

# Simulation of Human Digestive System

EDUCATIONAL CONFERENCE

"TEACHING SCIENCES IN SCHOOLS WITH CREATIVITY AND INNOVATION: TRANSFORMING THE THEORY INTO PRACTICE"

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# Simulation of Human Digestive System

The digestive system plays an important role in the operation of the human body.

It provides the body with **energy** and **nutritional ingredients** .

Students find it difficult to understand how the digestive system functions because most of its parts are located inside the human body.

The simulation of the digestive system helps students to comprehend :

1. The parts of the digestive system ( the course food follows into the human body )
2. The liquids which take part in the digestion of the food .
3. The length of the small and large intestines.

# Simulation of Human Digestive System

The digestion process begins from the mouth where our teeth, in combination with saliva enzymes, begin to break up the food.



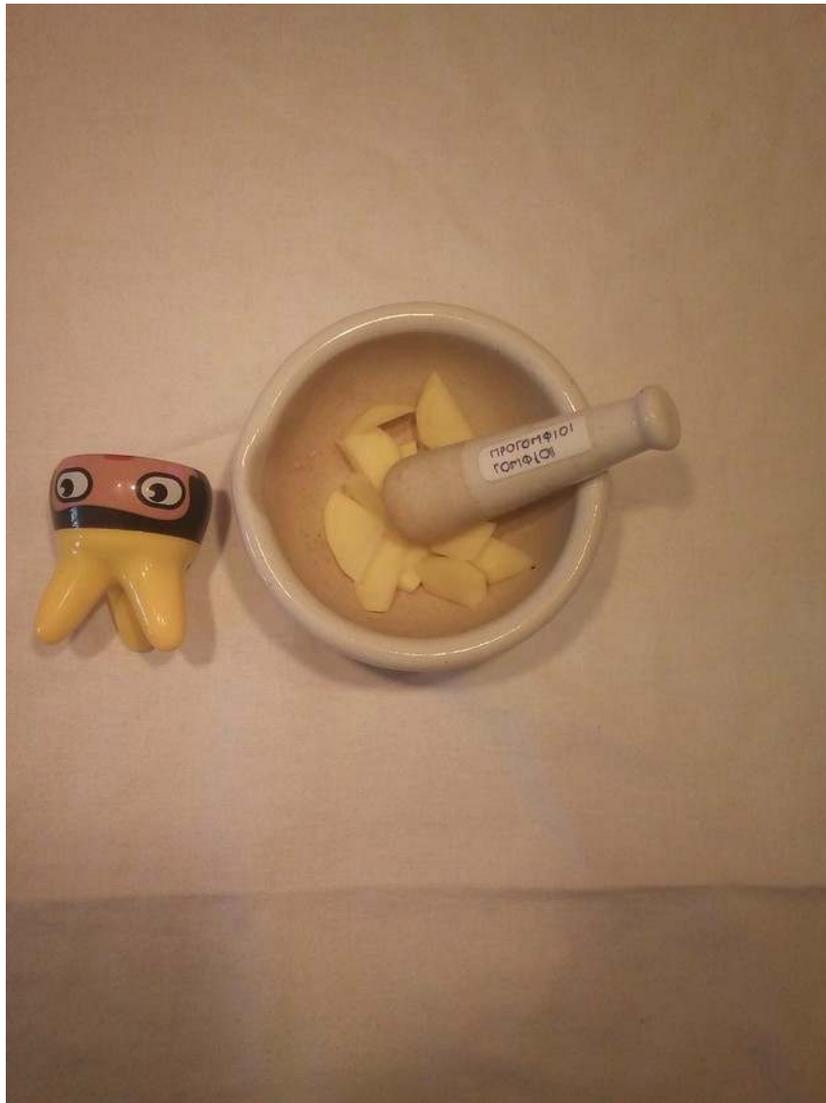
# Simulation of Human Digestive System



## Incisors

Using our incisors, we cut the food .

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## Molars

Our molars mash up the food .

# Simulation of Human Digestive System



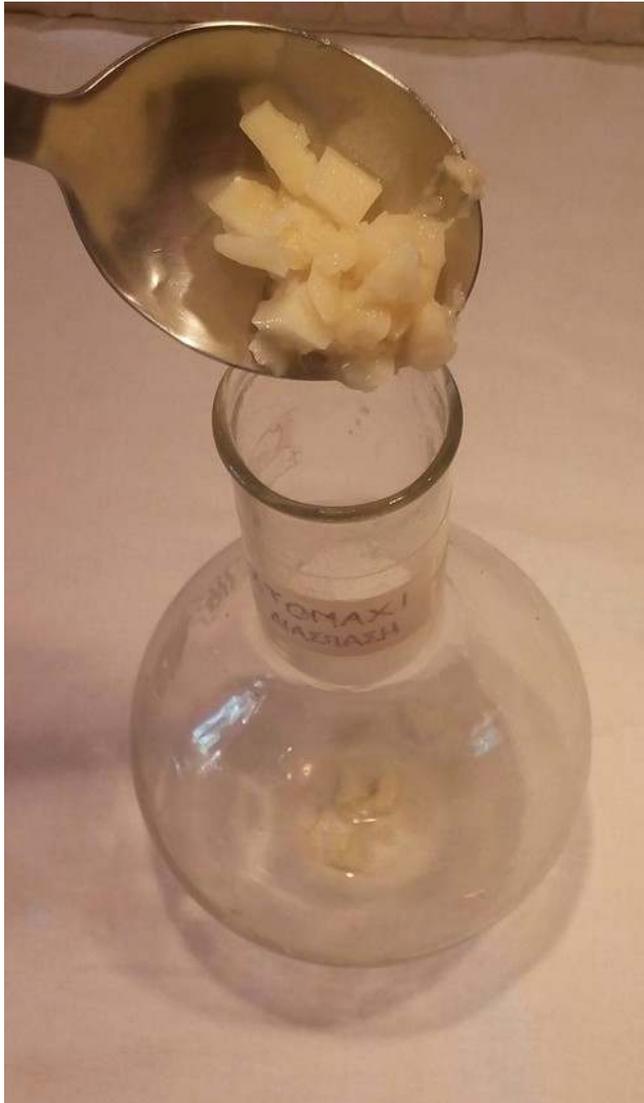
## Saliva

Saliva is a watery substance formed in the mouths of animals, secreted by the salivary glands.

Human saliva comprises 99.5% water, plus electrolytes, mucus, white blood cells, epithelial cells (from which DNA can be extracted), glycoproteins, enzymes (such as amylase and lipase), antimicrobial agents such as secretory IgA and lysozyme.

The enzymes found in saliva are essential in beginning the process of digestion of dietary starches and fats.

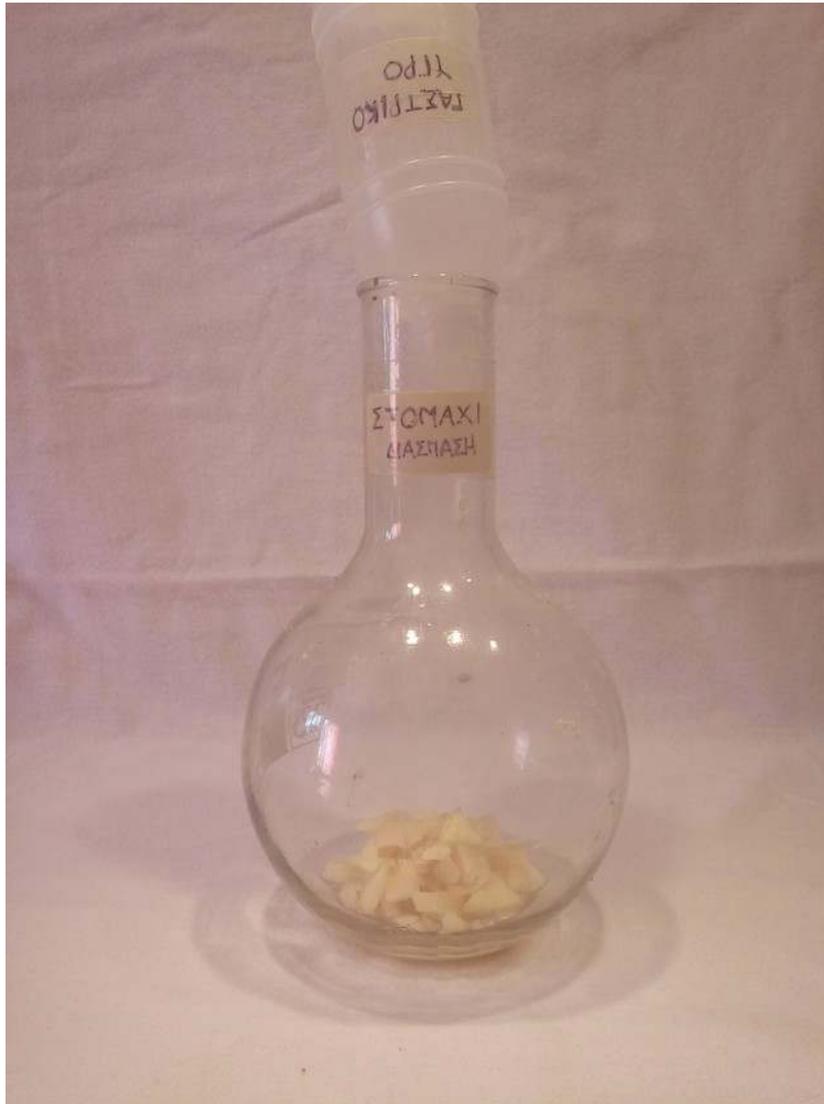
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The bolus that has been formed will be driven to our stomach.

When we swallow, our esophagus transports our food to our stomach using muscle contractions that resemble a wave.

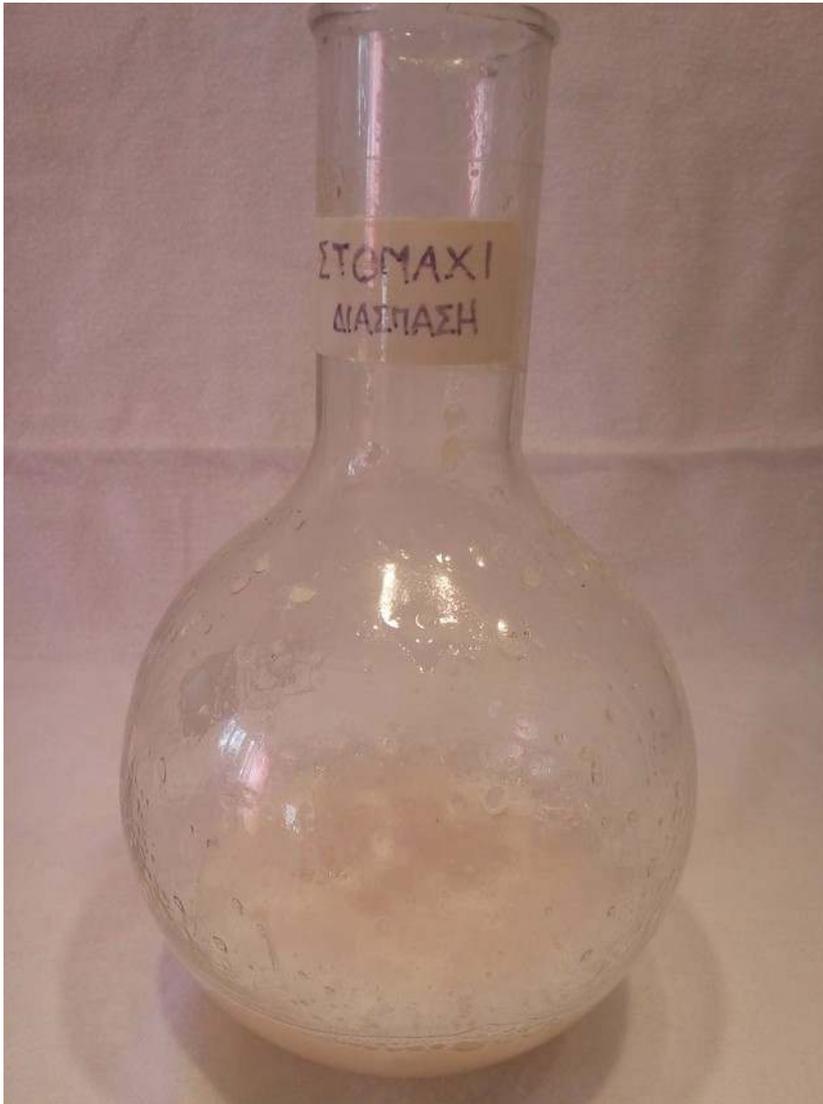
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## Stomach

The moment the bolus enters our stomach, it is further diluted due to the acidic gastric fluid and contractions of the stomach wall.

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## Stomach

Gastric acid, gastric juice or stomach acid, is a digestive fluid formed in the stomach and is composed of hydrochloric acid (HCl), potassium chloride (KCl) and sodium chloride (NaCl).

The acid plays a key role in digestion of proteins, by activating digestive enzymes, and making ingested proteins unravel so that digestive enzymes break down the long chains of amino acids.

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## Small intestine

The mixture that has been formed passes through the small intestine. Digestive fluid from the intestine as well as the liver, gall bladder and pancreas disrupt food.

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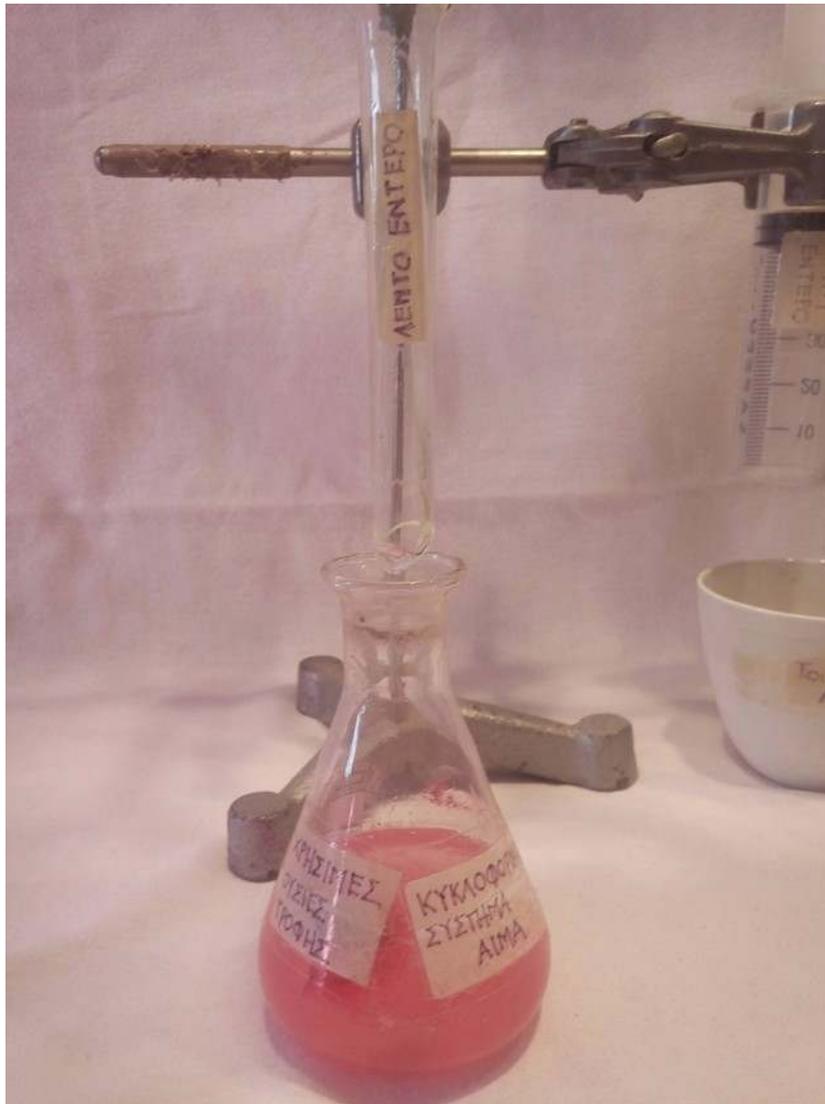


## Small intestine

The small intestine is where most chemical digestion takes place.

Many of the digestive enzymes that act in the small intestine are secreted by the pancreas and liver and enter the small intestine via the pancreatic duct. Pancreatic enzymes and bile from the gallbladder enter the small intestine in response to the hormone cholecystikinin, which is produced in the small intestine in response to the presence of nutrients.

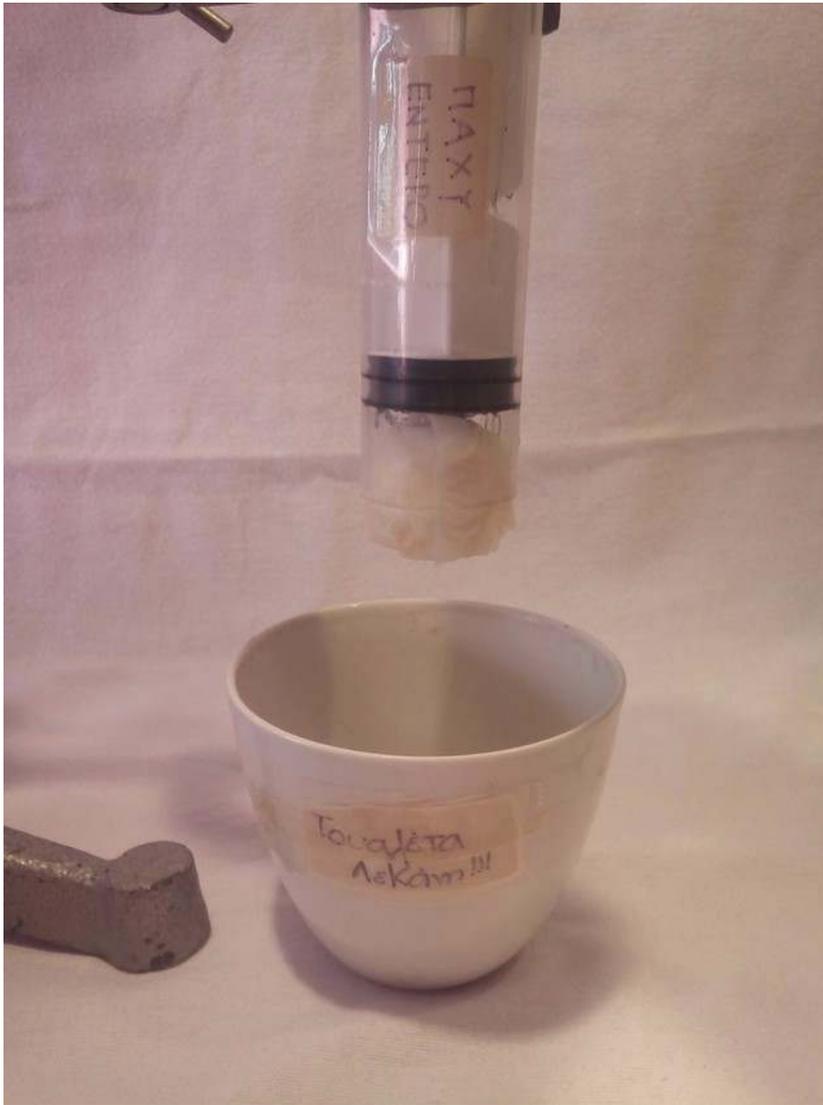
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## Small intestine

The nutritional ingredients contained inside our food pass through the intestinal villi into the circulation of our blood.

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## Large intestine

Unnecessary substances continue their way into the large intestine, where water becomes absorbed and food remains accumulate.

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Large intestine

Unnecessary substances are finally expelled from our body.

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How long our small and our large intestines are???



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Small intestines is about 5.5m

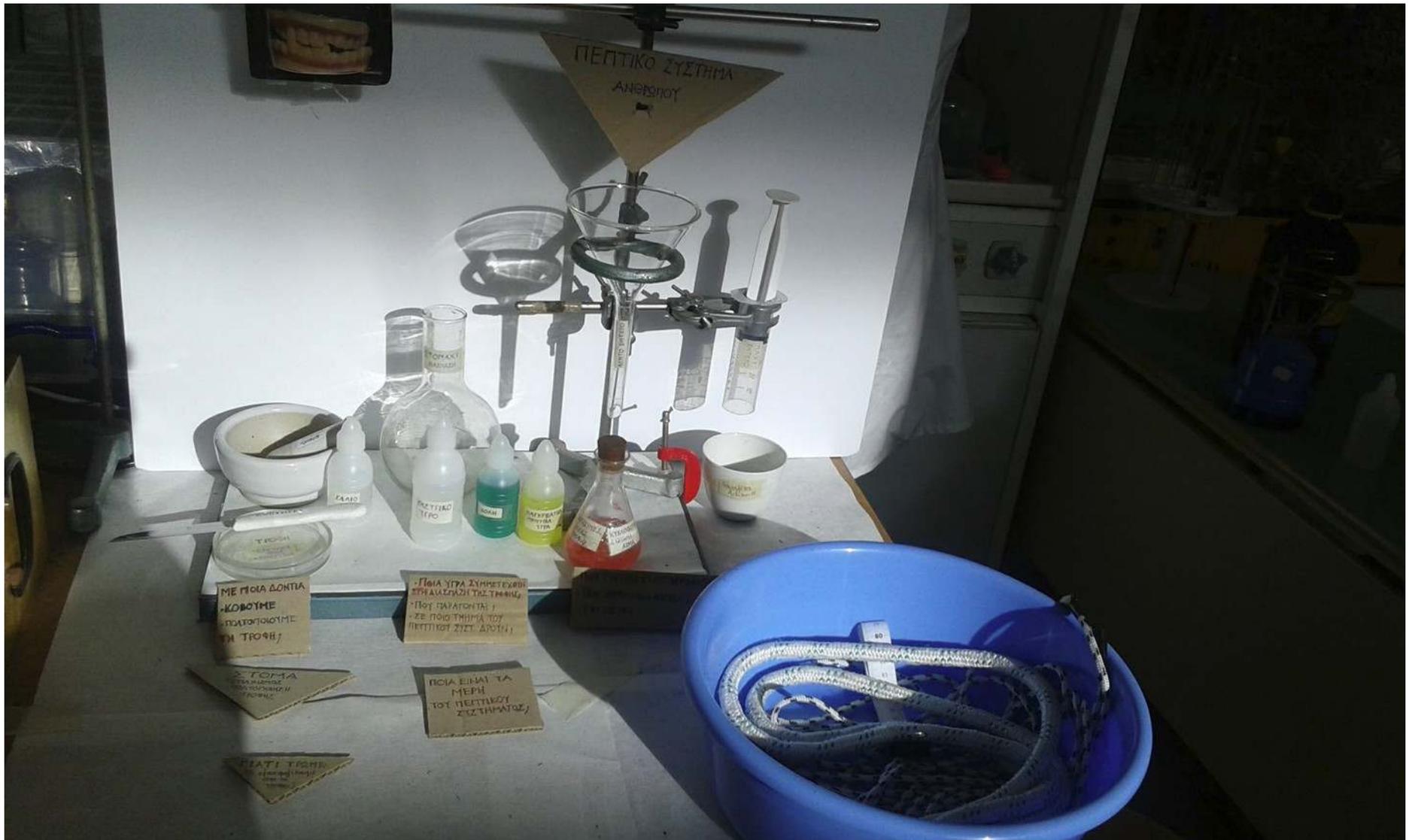


# Simulation of Human Digestive System

Large intestines is about 2m



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Ευχαριστούμε

# Simulation of Human Digestive System

## Βιβλιογραφία

1. "Πως λειτουργεί η ζωή " Mahlon Hoagland , Bert Dodson ,εκδόσεις κάτοπτρο
2. "Βιολογία " Campbell , Reece , Παν.εκδ. Κρήτης
3. "Ανθρώπινο Σώμα " Steve Parker , εκδόσεις Π.Χ. Πασχαλίδης
4. "Φιλοσοφία της Βιολογίας" Peter Godfrey- Smith . Παν.εκδ. Κρήτης
5. " Σε αναζήτηση σκοπού σε ένα κόσμο χωρίς σκοπό "  
Λευτέρης Ζούρος , Παν.εκδ. Κρήτης
6. Σχολικά βιβλία βιολογίας Γυμνασίου , Λυκείου