

Introduction: Biology Today

Chapter 1



(a) Order

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(b) Regulation

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(c) Growth and development

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(d) Energy processing

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(e) Response to the environment

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(f) Reproduction

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(g) Evolution

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Parameters for classifying life forms

- Morphology of the organism
- Cell type and its composition
 - Prokaryotic or eukaryotic (Plant, animal)
- Type of metabolism exhibited
 - Autotrophic or heterotrophic
- Motility in the predominant phase
- Molecular signature

Classification: The current picture

- Organisms must have names that all scientists can identify.
- Naming organisms involves two different activities:
 - **Taxonomy**
 - The naming of organisms
 - **Phylogeny**
 - Demonstrating how organisms are related evolutionarily

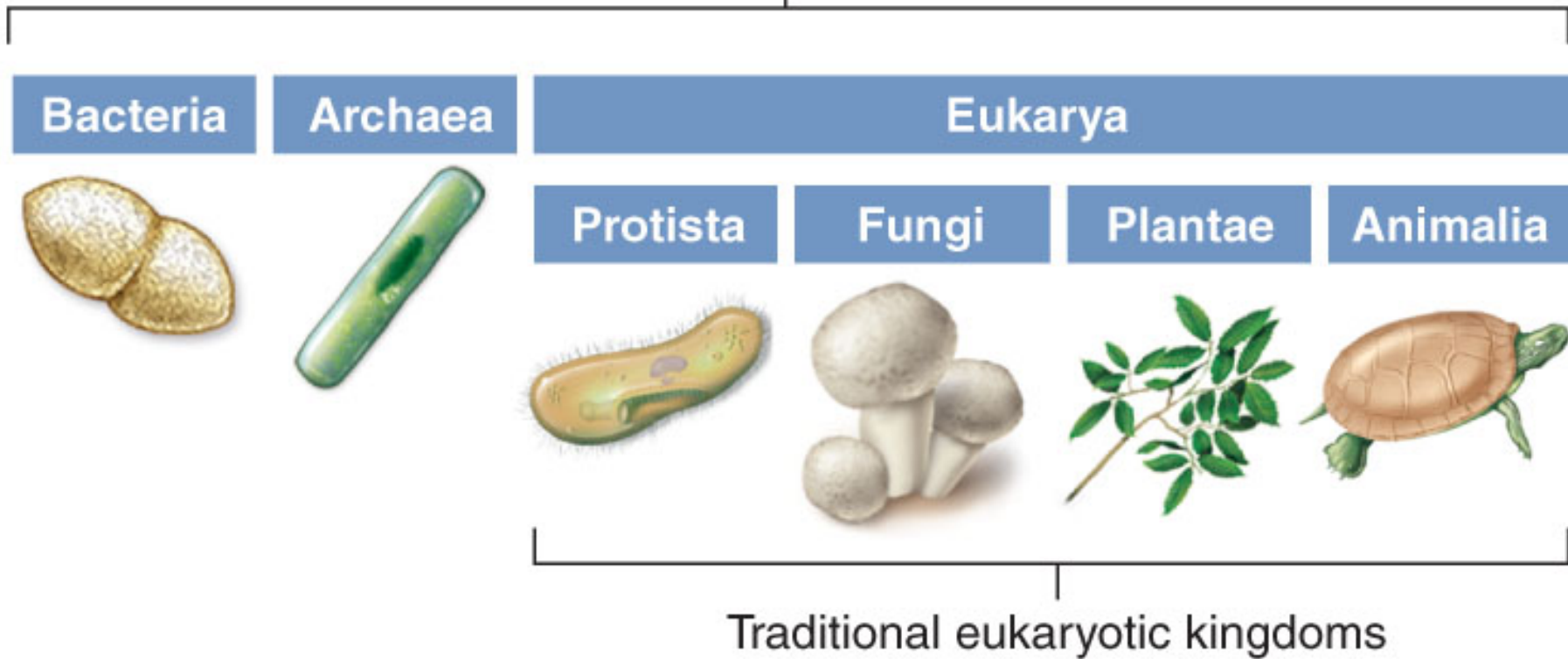
The Linnaean Hierarchy

- Taxa are based on shared characteristics
 - Domain** (most shared)
 - Kingdom**
 - Phylum**
 - Class**
 - Order**
 - Family**
 - Genus**
 - Species** (least shared)

The Three Domains of Life

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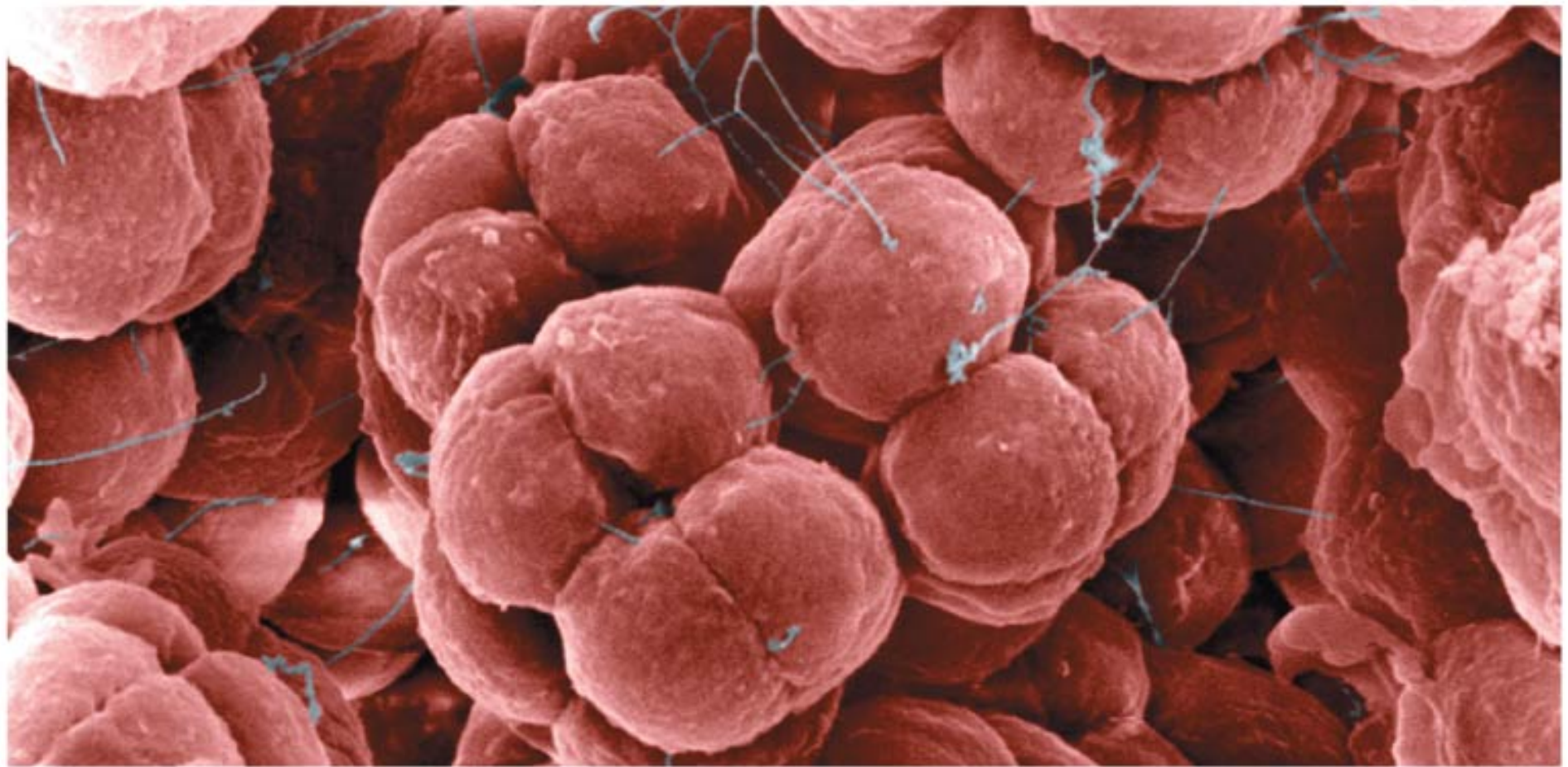
Domains





Domain Bacteria

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Domain Archaea

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Domain Eucarya

- Eukaryotic; have membrane-bound organelles
- **Compartmentalization**
 - Allows for increased sub-cellular specialization
- **Sexual reproduction**
 - Allows for greater genetic diversity
- **Multicellularity**
 - Allows for differentiation of cells into tissues

DOMAIN EUKARYA



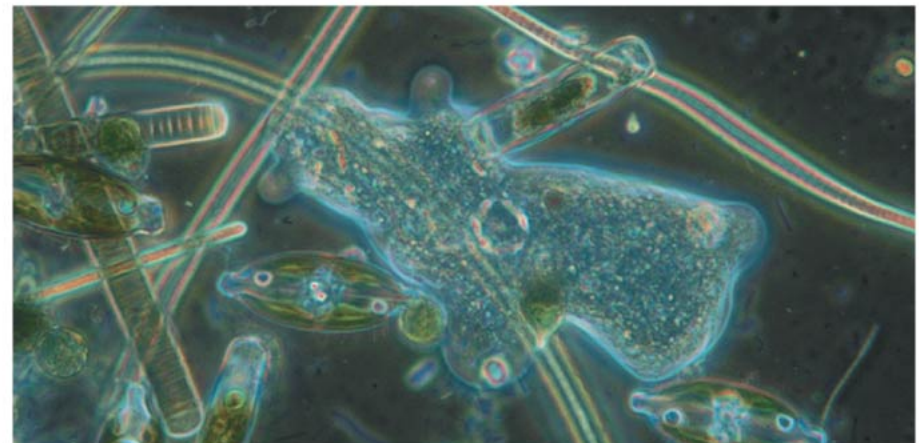
Kingdom Plantae



Kingdom Animalia



Kingdom Fungi



Protists (multiple kingdoms)

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(a) Yellow sponge (*Cleona celata*)



(b) Firefly (*Photinus granulatus*)



(c) Zebra mussel (*Dreissena polymorpha*)



(d) Rainbow trout (*Oncorhynchus mykiss*)



(e) The lesser flamingo (*Phoeniconaias minor*)



(f) Red squirrel (*Tamiasciurus hudsonicus*)

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Ferns



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Flowering plants



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Conifers



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Mosses

**Nonseed
plants**

**Seed
plants**

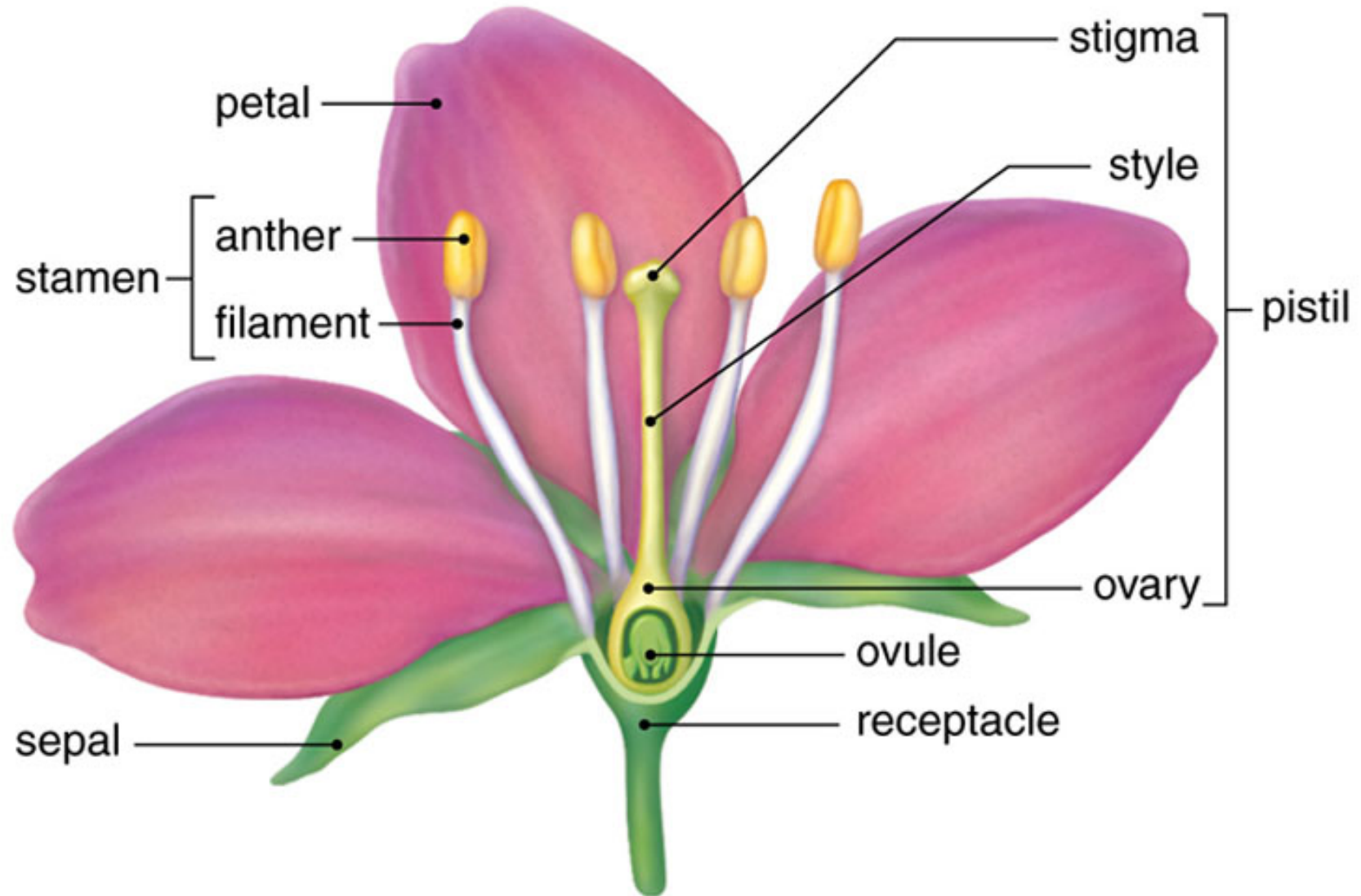
**Vascular
plants**

**Nonvascular
plants**



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Green algae

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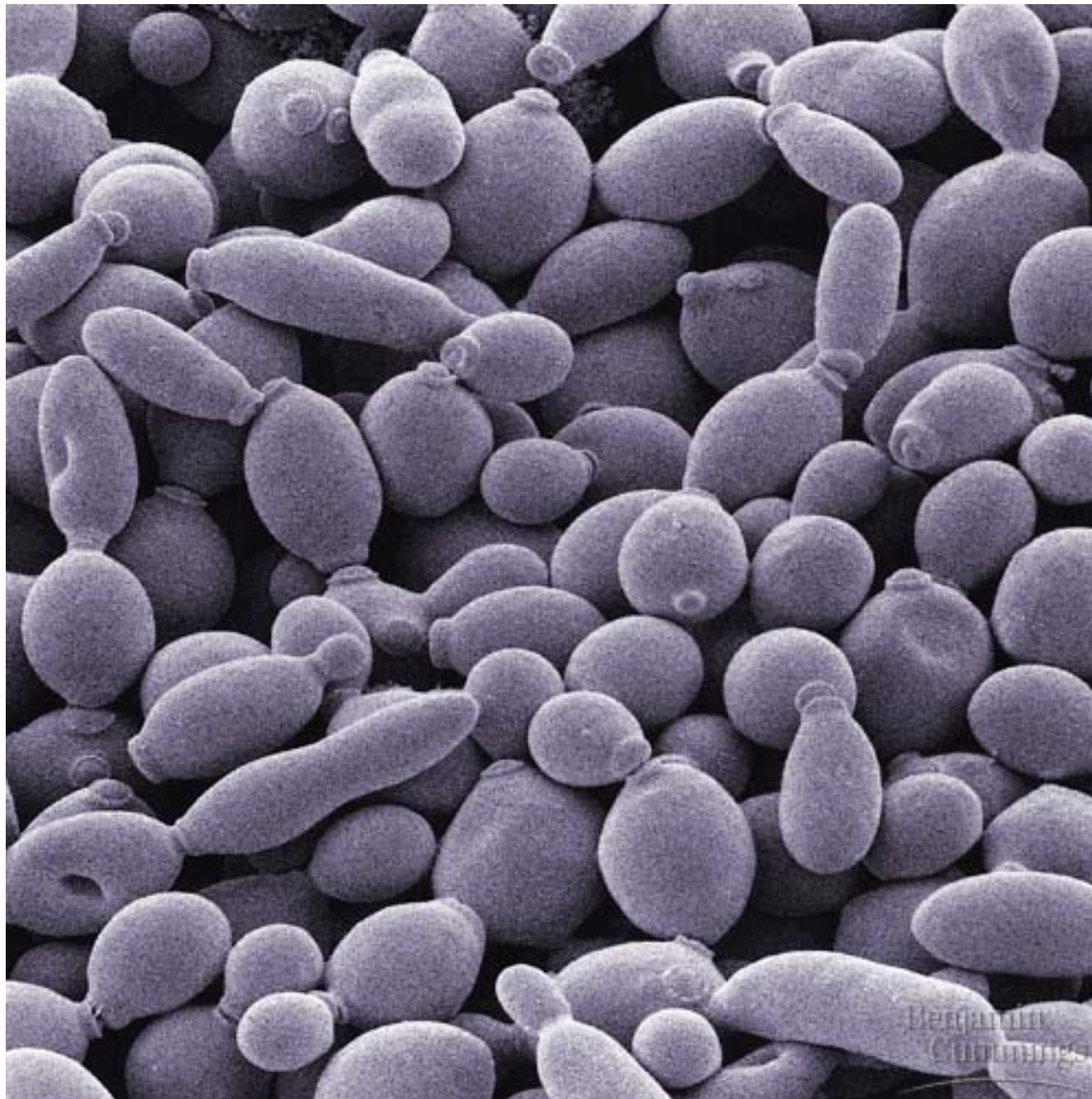




Credit: © Forest Buchanan/Visuals Unlimited

Destroying Angel (*Amanita virosa*) Mushroom.

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Kingdom Protista

- Catchall for eukaryotes that are not plant, fungus or animal
- Diverse - 60,000 species
- Most live in aquatic habitats
- Most unicellular; some are colonial or simple multicellular
- Some photosynthesize while others eat bacteria or other protists
- Asexual or sexual reproduction



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Paramecium caudatum. X100.

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Top 8 Deadly Diseases

Disease	Main Agents	Estimated New Cases per Year	Estim. Deaths per Year
Acute respiratory infection*	Bacteria, viruses	1 billion	4.7 million
Diarrhea**	Bacteria, viruses, protozoans	1.8 billion	3.1 million
Tuberculosis	Bacteria	9 million	3.1 million
Malaria	Sporozoans	110 million	2.7 million
AIDS	Virus (HIV)	5.6 million	2.6 million
Measles	Viruses	200 million	1 million
Hepatitis B	Virus	200 million	1 million
Tetanus	Bacteria	1 million	0.5 million



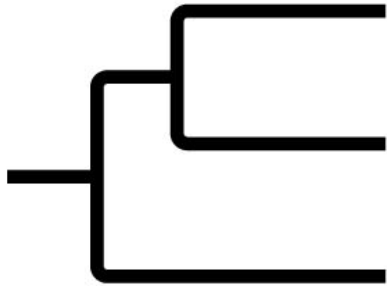
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Girl 11 years old with chickenpox having her temperature taken.

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MAJOR THEMES IN BIOLOGY

Evolution



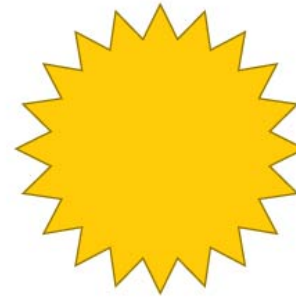
**Structure/
Function**



**Information
Flow**



**Energy
Transformations**



**Interconnections
within Systems**

