




Name:

Set:.....



WJEC AS Biology Adaptations for Nutrition

Specification Points:	  
(a) The differences between autotrophic and heterotrophic methods of nutrition. The principles of saprotrophic nutrition in Fungi. Secretion of enzymes, external digestion, absorption by diffusion.	
(b) Processing food in a tube gut. Ingestion, digestion, absorption and egestion.	
(c) The layered structure of the wall of mammalian gut. Regional specialisations of the mammalian gut. Functions of stomach, small intestine and colon.	
(d) Adaptations to different diets. Comparison of dentition in a carnivore and a grazing herbivore. Adaptations of herbivore gut to a high cellulose diet.	



Different Types of Nutrition

What are the two different types of nutrition?

1.

2.

What is the difference between them?

Give examples of organisms that use each type of nutrition.

Heterotrophs

An important group within this is the **saprotrophs/saprophytes/saprobionts**.

Using the image below, explain how saprophytes gain their nutrition.

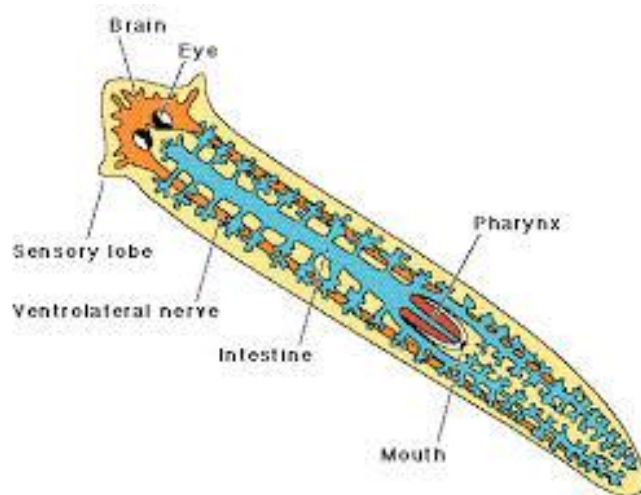


Heterotrophic Nutrition in Animals

Organisms that only digest one type of food have a much more simple gut.

What does undifferentiated mean?

Use the diagram below to help explain *why* an undifferentiated gut is sufficient for the flatworm.



Why do some organisms have a differentiated gut structure?

Draw a diagram to show the regions in a differentiated gut in the space below.

Stages in digestion

Put the following stages in the correct order. Include a definition of each stage.

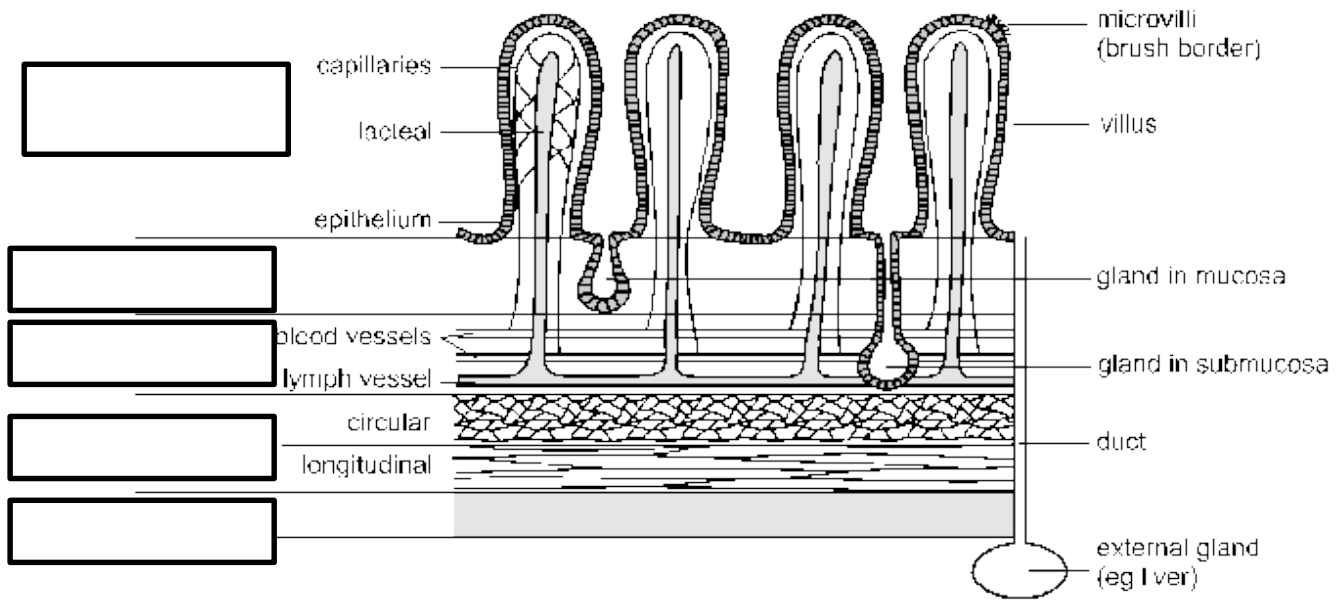
Egestion

Digestion

Ingestion

Absorption

Structure of the gut wall

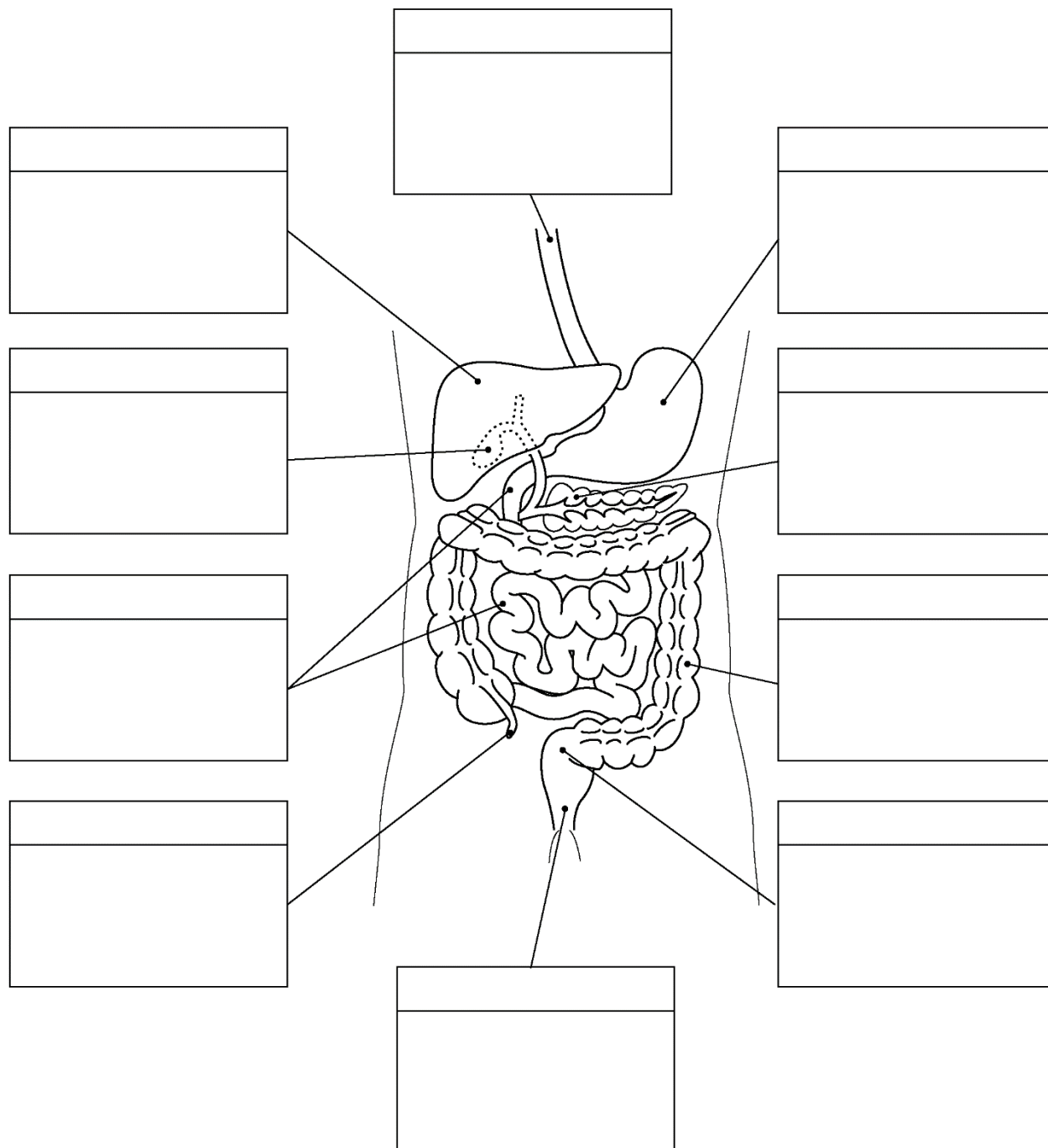


For each of the labels that you have just added, what is the function? Draw a table to summarise this below.

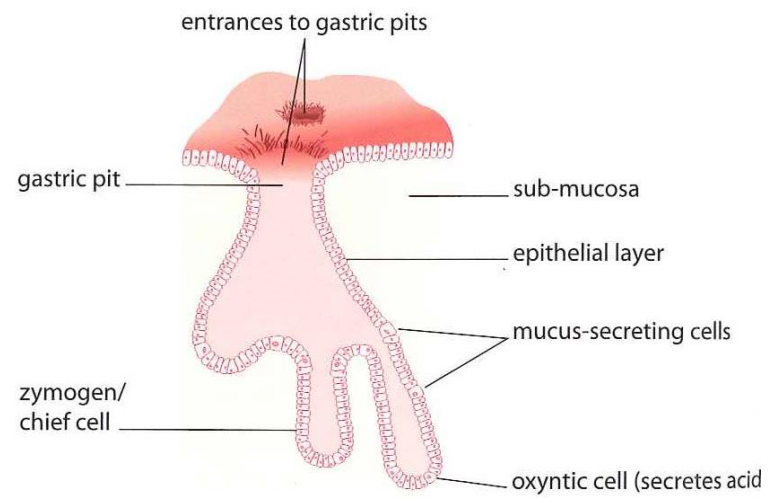
Human alimentary canal

Complete the diagram of the human alimentary canal.

Label the name of the structure in the top box and the function in the bottom box.



Glands in digestion



▲ Stomach wall

Enzymes in digestion

Which digestive enzymes did you learn about at (I)GCSE?

At A Level, the picture is more complex. Many food substrates require more than one enzyme to digest food.

Carbohydrate digestion

Draw a flow diagram to show the process of digestion of carbohydrates.

Protein digestion

There are two different types of protease enzymes:

- 1.
- 2.

Label each type of enzyme on the diagram.



Lipid digestion

For each enzyme add on details of where it will act in the digestive system and what the optimum pH will be.

Secretion of mucus

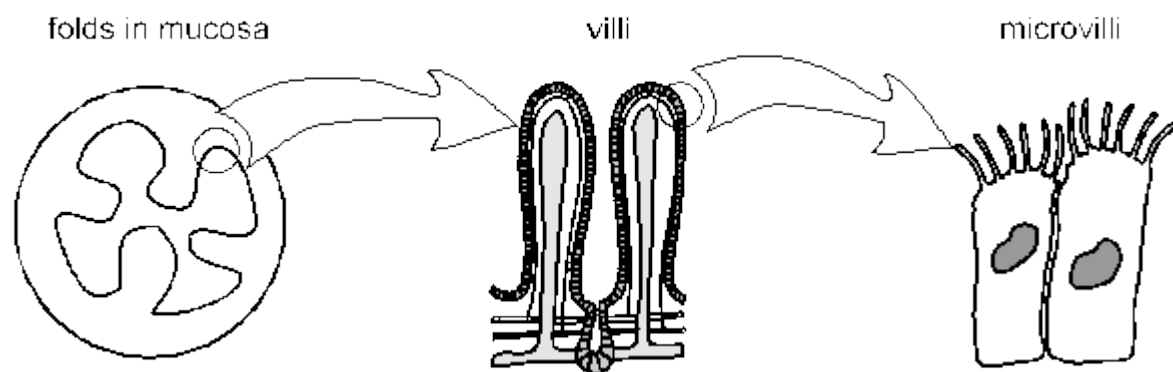
Why is mucus secreted?

How is mucus secreted?

Structure of the ileum

What process occurs in the ileum?

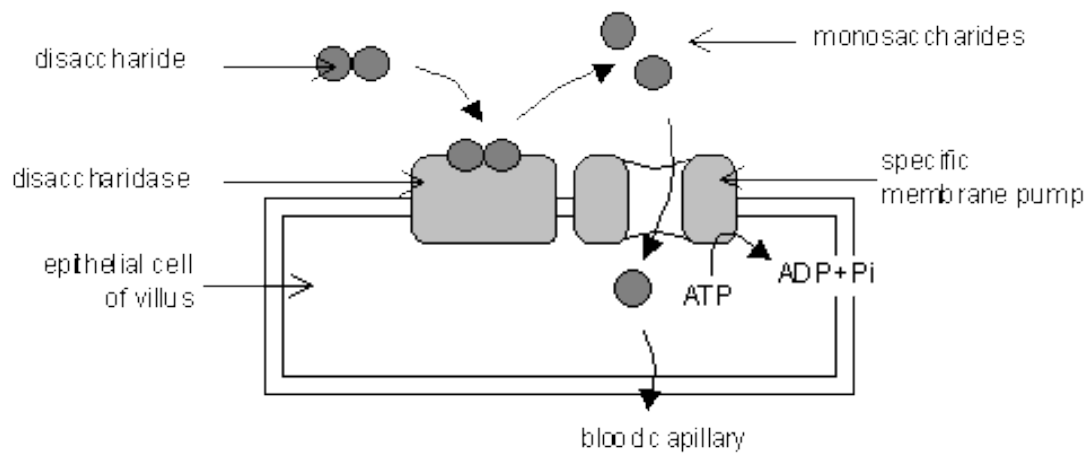
How is the ileum structure adapted to its function?



Draw a labelled diagram of a villus in the space below.

Absorption of digested molecules

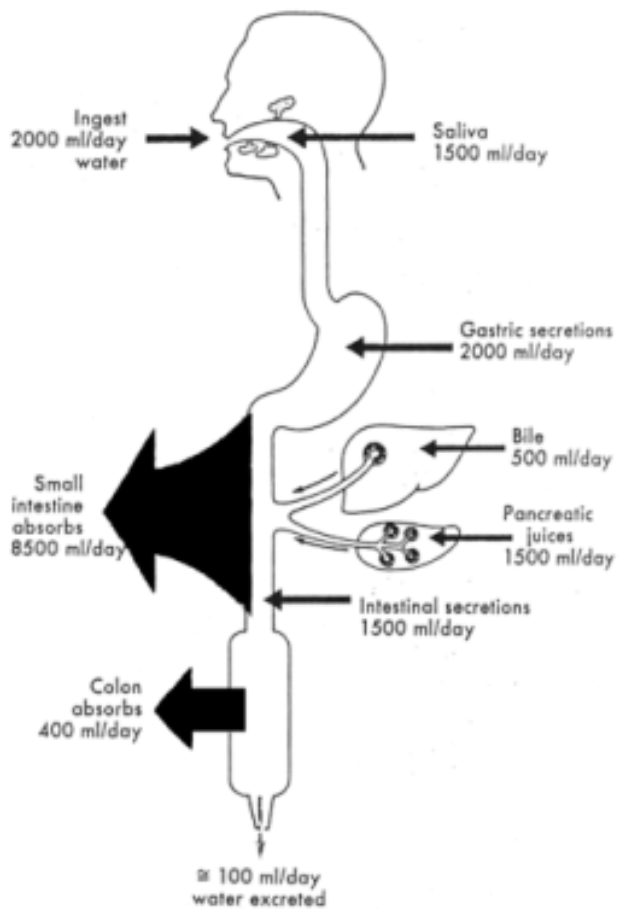
Absorption of glucose:



Absorption of amino acids:








The Colon

The colon absorbs any remaining water in the digestive system.



Composition of faeces

Bristol Stool Chart

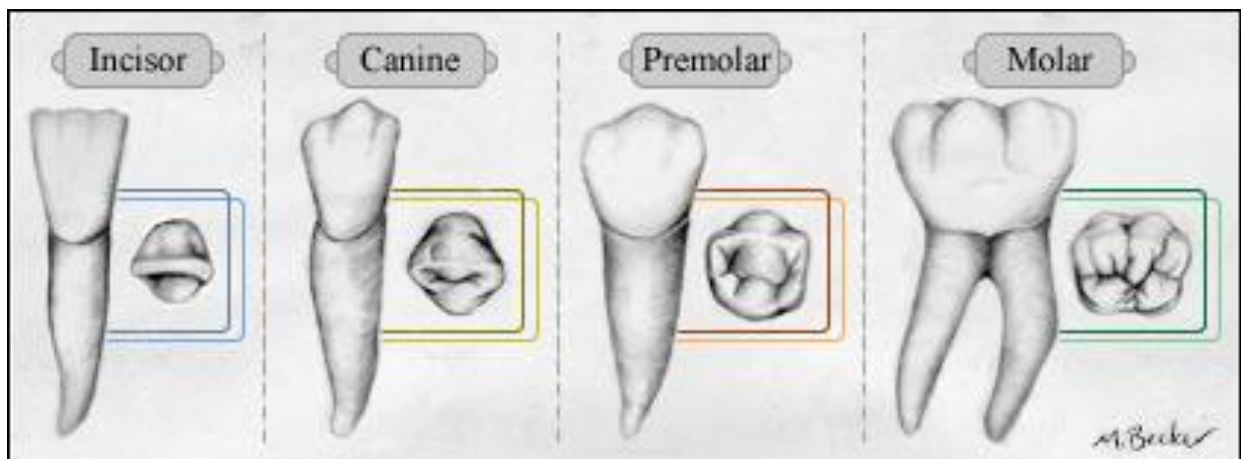
Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely Liquid

What is the contents of faeces?

Use of teeth

What is the purpose of teeth in digestion?

Adaptations of teeth



What are the functions of each type of teeth?

TASK: Research the differences between the teeth of carnivores and herbivores.

- C grade** Include diagrams/pictures of the teeth and jaw
- B grade** Describe the structure of the teeth and the movement of the jaw
- A grade** Explain how the structure is adapted to the function

Ruminant digestion

In comparison to the ruminant, the gut of a carnivore is much shorter. Why?

In ruminants, what is the main structural biological molecule in their food?

How is the rumen adapted to its function?

