

# BioMEDIA ASSOCIATES LLC

## HIDDEN BIODIVERSITY Series

### *Feeding of microorganisms*

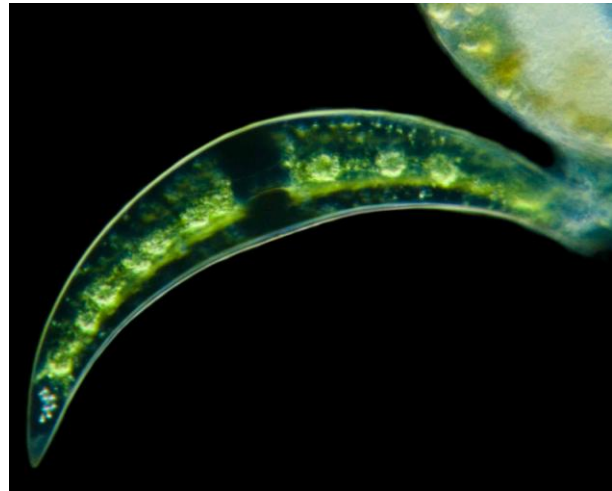
Study Guide Written and Photographed by Rubén Duro Pérez  
Supplement to Video Program  
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All organisms need to incorporate nutrients, i.e., we need to feed. That gives us both the matter and the energy necessary to maintain our lives, to grow and to reproduce. And exactly the same happens in the microscopic world, in the world of invisible organisms.

Depending on how to get food, all living beings can be classified in two groups: that of **autotrophic** organisms and that of **heterotrophic** organisms.

**Autotrophic** organisms are those capable of producing their own material by using the energy from the environment. Whether the luminous energy comes from the sun, as do plants or the chemical energy from some minerals, as do some bacteria.



**Heterotrophic** organisms need to eat substances produced by other organisms. We, humans, are an example of this group, but also ciliates, rotifers, and many who are part of the microscopic world.

Because of these differences in the way to get food, organisms that are part of any ecosystem can be classified also into two types: primary producers, which include autotrophic organisms and secondary producers or consumers, which include heterotrophic organisms.

**Some questions:**

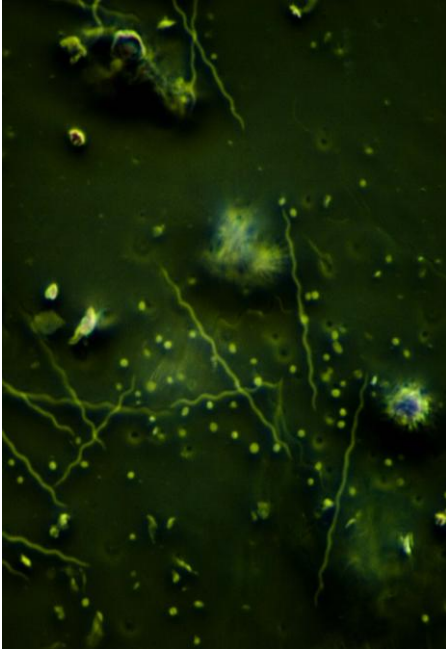
Give some examples of different autotrophic organisms appearing in the text.

Why do you think that autotrophic organisms are also called primary producers?

In which group of organisms would you include examples such as the coyote, fungi or algae?

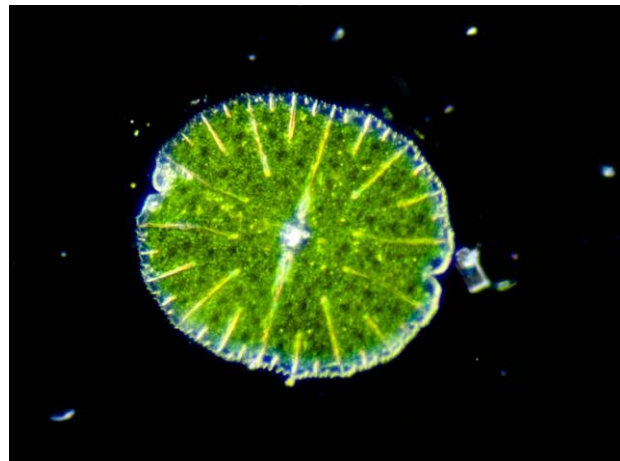
Which of the organisms listed in the program are autotrophic? And which are heterotrophic?

Many species of microorganisms are autotrophic, which means they can use the energy captured in the environment to carry out the synthesis of the molecules they need to live. This is how they are able to create their own matter from an external energy source and some simple chemical compounds such as carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) are.



Some of the lesser known autotrophic microorganisms are the chemoautotrophic ones, among which are many bacteria. These microorganisms are able to get the energy from some chemical compounds, including many minerals, necessary to carry out their vital functions. For the same reason, many of them do not even need sunlight to live and can grow in dark environments such as undersea vents.

However, the best known autotrophic organisms are photoautotrophs. These are microscopic algae that form part of the group known as plankton. These algae can perform photosynthesis, so they work in the same way as the plants and trees we use to see in the woods.

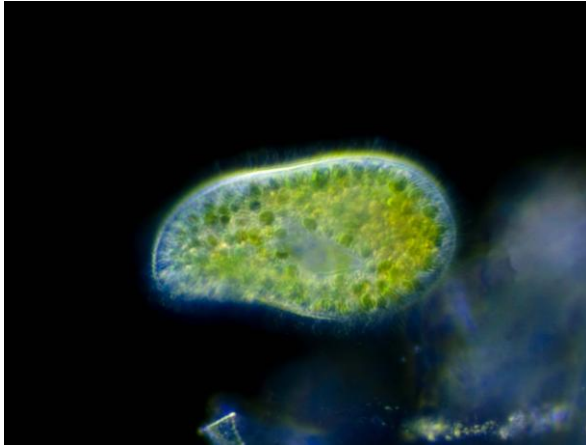


### Some questions:

What is the main difference between chemoautotrophic and photoautotrophic organisms?

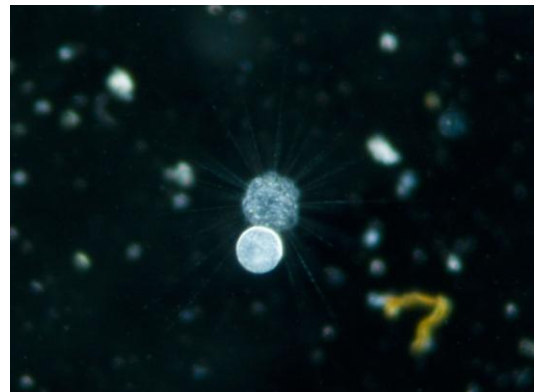
Why do photoautotrophic organisms need CO<sub>2</sub>? Why do chemoautotrophic organisms need sunlight? Do you think this allows them to colonize new environments?

All non-autotrophic microorganisms are heterotrophic organisms. That means they need to feed on organic substances previously produced by some other organism, either autotrophic or heterotrophic, and therefore, they have adopted certain strategies to capture their food.



Among heterotrophic microscopic organisms are the filter feeders. They are organisms that have developed a mechanism that allows them to filter the water to remove food particles. These particles can be either organic matter or even other microorganisms, especially bacteria. Ciliates and rotifers are heterotrophic microscopic organisms.

Heterotrophic microscopic predators do not filter water for particulates but rather actively hunt other organisms to devour. In this group we find diversity from single-celled organisms, such as some species of ciliates, to multicellular organisms, like some worms or annelids.



### Some questions:

What are the two main food strategies adopted by heterotrophic organisms in this microscopic world?

In the program you can watch a microscopic annelid of the genus *Chaetogaster* capturing a rotifer and then releasing it without devouring it. Could you explain why?



Roe deer (*Capreolus capreolus*)  
Black-headed Gull (*Larus ridibundus*)



Black-tailed Godwit (*Limosa lapponica*) and  
Black-headed Gull (*Larus ridibundus*)



Nymph (Ephemeroptera)



Microalga (*Haematococcus* sp.)



Diatoms Conjugated microalga (*Cosmarium* sp.)



Ciliate (*Oxytricha* sp.)



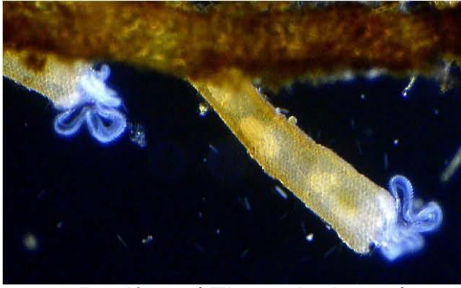
Ciliate (*Stentor* sp.)



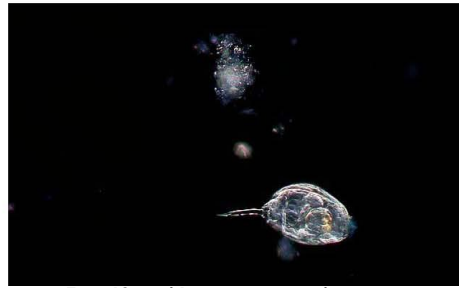
Ciliate (*Vorticella* sp.)



Ciliate (*Cothurnia* sp.)



Rotifers (*Floscularia* sp.)



Rotifer (*Lecane* sp.)



Annelid (*Chaetogaster* sp.)



Ostracod (*Cypris* sp.)



Larva (Chironomidae)