Circulation
General Structure and Function of Circulatory System

Differentiation between pulmonary and systemic circulation

- **Pulmonary circulation**: Right ventricle > Pulmonary artery > Lungs > Pulmonary Vein > Left atrium
- **Systemic circulation**: Left ventricle > Aorta > Vena Cava > Right atrium

<table>
<thead>
<tr>
<th>Pulmonary</th>
<th>Systemic</th>
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</thead>
<tbody>
<tr>
<td><strong>Lower pressure</strong> - Shorter pumping distance</td>
<td><strong>Higher pressure</strong> - Need to pump blood to all organs (except for the lungs) in the body</td>
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<tr>
<td><strong>Lower resistance</strong> - Less smooth muscles in arterioles, wider and shorter veins and thinner pulmonary vessel walls</td>
<td><strong>Higher resistance</strong> - More smooth muscles in the systemic arterioles</td>
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<tr>
<td><strong>Higher compliance</strong> - Accommodates shifts of blood more quickly</td>
<td><strong>Lower compliance</strong> - due to resistance offered by arterioles</td>
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- **Platelets**
  - Colorless, nonnucleated cell fragments that contain numerous granules

- **Platelet plug**
  1. Injury causes the endothelium to be disrupted and the underlying collagen fibres to be exposed.
  2. Von Willebrand factors (secreted by the endothelium and platelets) changes the conformation of collagen molecules, allowing platelets to bind.
  3. The binding triggers the release of the content inside of the secretory vesicles of platelets, including ADP and serotonin, which induce metabolic and structural changes of the platelets and cause them to be activated.
  4. As new platelets aggregate on top of the old ones, a platelet plug is formed.
  5. The adhesion of platelets to collagen fibres causes the release of thromboxane A2, which further stimulate the aggregation of platelets and the release of secretory vesicle contents. Thromboxane A2 also stimulates the vasoconstriction of the damaged vessel to restrict blood loss.
  6. Prostacyclin, which is a substance that is released by the neighbouring, undamaged cells, acts as an inhibitor of platelet aggregation. Nitrogen oxide is also released by the neighbouring cells to cause vasodilation and inhibit platelet adhesion, aggregation and activation.

- **Clot formation**

![Diagram of the intrinsic and extrinsic clotting pathways](image-url)