blood
from black blood
1940

Karl Landsteiner

Rh factor
Blood banks for Europe
1940
Edwin Cohn 1940
breakdown plasma into components
Photomicrograph of a human blood smear, Wright’s stain (715×)
Hemophilia
Injury Occurs

- Injury to blood vessel results in bleeding.
- Vessel constricts and clotting factors are activated.

Normal

- Natural clotting factor helps form a strong platelet plug.
- A stable fibrin mesh forms a sealed clot over the platelet plug to stop the bleeding.

Hemophilia

- Lack of natural clotting factor means only a weak platelet plug can form.
- Incomplete fibrin mesh allows bleeding to continue.

Sickle Cell Anemia

James Herrick 1910

Linus Pauling 1949

defective hemoglobin molecule

Malaria
Lymphatic System

1. Immune system
2. Absorbs excess fluids
3. Absorbs fat
Thomas Bartholin  1652
Danish
Lymphatic system
(thymus, lymph nodes,
Bone marrow, tonsils, spleen
The Lymphatic System

- Cervical lymph nodes
- Lymphatics of the mammary gland
- Cisterna chyli
- Lumbar lymph nodes
- Pelvic lymph nodes
- Lymphatics of the lower limb
- Thoracic duct
- Thymus
- Axillary lymph nodes
- Spleen
- Lymphatics of the upper limb
- Inguinal lymph nodes