

# Introduction to Botany. Lecture 4

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1 Questions and answers

2 Ways of life

- Energy and food

3 Basics of life

- Chemistry of life



# Outline

1 Questions and answers

2 Ways of life

- Energy and food

3 Basics of life

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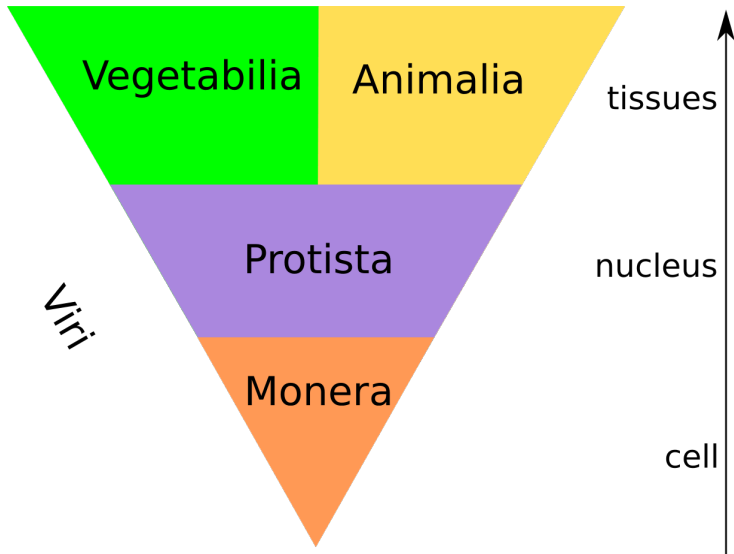


What is the difference between plants<sub>1</sub> and plants<sub>2</sub>?

- Plants<sub>1</sub> are all green photosynthetic organisms
- Plants<sub>2</sub> are **Vegetabilia**: multi-tissued, terrestrial, primarily photosynthetic eukaryotes



# Pyramid of life



# Questions about pyramid

**What is Monera?** Prokaryotes: (1) Bacteria and (2) Archaea

**What is Protista?** Eukaryotes without tissues

**Where are eukaryotes?** Protista, Vegetabilia and Animalia

**Where are fungi?** They belong to different protists

**Where are plants<sub>2</sub>?** Vegetabilia

**Where are plants<sub>1</sub>?** Here it is not applicable

**Why are two groups on one level?** Vegetabilia and Animalia both have tissues but obtained them for the radically different purposes. Animals acquired *kinoblast* and *phagocytoblast* **to hunt and digest**, and plants have *epidermis* and *photosynthetic tissue* **to survive on land**.



# Ways of life

## Energy and food





# Ways of life

- How to obtain energy?
  - Ⓐ From sun light: **phototrophy**
  - Ⓑ From chemical reactions with inorganic matter (“rocks”): **lithotrophy**
  - Ⓒ From breaking organic molecules into inorganic (typically, carbon dioxide and water): **organotrophy**
- How to obtain building blocks?
  - Ⓐ From assimilation of carbon dioxide: **autotrophy**
  - Ⓑ From other living beings: **heterotrophy**



# Six life styles and taxonomy

	<b>Phototrophs</b>	<b>Lithotrophs</b>	<b>Organo- trophs</b>
<b>Autotrophs</b>	Plants <sub>1</sub> : some Monera, some Protista, most of Vegetabilia	Some Monera	Some Monera
<b>Heterotrophs</b>	Some Monera	Some Monera	Majority of Animalia and many Protista and Monera



# Plants<sub>1</sub>, plants<sub>2</sub> and life styles

- Plants<sub>1</sub> are **photoautotrophs**
- Plants<sub>2</sub> are photoautotrophs too but there are exceptions: **fully parasitic plants**. Formally, many parasitic plants are plants<sub>2</sub> but not plants<sub>1</sub>
- Carnivorous plants (like sundew or Venus flycatcher) are all photoautotrophs! They “eat” animals to obtain fertilizers: nitrogen and phosphorous.



# Basics of life

## Chemistry of life



# Very basics of chemistry

- Atoms
  - Protons
  - Neutrons
  - Electrons
- Atomic weight
- Isotopes
- Elements
- Periodic table: rows and columns
- Chemical bonds: ionic, covalent, hydrogen
- Valence and group
- Molecules
- Molecular weight



# Final question (2 points)



# Final question (2 points)

What is a molecular weight of sulfuric acid,  $\text{H}_2\text{SO}_4$ ?



# Summary

- “Carnivorous” plants are not carnivores





# For Further Reading



A. Shipunov.

*Introduction to Botany* [Electronic resource].

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_154](http://ashipunov.info/shipunov/school/biol_154)

