Mycology
Week 1

Mycology: **Is a discipline that studies the group of living organisms; fungi, mycetes and yeasts**

- **General Mycology:** Examines the morphology, biology, biochemistry and phylogenic properties of botanical fungi

- **Industrial Mycology:** It is a science of fungi used in the food and pharmaceutical industry. In the food industry, it is particularly effective in the preparation of fermented foods such as wine, beer and bread. In the pharmaceutical industry, antibiotics are related to fungi.

- **Medical Mycology:** It is a science that studies pathogenic fungi.

Mycotic Diseases Exist in Mammals in 4 Different Ways

1. **Hypersensitivity- Hypersensitivity and allergic reactions to fungi and their spores. Indoor air pollution.**
2. **Mycotoxicosis- Poisoning caused by the consumption of food and feed products contaminated with toxin-producing fungi by humans and animals.**
3. **Mycetismus (Fungi intoxication)- Oral intake of previously created toxin (consumption of poisonous mushrooms)**
4. **Infection- It is formed by pathogenic fungi. Most common pathogenic fungi do not produce toxins.**

Fungi;

- Eucaryotic organisms
- Do not contain chlorophyll
- Do have cell wall
- Do have filamentous structures
- Develop spores
- They reproduce as saprohytes and decompose dead organic substances
- Aproximatelly 100.000-200.000 species
- 300 of them are human and mammalian pathogen

- Living organisms can be studied in 5 kingdoms. Fungi are studied in the kingdom of Fungi

- In past the taxonomix classification of fungi were evaluated by macroscobic (growth on the agar) and microscobic (light microscope morphology) morphology
- Currently the taxonomy is based on the ultra-structural and biochemical analyses
- Particularly the molecular techniques improved the taxonomic classification

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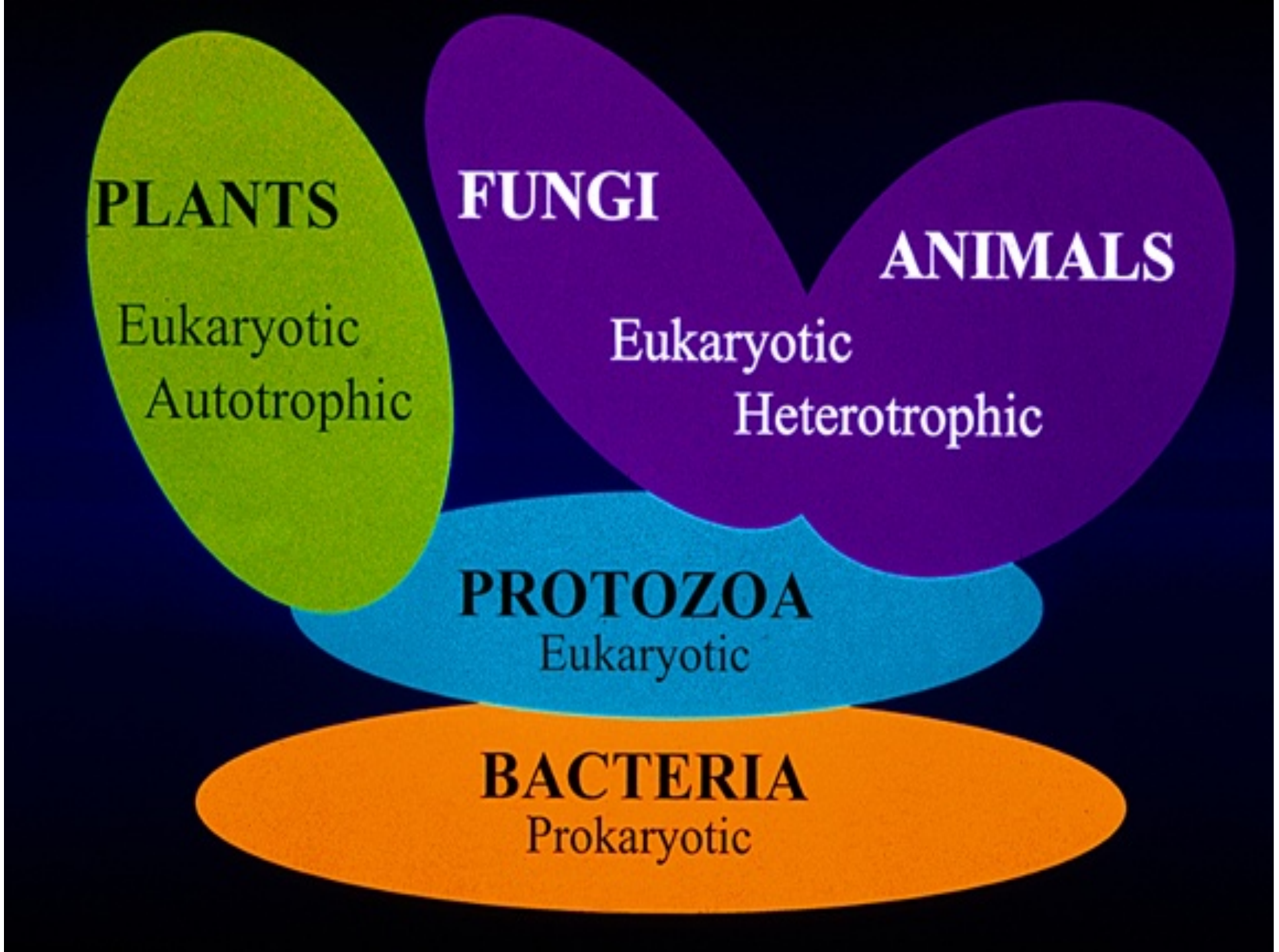
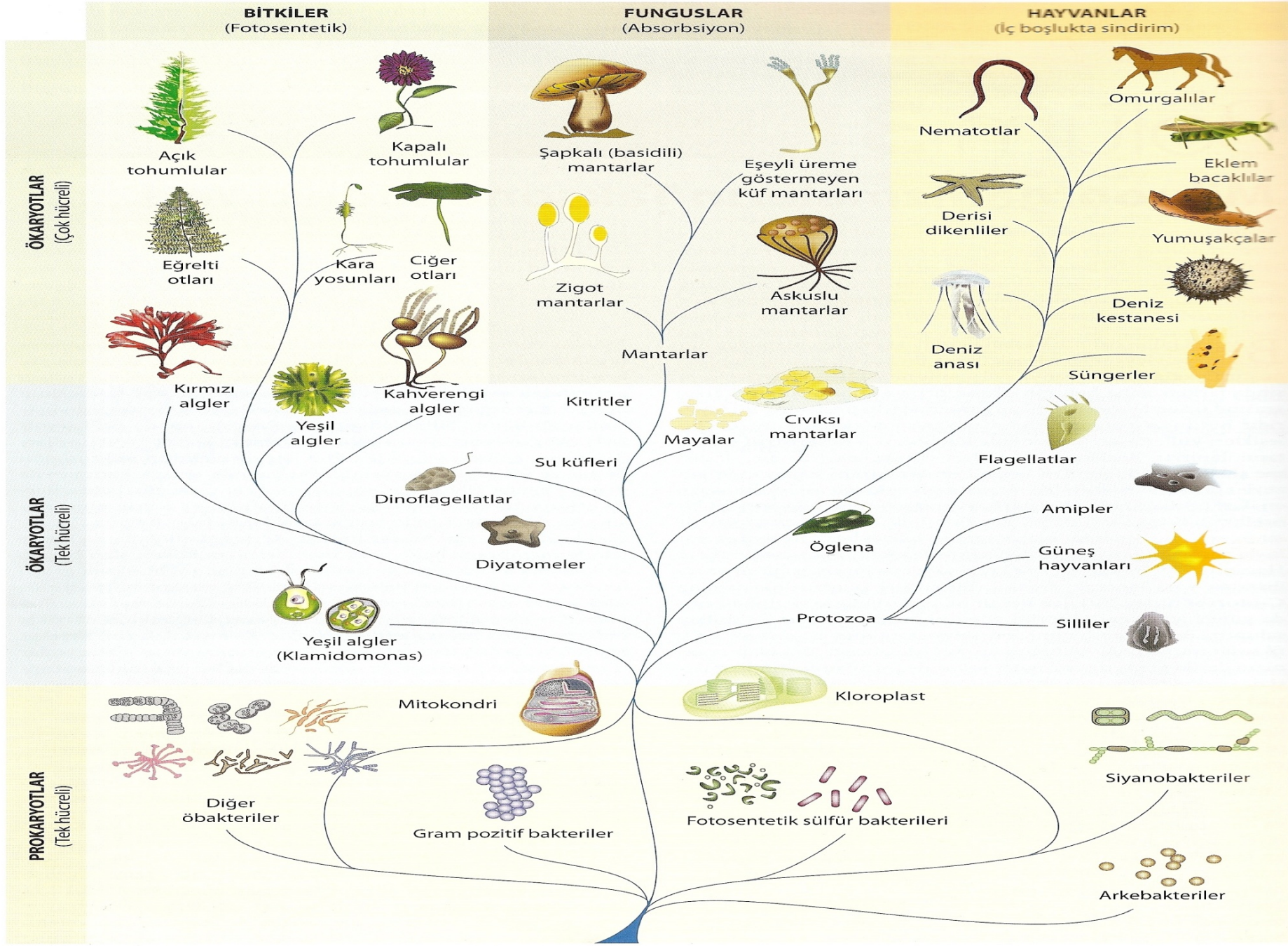

PLANTS
Eukaryotic
Autotrophic
FUNGI
ANIMALS
Eukaryotic
Heterotrophic
PROTOZOA
Eukaryotic
BACTERIA
Prokaryotic



Şekil 3.1. **Organizmaların beş âlem sistemi.** Şekil, D. Voet and Judith G. Voet, Biochemistry 2nd Ed. Copyright © 1995 John Wiley & Sons Inc., New York, NY'dan yayınevinin izniyle alınmış ve adapte edilmiştir.

Taxonomy

Kingdom	Characteristics	Sample
Monera **Protista**	**Procaryotes** **Eucaryotes***	**Bacteria** **Actinomycoses** **Protozoa**
Fungi	Eucaryotes*	**Fungus**
Plants	**Eucaryotes***	**Plant** **Algae**
Animals	**Eucaryotes***	**Arthropods** **Mammalians** **Human**

**This common characteristic complicates the antimycotic therapy*

Kingdom of living organisms

Kingdom	**Characteristic**	**Example**
Monera	Procaryotes	Bacteria, Archaea Actinomycetes
Protista	Eucaryotes	Protozoa
Fungi	Eucaryotes	Fungus
Plantae	Eucaryotes	Plant, Algae
Animalia	Eucaryotes	Arthropod, Mammalian animal, human

- In eucaryotes the genetic material is surrounded by membrane and located in one (or several) nucleus
    - Ancient Greeks it is dervied from *eu*, **real** and c*aryon*, **nucleus**

- Bacteria and Archae do not have nucleus and together they are named as **procaryotes**
    - Ancient Greeks it is dervied from *pro-*, **former** ve *caryon* **nucleus**

- Beside the nucleus eucaryotes also have organells which are surrended by membrane; mitochondria or chloroplast

- Procaryotes do not have this kind of complicated structures

Differences between Eucaryotes and Procaryotes

Characteristic	Procaryotes	Eucaryotes
Chromosome number	one	more than one
Nuclear membran	absent	present
Nucleolus	absent	present
Mitosis	absent	present
Mytochondria	absent	present
Centromere	absent	present
Ribosome	70 S	80 S
Mesosome	present	absent
Golgi	absent	present
Endoplasmic reticulum	absent	present
Peptidoglycan	present	absent

	VİRUS	BAKTERİ	MANTAR	PROTOZOON
HÜCRE	-	Tek Hücreli	Tek Hücreli veya Çok Hücreli	Tek Hücreli
BOYUT	0.02-0.2 nanometre(10^{-9} metre)	Mikrometre (10^{-6} metre)	3-10 mikrometre	15-25 mikrometre
NÜKLEİK ASİT	DNA VEYA RNA	DNA+RNA	DNA+RNA	DNA+RNA
ÇEKİRDEK TİPİ	-	PROKARYOTİK	ÖKARYOTİK	ÖKARYOTİK
RİBOZOM	-	70S	80S	80S
MİTOKONDRİ	-	-	+	+
DIŞ YÜZEY YAPISI	PROTEİN KAPSİD VE LİPOPROTEİN ZARF	PEPTİDOGLİKAN	KİTİN	ESNEK MEMBRAN
HAREKET	-	-/+	-	+
ÇOĞALMA	Replike olarak	İkiye bölünerek	EŞEYLİ VEYA EŞEYSİZ	EŞEYLİ VEYA EŞEYSİZ

Nomenclature

Genus species

Example: *Histoplasma capsulatum*

Aspergillus niger

Candida albicans

Histoplasma capsulatum

Kingdom	*:Mycetae*
Division	*:Mycota*
Subdivision	*:Eumycota*
Class	*:Deuteromycetes*
Order	*:Moniliales*
Family	*:Moniliaceae*
Genus	*:Histoplasma*
Species	*:Histoplasma capsulatum*

Aspergillus niger

Kingdom	*:Mycetae*
Division	*:Ascomycota*
Subdivision	*:Ascomycota*
Class	***:****Ascomycetes*
Order	*:Aspergillales*
Family	*:Aspergillaceae*
Genus	*:Aspergillus*
Species	*:Aspergillus niger*

Candida albicans

Kingdom	*:Mycetae*
Division	*:Deuteromycota*
Subdivision	*:Deuteromycotina*
Class	***:****Blastomycetes*
Order	*:Saccharomycetales*
Family	*:Saccharomycetaceae*
Genus	*:Candida*
Species	*:Candida albicans*