Liver

- The liver produces a compound called **Bile**, which is stored in the gall bladder (Since not all is needed at the same time). It is also released into the **Duodenum**
- Bile breaks down fat droplets into many smaller droplets. This increases the digestion speed of fats & oil

  *After the small intestine, we enter the large intestine*

Large intestine

- Not much nutrients are left when it comes to the large intestine, if the person is healthy
- Now contains water and undigested materials as well as waste products such as dead cells
- Water is reabsorbed via osmosis
  - If not enough water is reabsorbed, the person gets diarrhea
  - If too much water is reabsorbed, the person gets constipated
- **E. Coli** bacteria produce vitamins from cellulose
  - Also produce methane (Farts)

  *Exits from anus*

The circulatory system

- Transports blood around the body
- Ca. 5-6 liters of blood in adults

Why is blood important?

- Transports oxygen (O\(_2\)) and carbon dioxide (CO\(_2\))
- Transports nutrients
- Heals wounds
- Immune system
  - Transports antibodies (Y-shaped proteins used to identify and kill diseases)
  - Transports urea (What is urea ask göran)
  - Transports hormones
  - Chemical substances transported through the blood system
- Transports heat
  - Heat is transported by blood to **superficial blood vessels** (A vein that is close to the surface of the body). That allows heat to leave the body. This is why a person turns red when they exercise. Sweat is a way for the body to release heat

What is in the blood?

The blood consists of 4 main components

- **Plasma**
  - Liquid part of the blood
  - 90% of plasma is water
  - The rest 10% is dissolved salts, hormones and proteins
- **Red blood cells** (Erythrocytes)
  - Transports oxygen (O\(_2\))
  - Contains a protein called **Hemoglobin** which has a primary purpose of oxygen transport
### Pancreas
Abdominal cavity
Releases Pancreatic juices into Duodenum

### Villi
Small intestine
Folds increasing surface area

### Microvilli
Small intestine
Membrane protrusions on the villi

### Superficial blood vessel
Veins close to the surface of the body
Cooling of the body

### Plasma
Blood
Liquid part of the blood

### Red blood cells (Erythrocytes)
Blood
Transports oxygen

### Oxyhemoglobin
Red blood cell
Hemoglobin that carries oxygen

### Deoxyhemoglobin
Red blood cell
Hemoglobin without oxygen

### White blood cells (Leukocytes)
Blood
Part of the immune system

### Phagocytes (white blood cell)
Blood
Swallow pathogens

### Lymphocytes (white blood cell)
Blood
Identification of diseases and initiation of defenses

### Platelets (Thrombocytes)
Blood
Blood coagulation

### Vena cava
Heart
Blood into right atrium

### Right and left Atrium
Heart
Top parts of the heart

### Right and left ventricle
Heart
Lower parts of the heart

### Pulmonary artery
Heart
Blood leaves heart, leading to the lungs

### Pulmonary vein
Heart
Blood returns to heart from the lungs

### Aorta
Heart
Blood leaves the heart

### Veins
Body
Transport blood to the heart

### Arteries
Body
Transport blood from the heart

### Capillaries
Body
Connect veins and arteries

### Peristalsis
Esophagus and Small intestine
Wave like muscle contractions that push food down

### Other (Proteins, bacteria etc.)

<table>
<thead>
<tr>
<th>Protein/Pathogen</th>
<th>Location</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucin (Protein)</td>
<td>Saliva and Gastric Juices</td>
<td>Acts as lubricants making food slippery</td>
</tr>
<tr>
<td>Hemoglobin (Protein)</td>
<td>Red blood cell</td>
<td>Transports oxygen</td>
</tr>
<tr>
<td>Fibrin (Protein)</td>
<td>Platelets</td>
<td>Forming net across the hole (Blood coagulation)</td>
</tr>
<tr>
<td>Antibodies</td>
<td>White blood cells</td>
<td>Identify and neutralize pathogens</td>
</tr>
<tr>
<td>E. Coli (Bacteria)</td>
<td>Large intestine</td>
<td>Vitamins from cellulose and methane</td>
</tr>
<tr>
<td>Peptic Ulcer disease</td>
<td>Stomach sack</td>
<td>Break in the lining of stomach</td>
</tr>
<tr>
<td>Gastric Juice</td>
<td>Stomach sack</td>
<td>Acidic and contains HCl and Pepsin</td>
</tr>
<tr>
<td>Pancreatic Juice</td>
<td>Duodenum (Produced in Pancreas)</td>
<td>Alkaline and contains buffers, trypsin, amylase and lipase</td>
</tr>
</tbody>
</table>