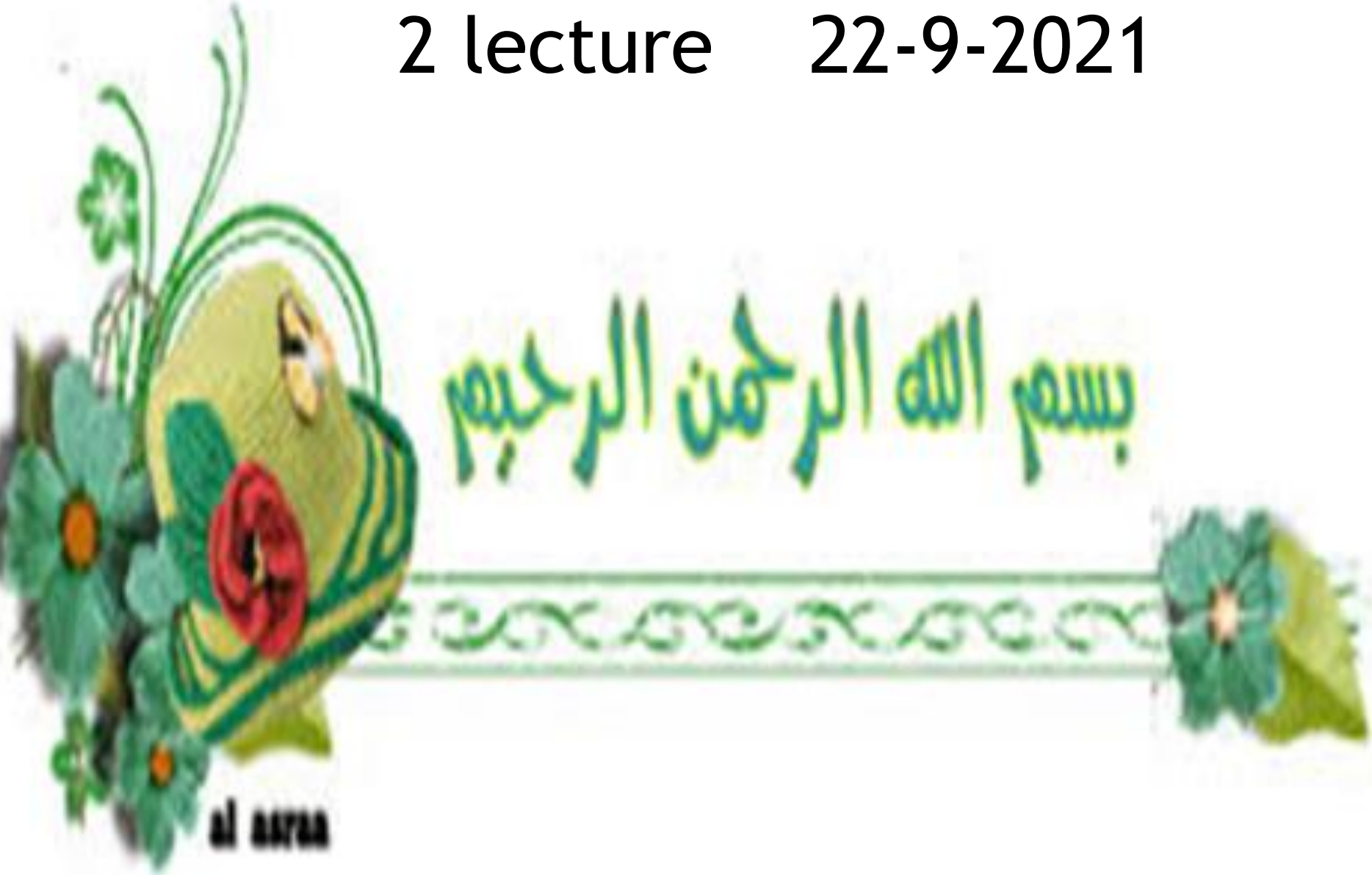
2 lecture 22-9-2021



Microbiology /Third stage /1 lecture

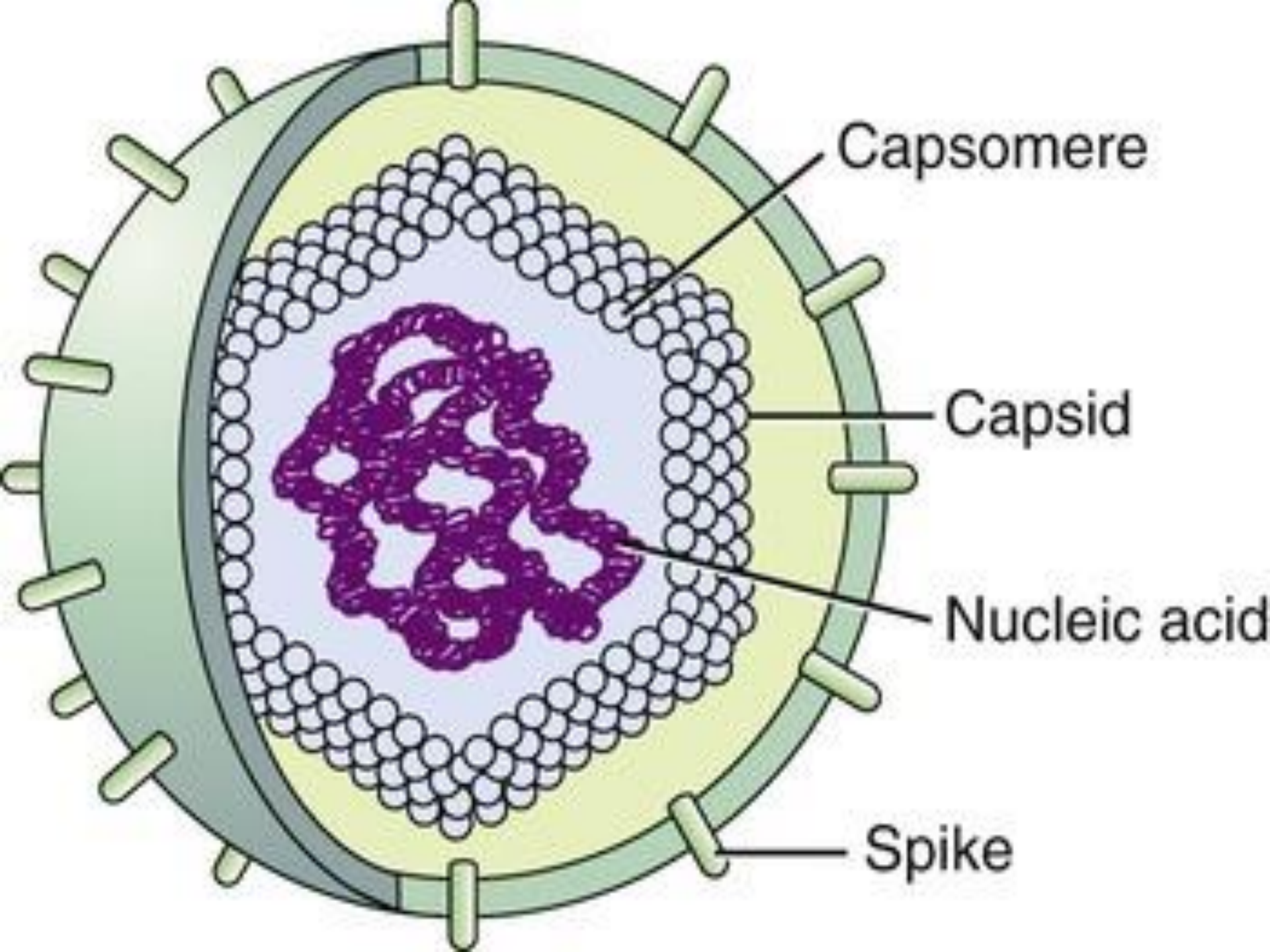
prof.Dr. Payman A.Hamaseed

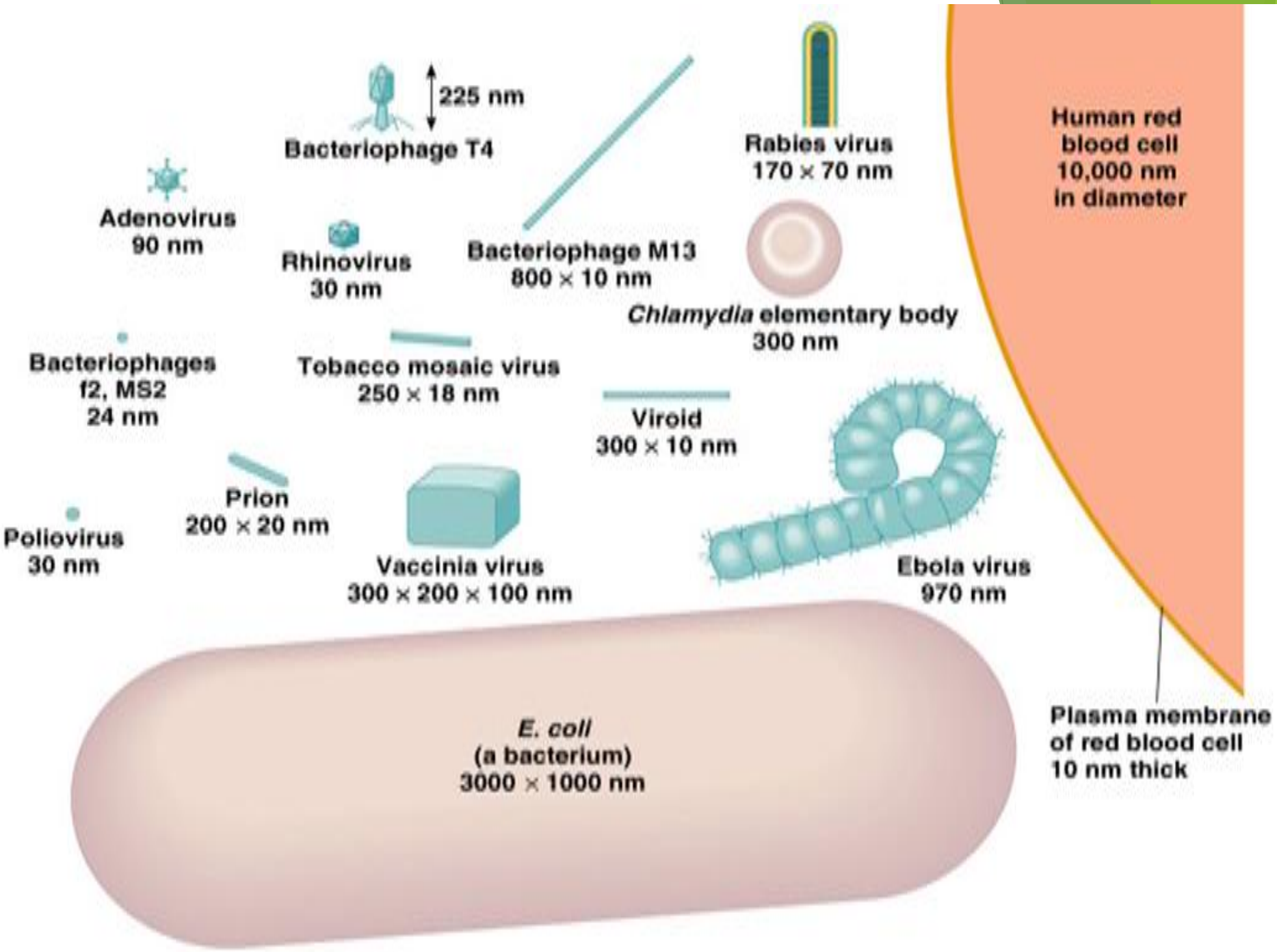
Virus (Virology) in microbiology:

virus is a small infectious agent (are a filterable agent[(Ivanoski reported in 1892 that Tobacco mosaic virus extracts from infected leaves were still infectious after filtration through a Chamberland filter) that separated them from other microorganisms]. that separated them from other microorganisms. they replicates only inside the living cells of other organisms. Viruses can infect all types of life forms, from human ,animals and plants to microorganisms, including bacteria and archaea

- 1-viruses differ from living organisms in that they cannot generate ATP. 2-Viruses also do not possess the necessary machinery for translation. They do not possess ribosome and cannot independently form proteins from molecules of messenger RNA. Because of these limitations, viruses can replicate only within a living host cell. Therefore, viruses are obligate intracellular parasites. According to a stringent definition of life, they are nonliving.

Virus Structure : A virus is made up of a core of genetic material, either DNA **or** RNA, surrounded by a protective coat called a capsid which is made up of protein. Sometimes the capsid is surrounded by an additional spikey coat called the envelope.


Capsomere
Capsid
Nucleic acid
Spike


225 nm
Bacteriophage T4
Rabies virus
170 × 70 nm
Human red
blood cell
10,000 nm
in diameter
Adenovirus
90 nm
Rhinovirus
30 nm
Bacteriophage M13
800 × 10 nm
Chlamydia elementary body
300 nm
Bacteriophages
f2, MS2
24 nm
Tobacco mosaic virus
250 × 18 nm
Viroid
300 × 10 nm
Prion
200 × 20 nm
Poliovirus
30 nm
Vaccinia virus
300 × 200 × 100 nm
Ebola virus
970 nm
E. coli
(a bacterium)
3000 × 1000 nm
Plasma membrane
of red blood cell
10 nm thick

Kingdom Fungi

Mycology

- myco = fungus
- -logy = study

The term "mycology" is derived from Greek word "mykes" meaning mushroom. The ability of fungi to invade plant and animal tissue was observed in early **19th** century but the first documented animal infection by any fungus was made by **Bassi,** who studied the muscardine disease of silkworm and proved the that the infection was caused by a fungus ***Beauveria bassiana.***

Some terms

Mycology : study of fungi

Mycologists :scientists who study fungi

Mycotoxicology study of fungal toxins and their effects

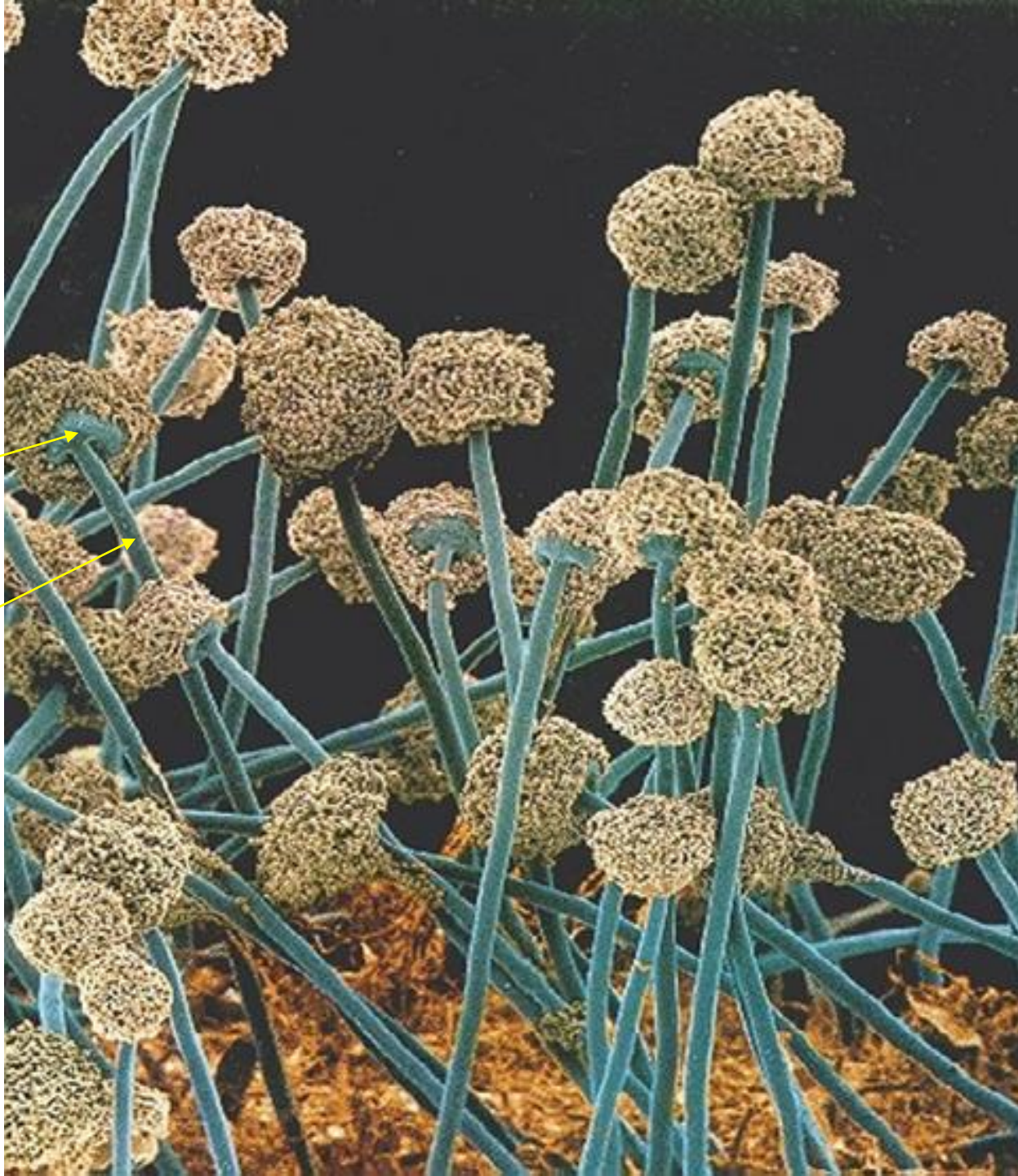
Mycoses :diseases caused by fungi

Sporangium: Produces the sporangiospores

Sporangiophore:Holds up the sporangium

Sporangium:

Sporangiophore



The living world is divided into the five kingdoms of **Planta, Animalia, Fungi, Protista and Monera.**

fungi are **eukaryotic, heterotrophic, unicellular to filamentous, rigid cell walled, sporebearing organisms** that usually reproduce by both sexual and asexual means. Further they are **insensitive to antibacterial antibiotics**.

Fungus Characterizes :

a- Eukaryotic cells contain membrane bound cell organelles including nuclei, mitochondria, golgi apparatus, endoplasmic reticulum, lysosomes etc. Eukaryotes also exhibit mitosis. These features separate fungi from bacterial which are prokaryotic cells lacking the above structures.

b- Heterotrophic - fungi **lack chlorophyll** and are therefore not autotrophic (photosynthetic) like plants and algae; rather they are heterotrophic absorptive organisms that are either

1-saprophytes (living on dead organic matter) or

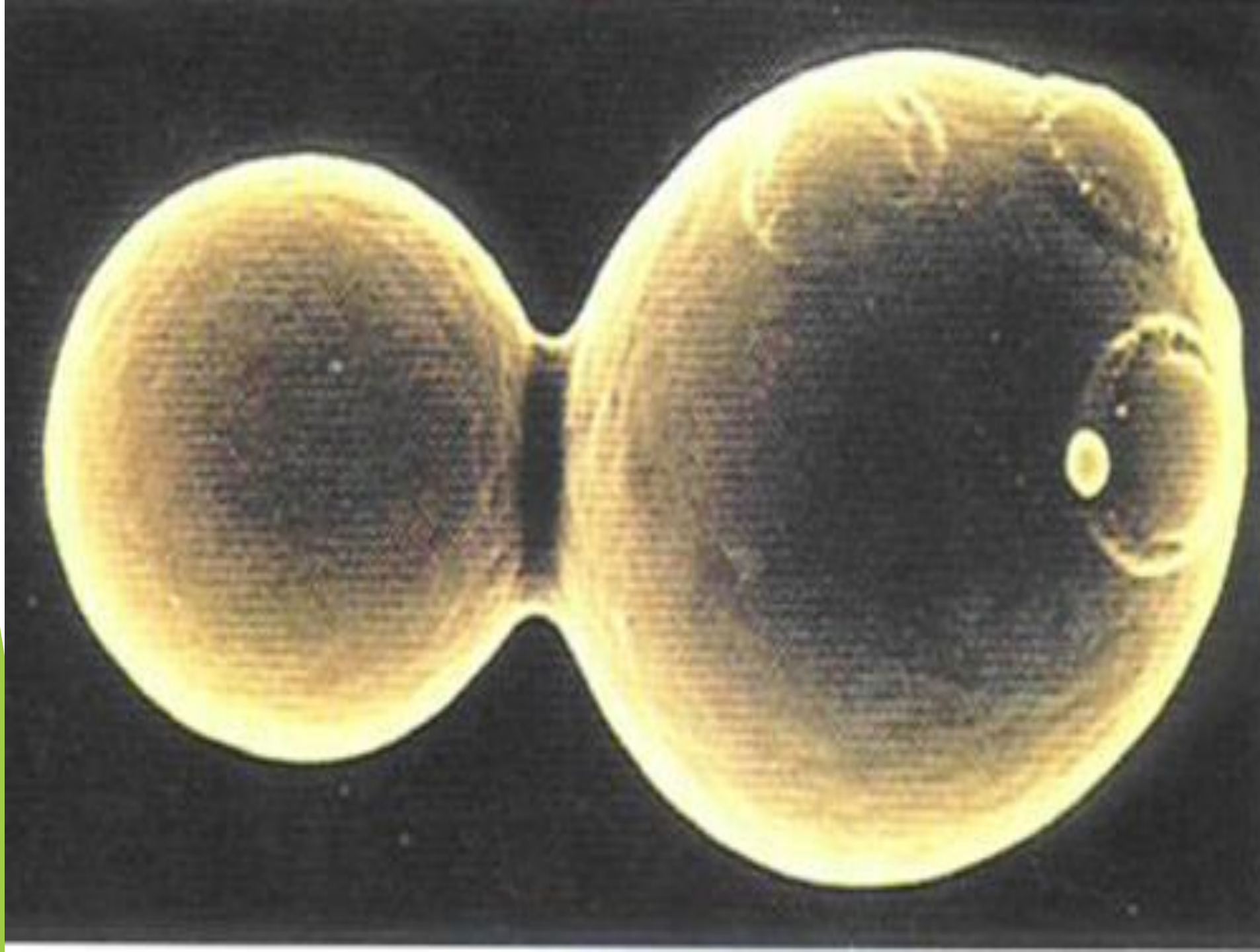
2-parasites (utilizing living tissue).

c- Like plants, fungi have rigid cell walls and are therefore non-motile, a feature which separates them from animals.

Structure of Fungi:

Fungi occur in two basic growth forms or stages:

(1) A unicellular or yeast form which is defined morphologically, as a single-celled fungus that reproduces by simple budding such as Candida albicans.

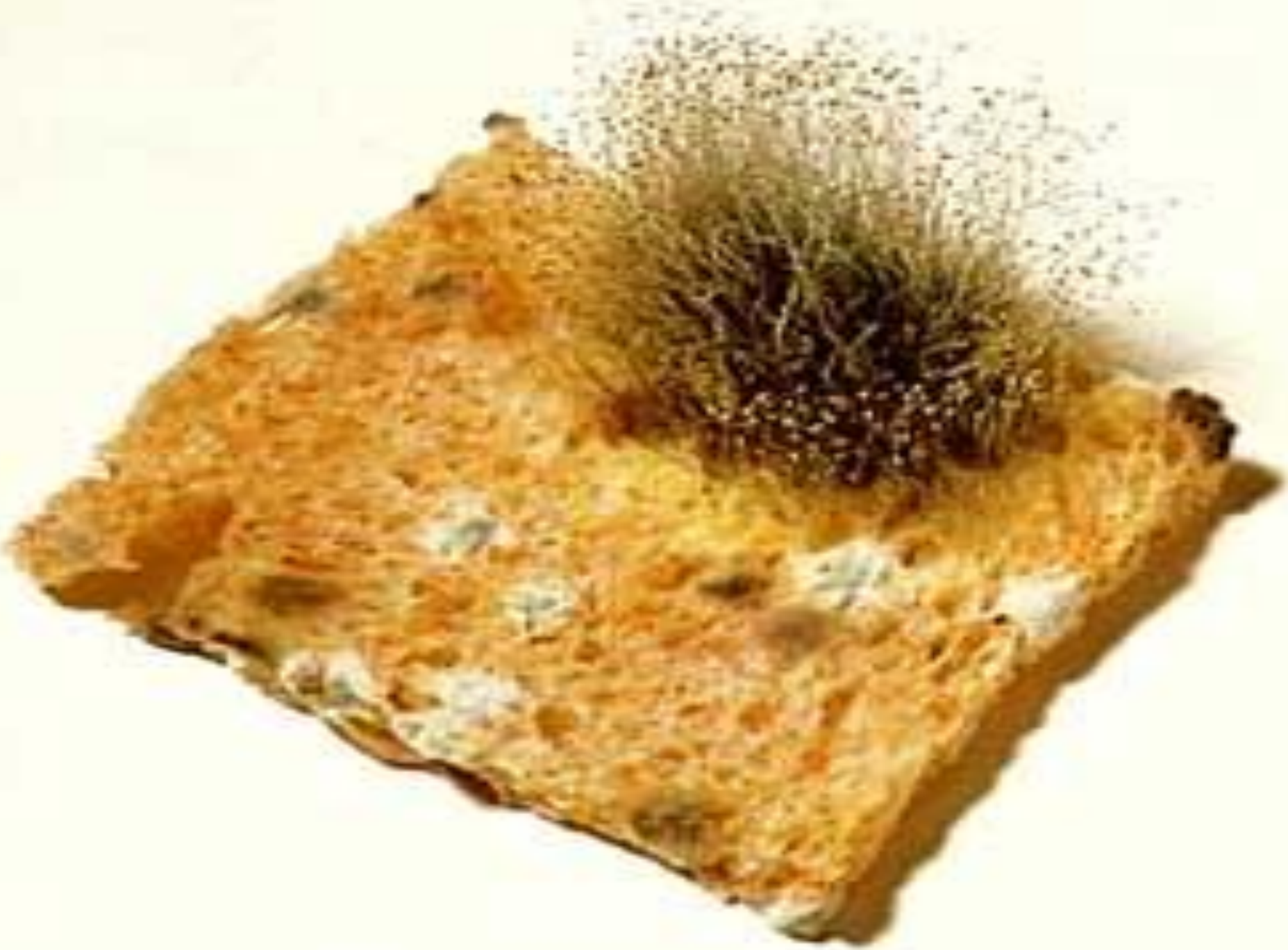


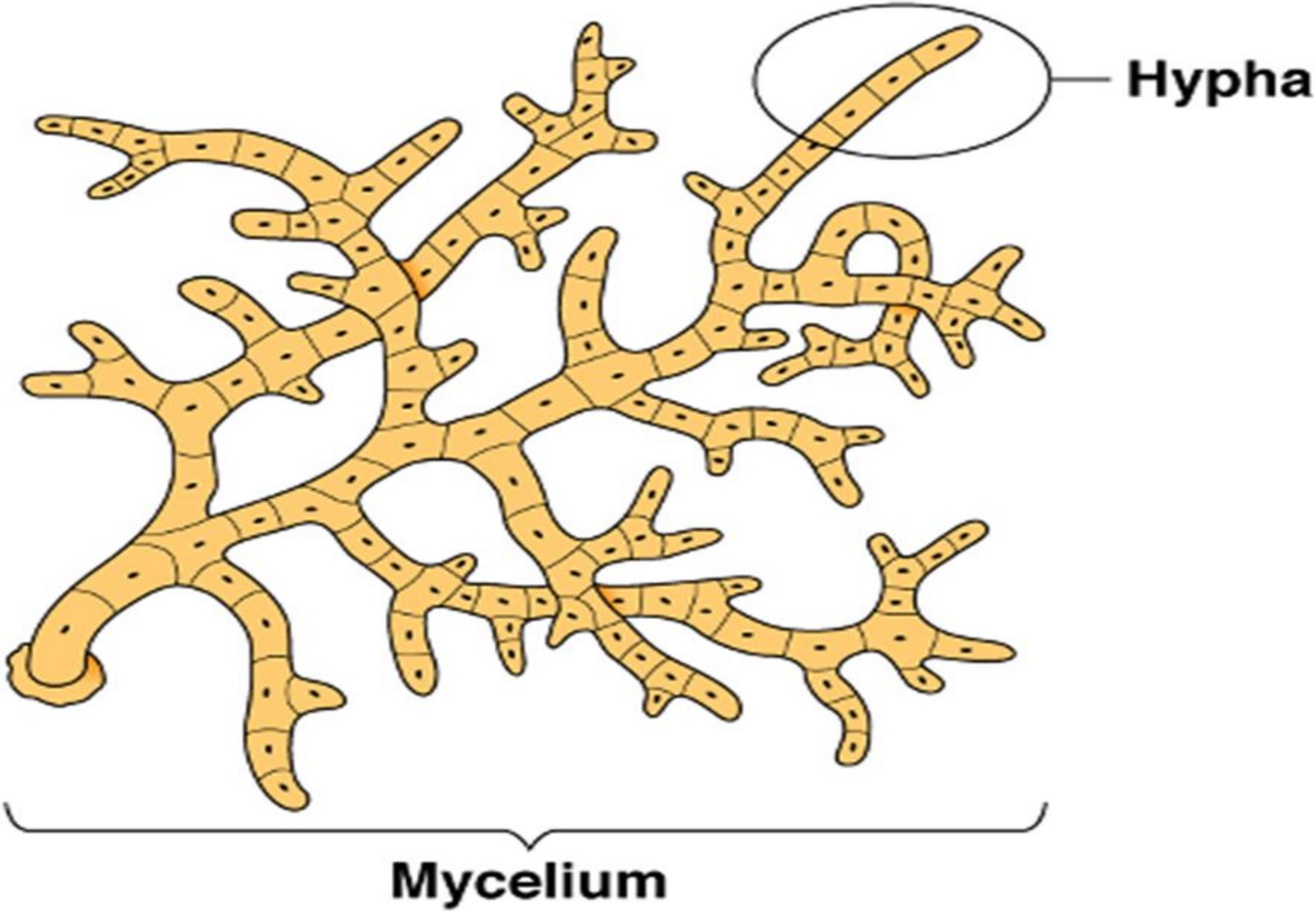
(2) A filamentous or molds form which is a vegetative growth of filaments.

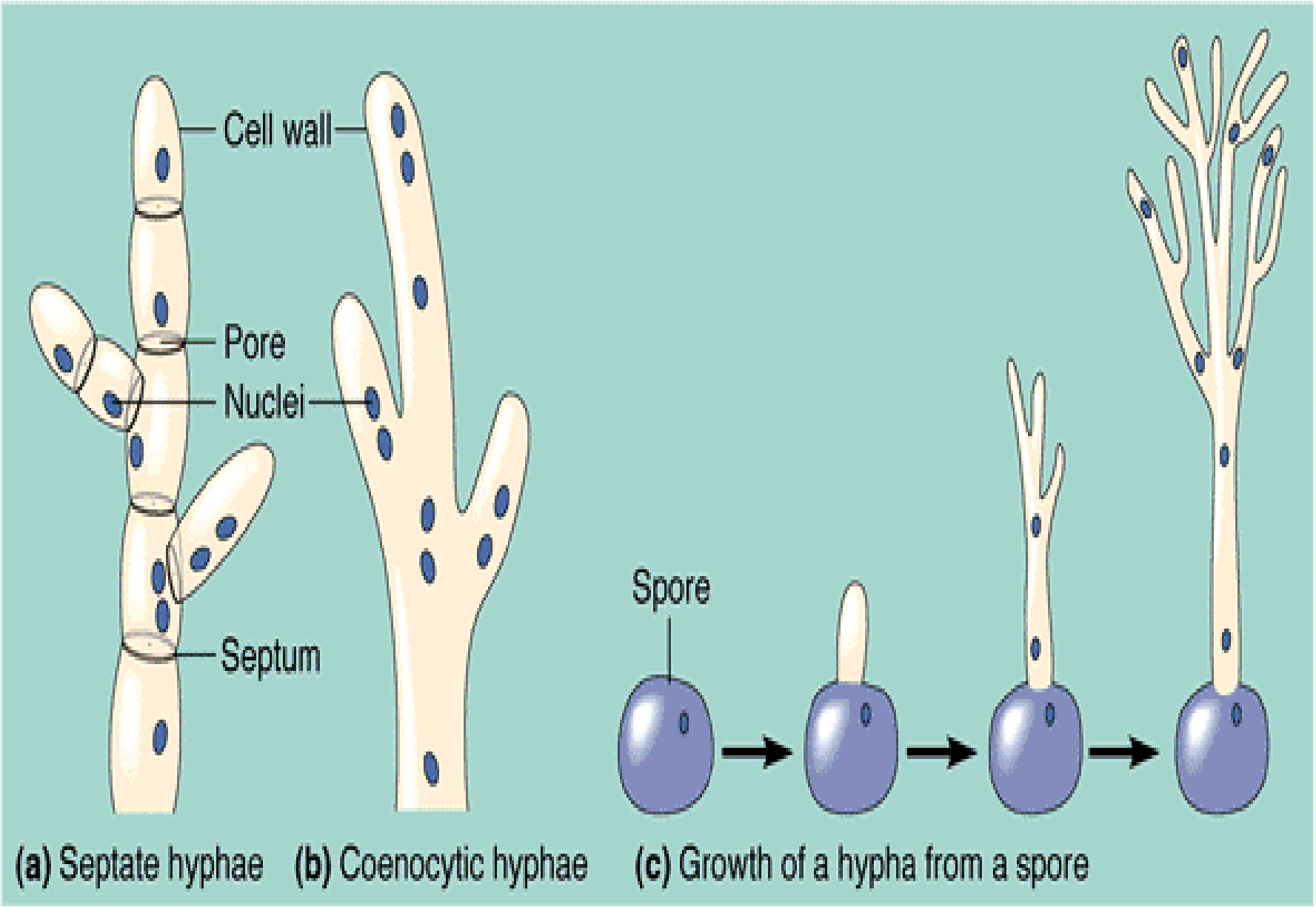
Fungal filaments are known as **hyphae** and a mass of hyphae collectively make up the **mycelium**. The terms "hyphae" and "mycelium" are used interchangeably. There are two kinds of hyphae; non-septate **(coenocytic) and septate**. The septa divide the hyphae into compartments but not into cells. In some groups nuclei and/or cytoplasm can flow through a **hole or pore** in the center of these septa.

Structures such as mushrooms consist simply of a number of filaments packed tightly together, and reproduction is by spores or conidia.

Many molds can be identified by the morphology of these spores and by their arrangement on the hyphae





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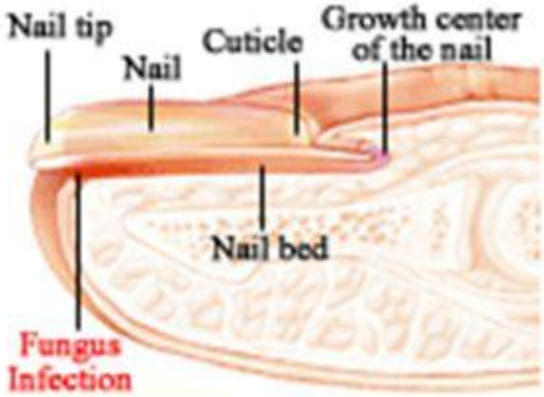
Tinea Unguium – Nail Infection

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There are between 100,000 to 200,000 species depending on how they are classified. About 300species are presently known to be pathogenic for man.

Any Questions or Comments