

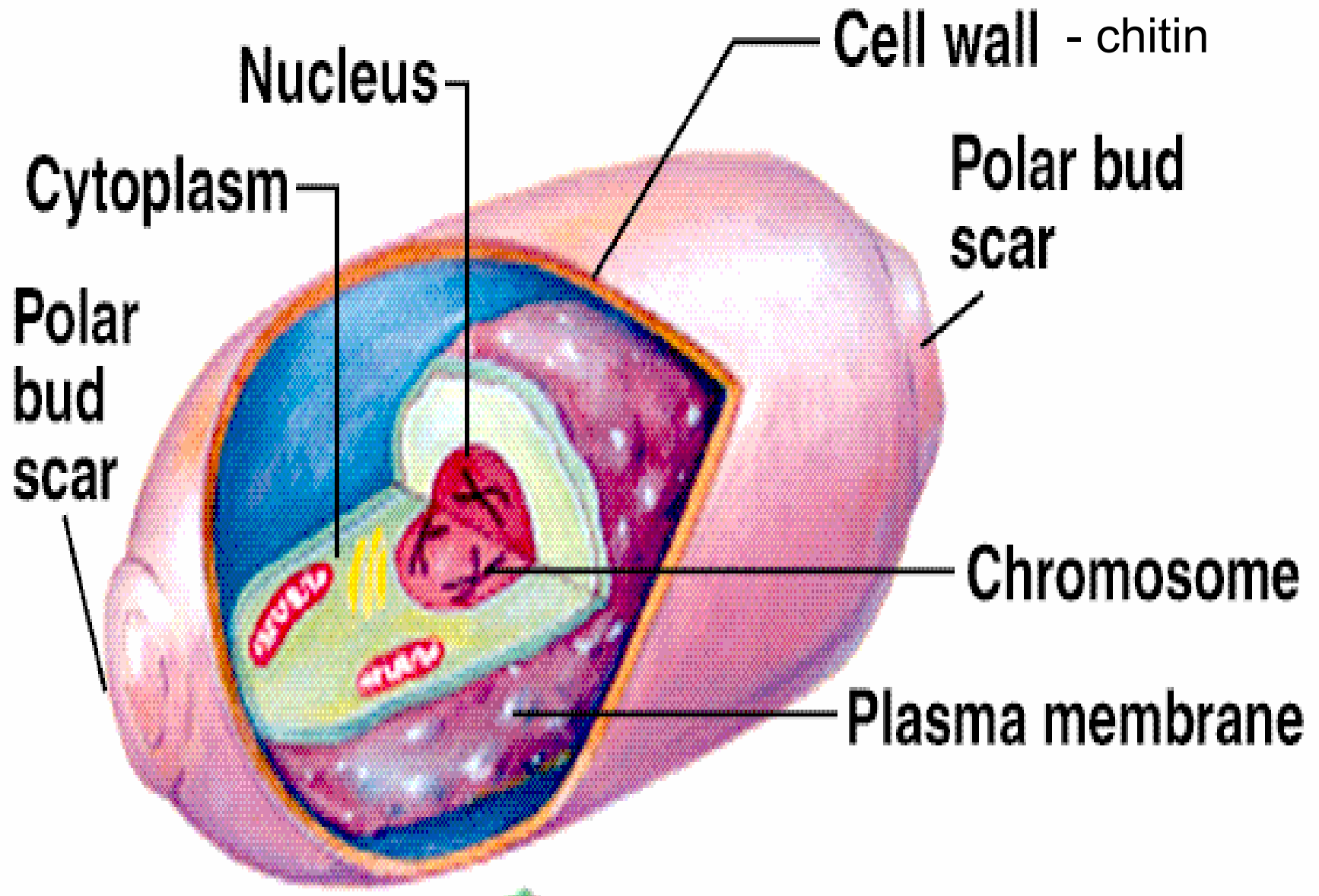
# Fungi – General characteristics

- Mycology – myco, myce
- Eukaryotic, aerobic
- Heterotrophic
  - Complex nutritional requirements
- Nutritional sources
  - Saprophytic
    - Decomposers
  - Opportunistic parasites
    - Host is usually compromised

# Fungal cells

- Cell wall composition
  - Thick layers of Chitin
    - Indigestible polysaccharide
- Spores
  - Dormant resistant forms
    - Dormant = metabolically inactive
  - Asexual spores
    - Clones
  - Sexual spores
    - Product of reproduction

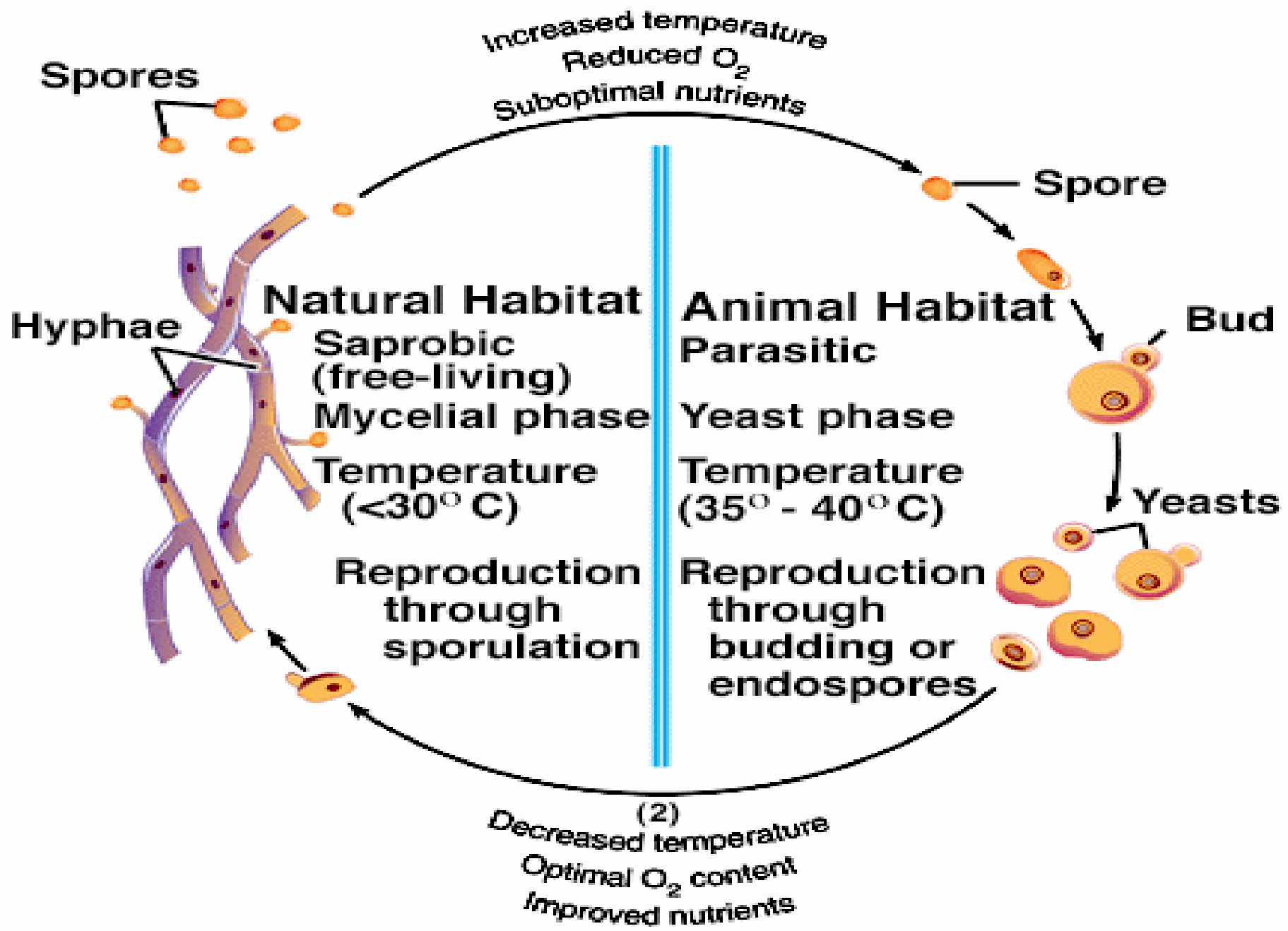
# Yeast cell anatomy image



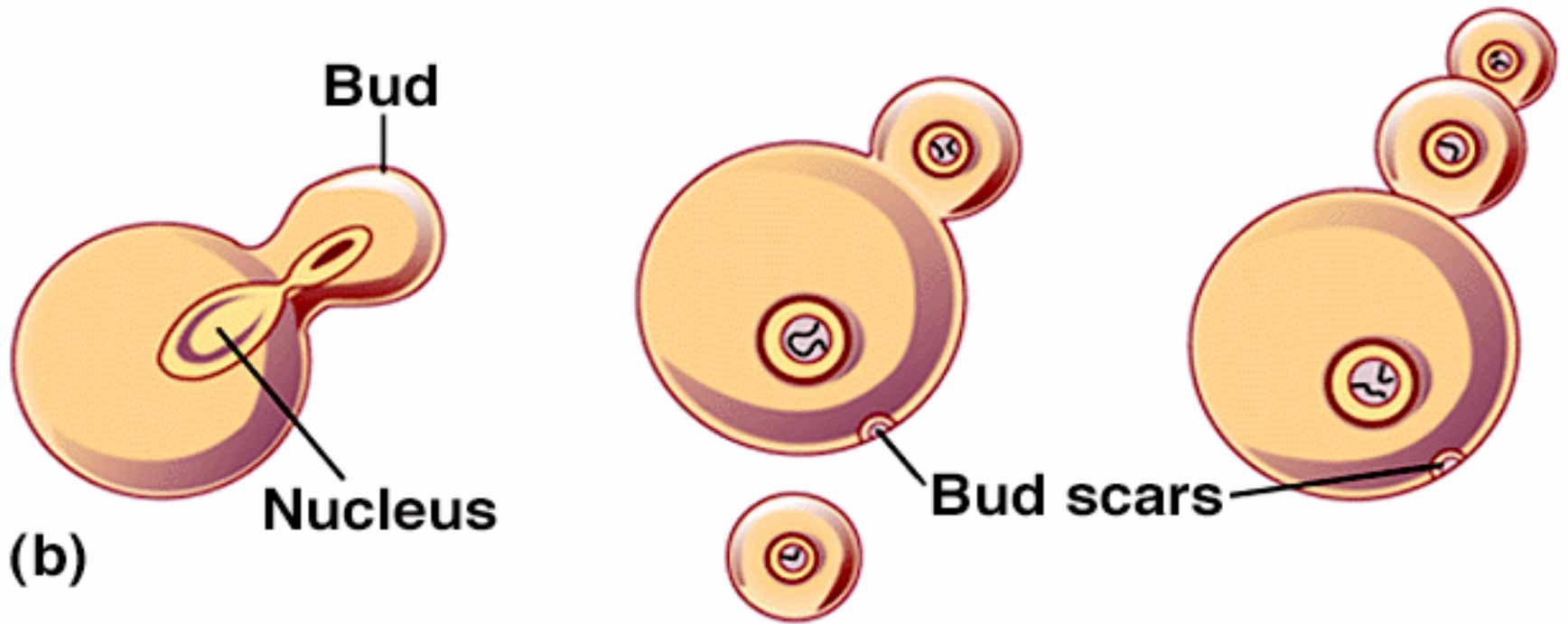
# Fungal Morphology

- Dimorphic
  - found in two physical forms
    - Yeasts
      - Single celled fungi
    - Molds
      - Multicelled filaments = Hyphae
        - Mycelium – hyphal mass
        - Mushrooms

# Dimorphism in fungi image



# Yeast cells and yeast hyphae



(b)

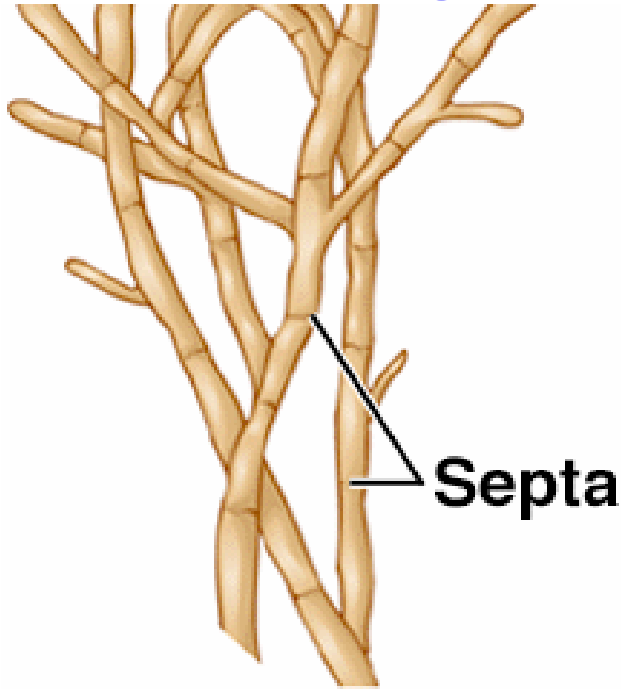


(c)

Pseudohypha

**Yeast  
structure**

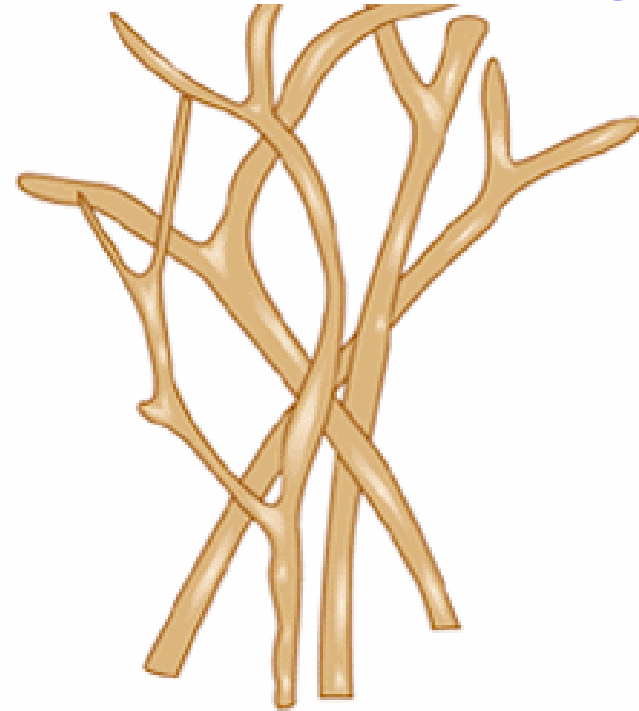
# Fungal hyphae forms image



Septa

**Septate hyphae**

↓ as in *Penicillium*



**Nonseptate hyphae**

↓ as in *Rhizopus*



**Types of  
hyphae**

(c)

# Hyphae forms photos





# Mold mycelium photo



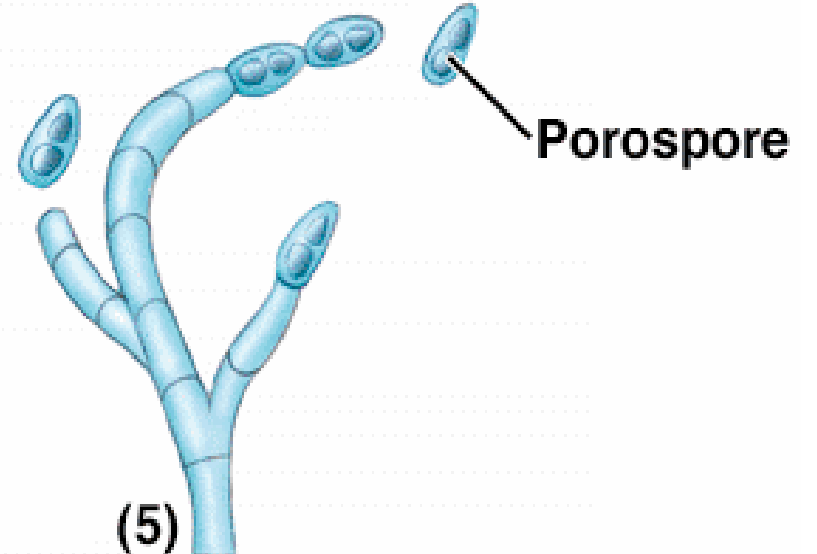
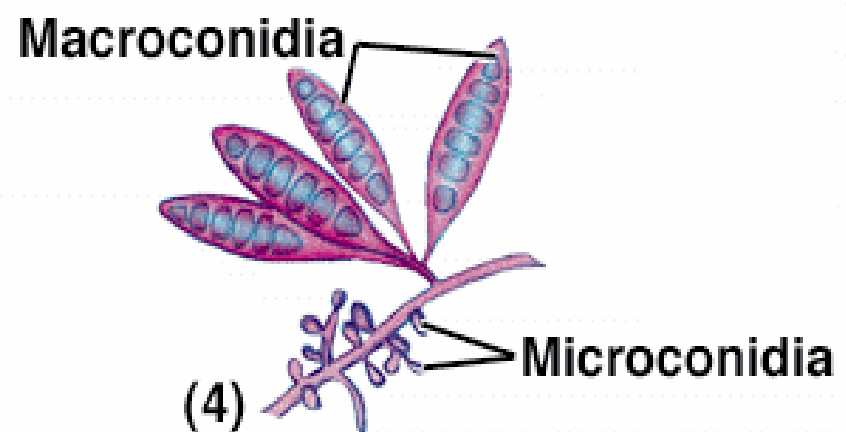
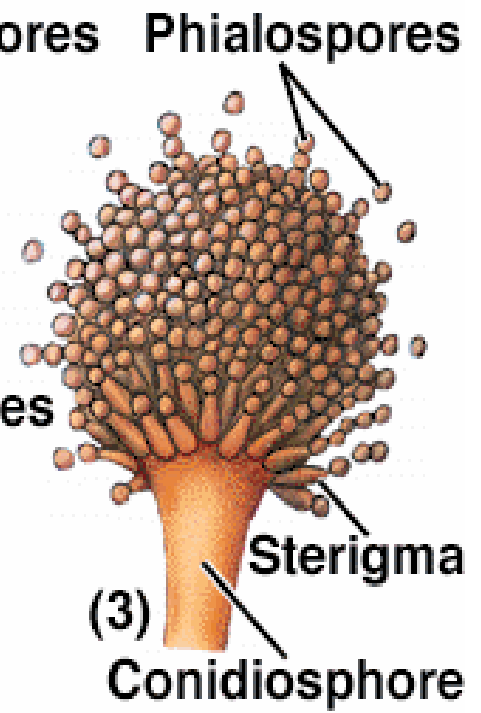
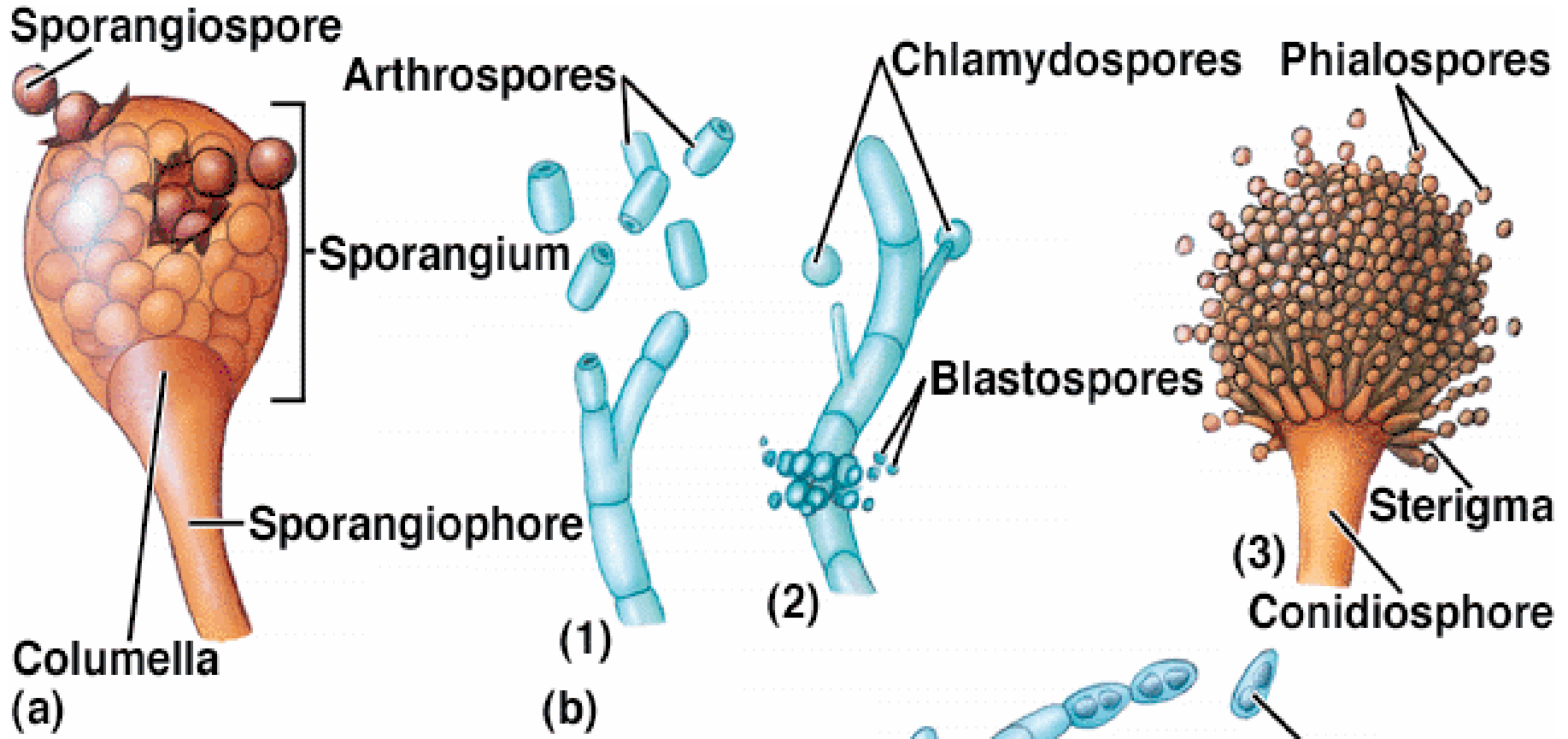
# Mixed fungal culture photo



# Fungal reproduction

- **Asexual**
  - Haploid spores formed on hyphae
  - Fragmentation
    - Broken fragments of hyphae
- **Sexual**
  - Two mating hyphae types fuse and produce spores

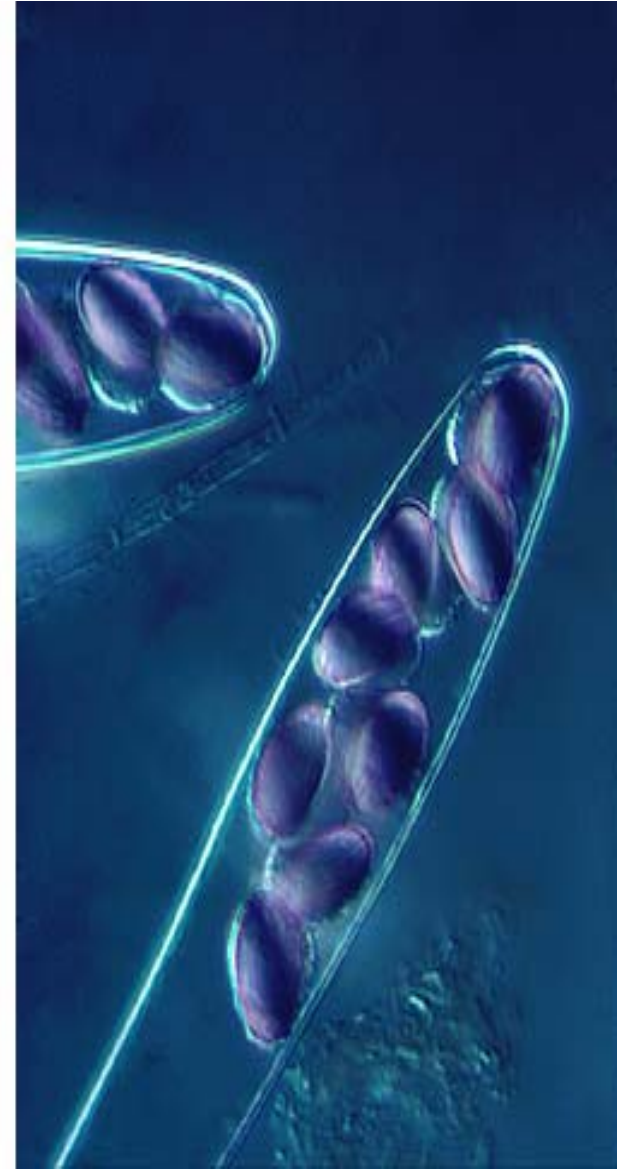
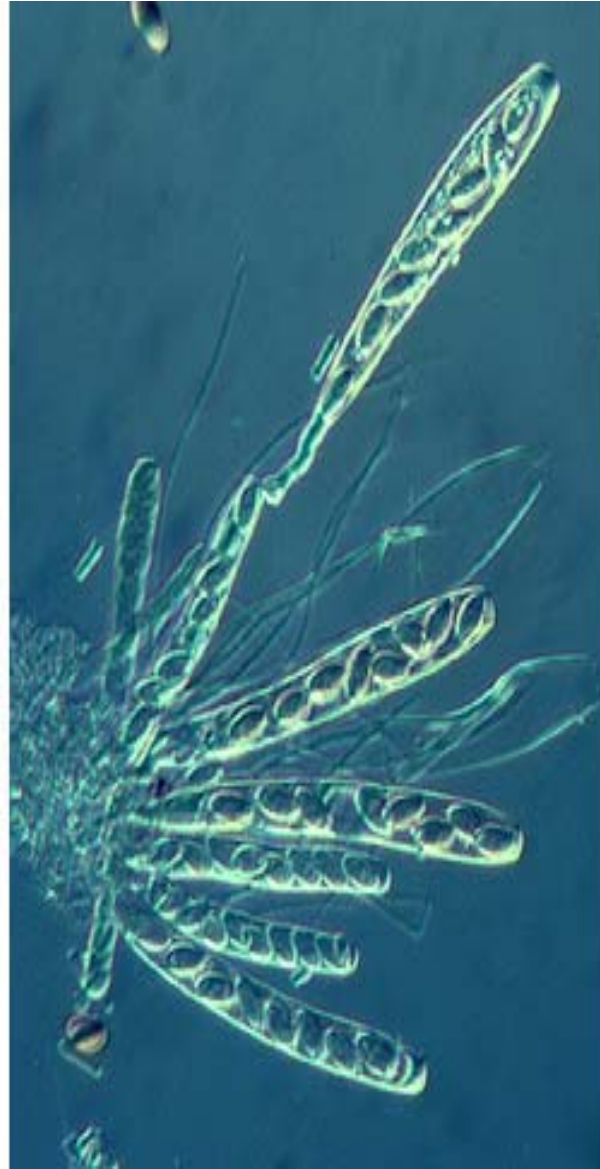
# Types of asexual fungal spores image



# Asexual modes of reproduction photos

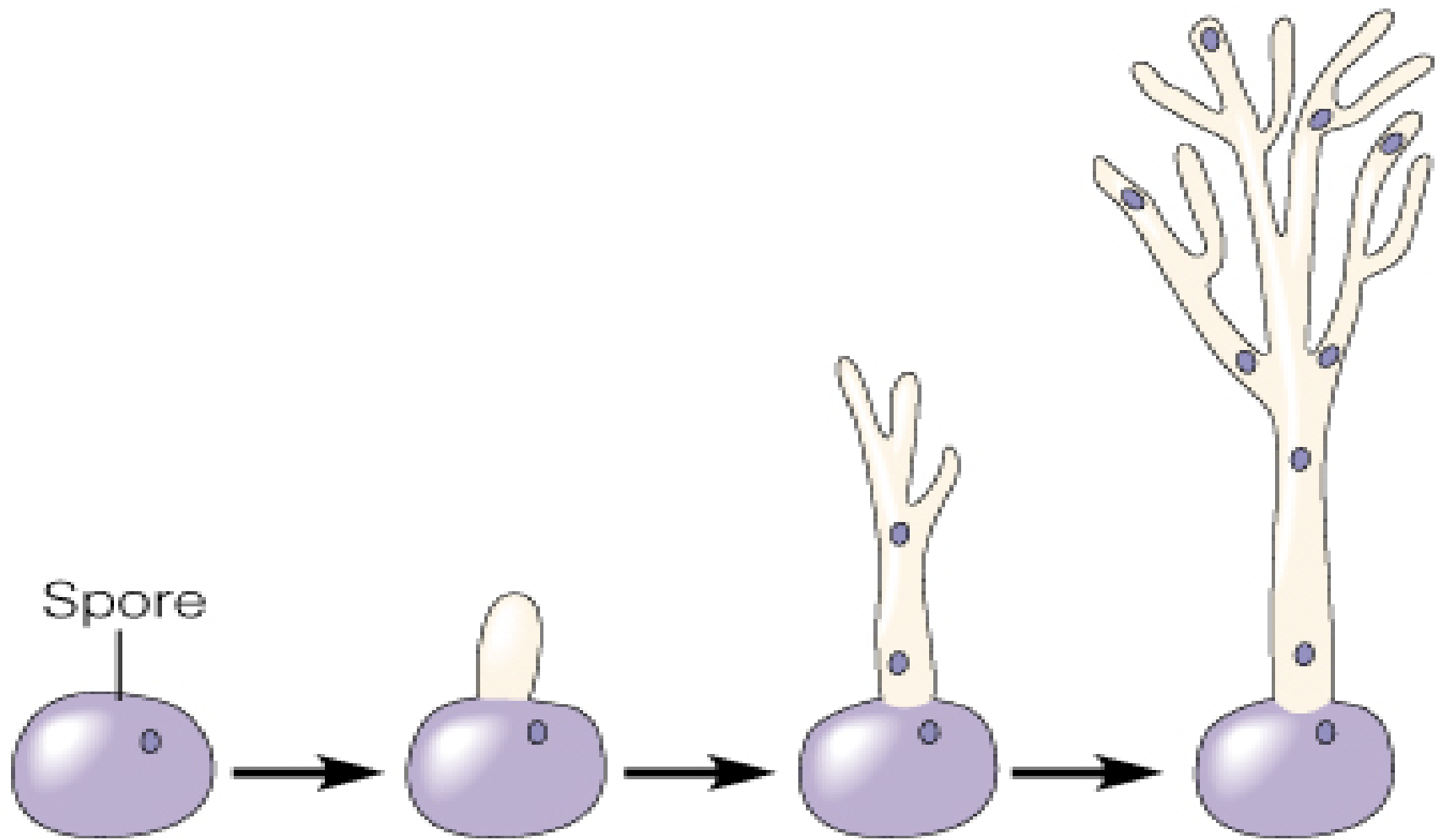


**Fragmentation**



**Spores**

# Spore germination image

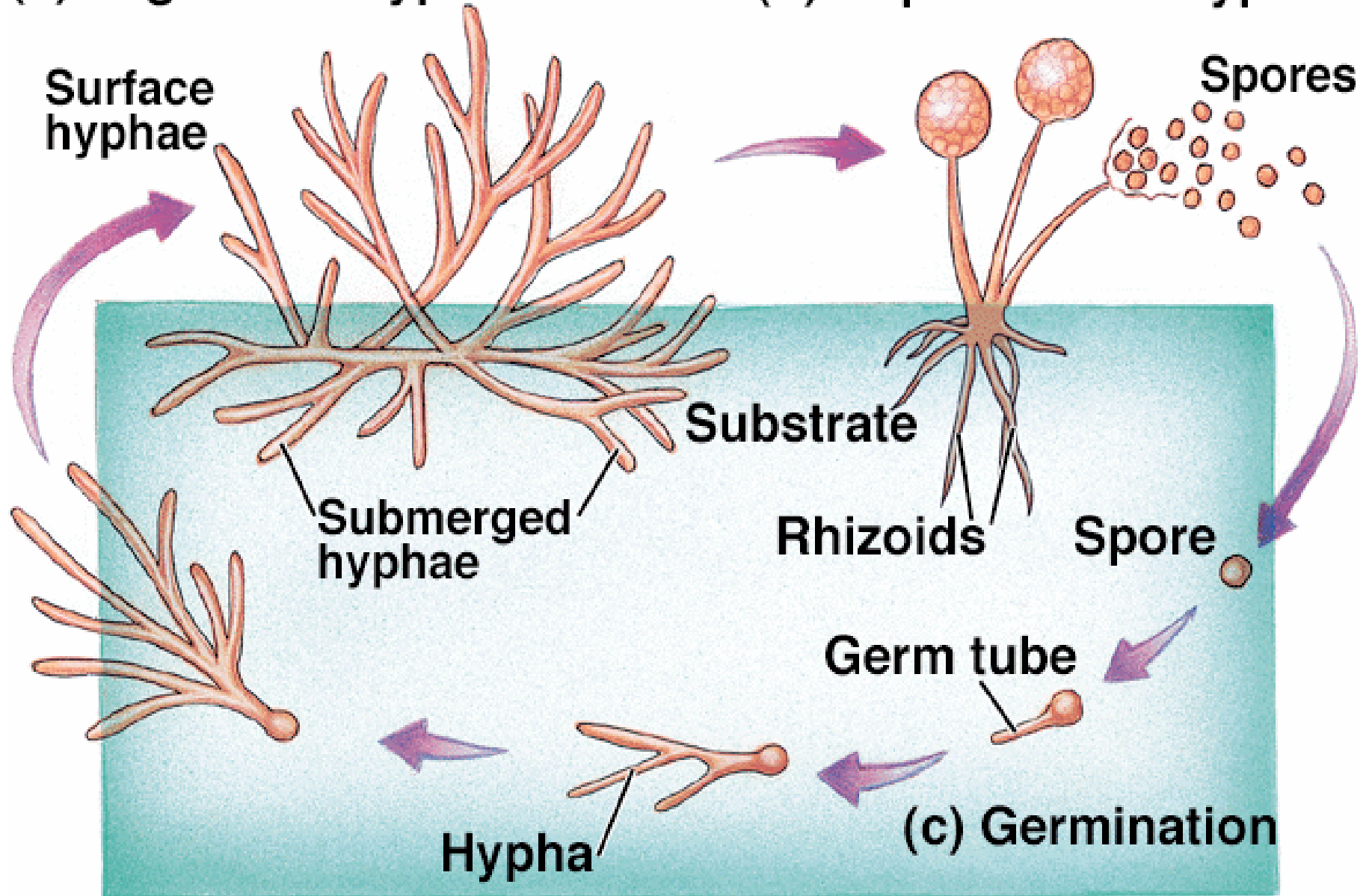


**(c)** Growth of a hypha from a spore

# Mold germination and reproduction

(a) Vegetative Hyphae

(b) Reproductive Hyphae

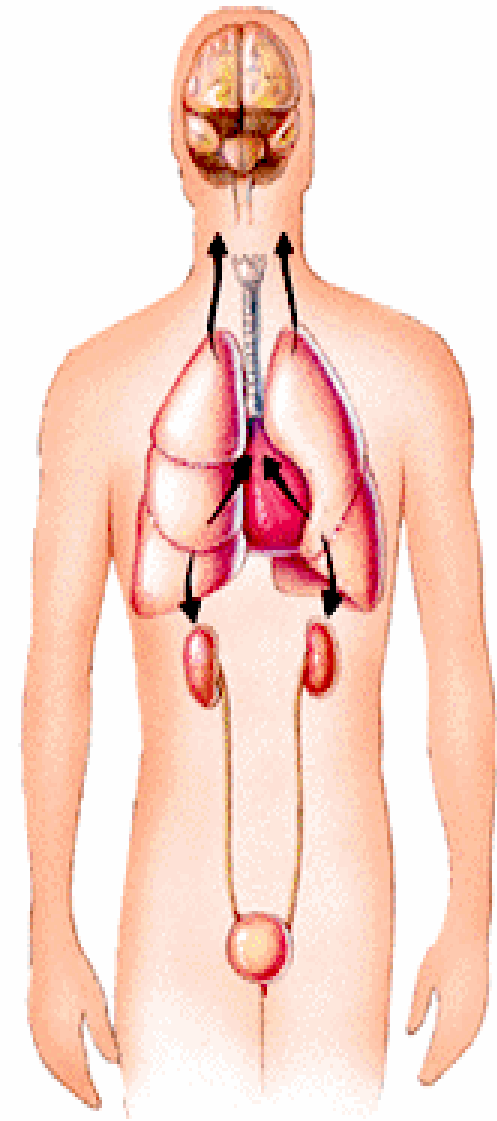


# Mycotic infection Types = Mycoses

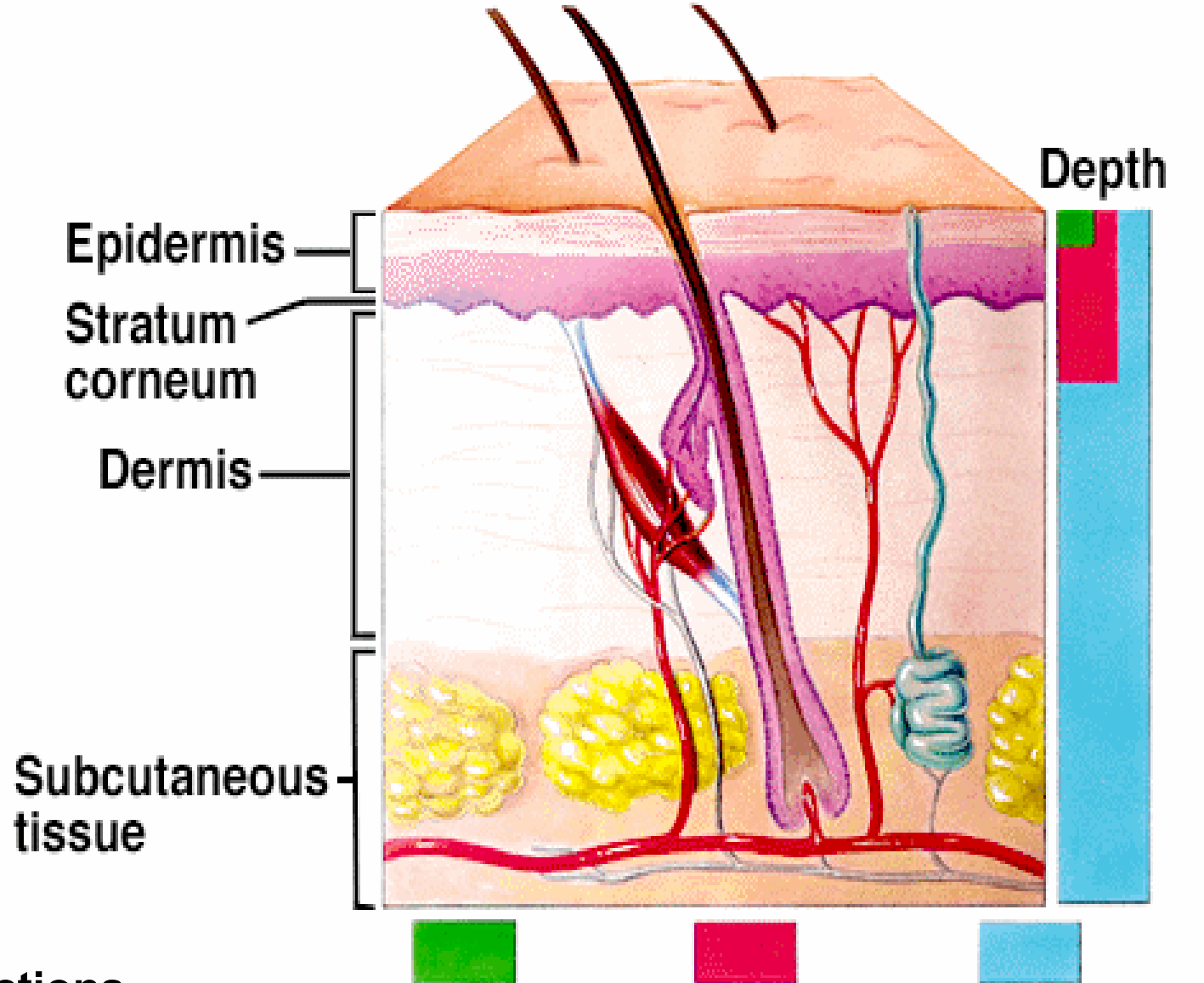
- Superficial
  - Non-living hair, skin, nails surfaces
- Intermediate - penetrated surfaces
  - Deep Cutaneous
  - Mucosal surfaces
    - oral, respiratory, genital, gastrointestinal
- Systemic - internal
  - Usually begins in lung tissue
  - Spreads to other major organs



# Mycotic infections image



**Systemic infections**



**(b)**

**Superficial Cutaneous Subcutaneous**

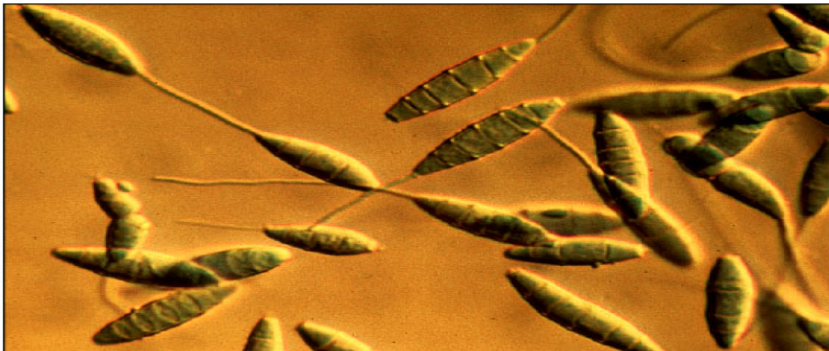
# Superficial mycoses

- Athletes foot, Jock itch
  - Caused by dermatophytes (mold)
    - *Dermophyton* or *Tricophyton*
  - Symptoms include rash & itching

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(a)



(b)

20 μm



blishing as Benjamin Cummings.

# Intermediate mycoses

- Yeasts and molds
  - *Candida* – ‘yeast infection’
  - *Mucor*
  - *Dermophyton* or *Tricophyton*



(a)

# Systemic mycoses

- Mostly occur in compromised patients
- Yeasts, molds
  - *Histoplasma*
  - *Blastomyces*
  - *Coccidioides*
  - *Pneumocystis*
  - *Cryptococcus*

# Systemic mycotic infections



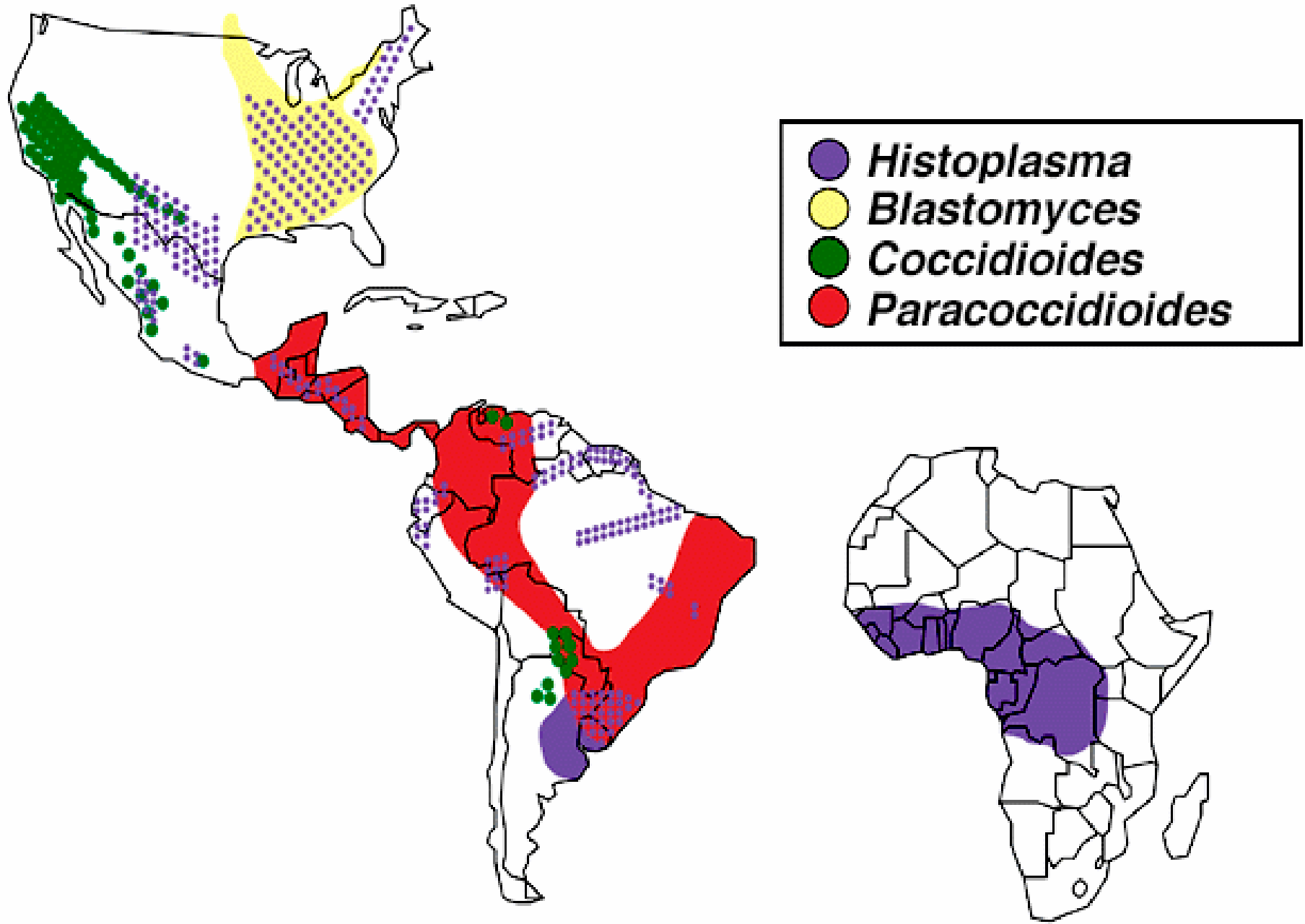
Cryptococcus

Copyright

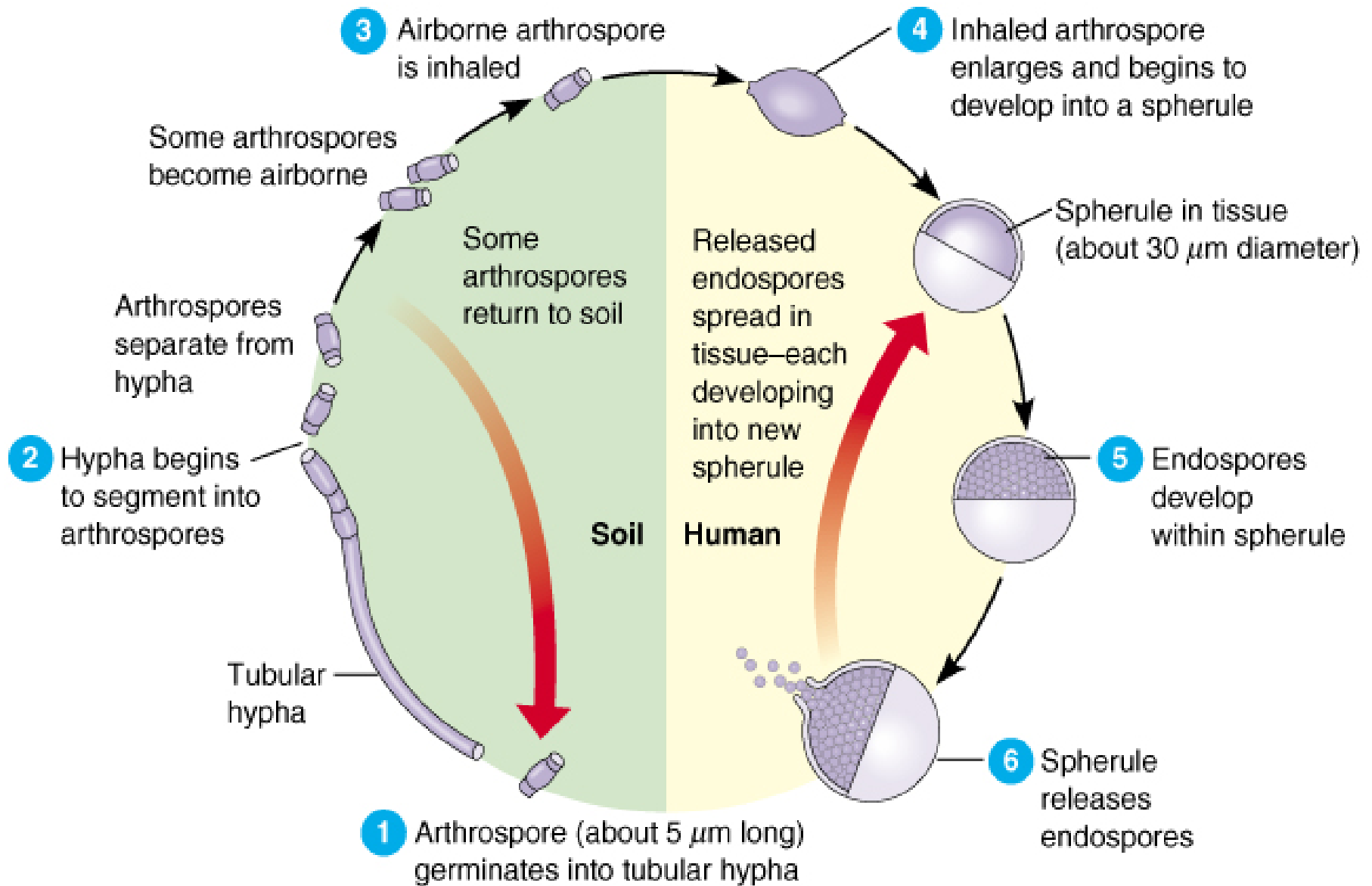


Blastomycosis

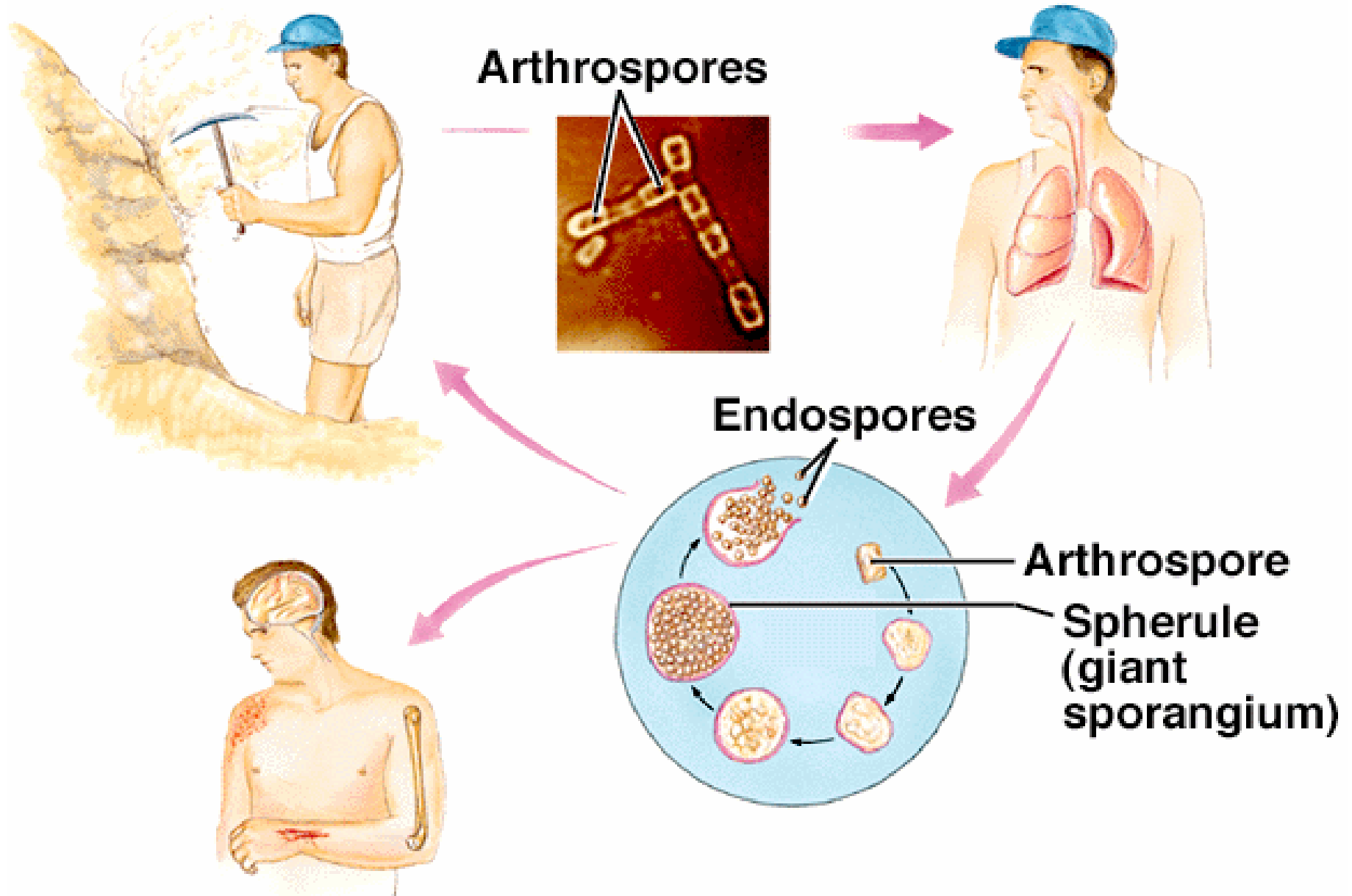
# Respiratory fungal agents map



# *Coccidioides immitis* dimorphism image



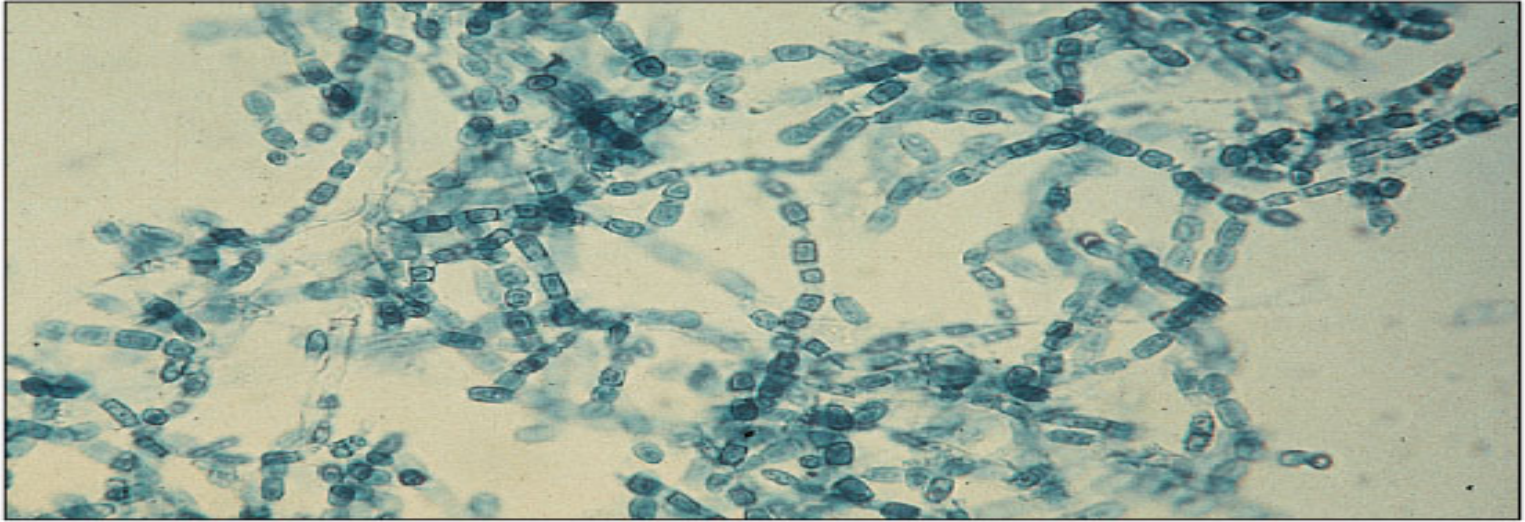
# Coccidioides infection cycle image





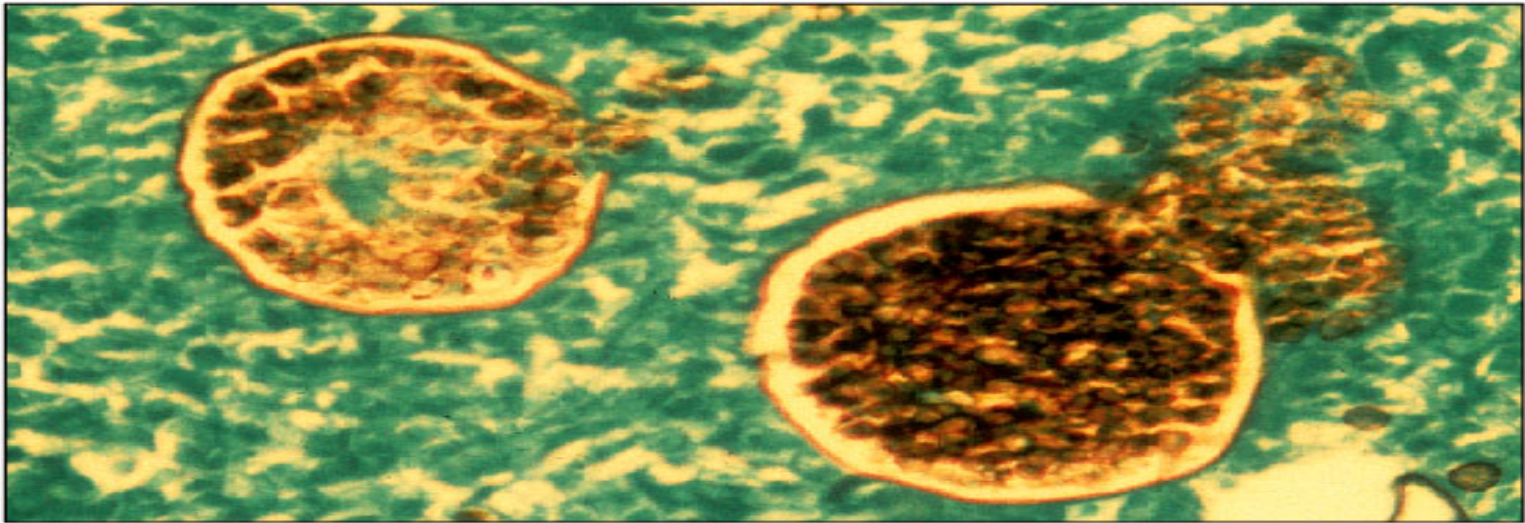
# *Coccidioides immitis* photos

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(a)

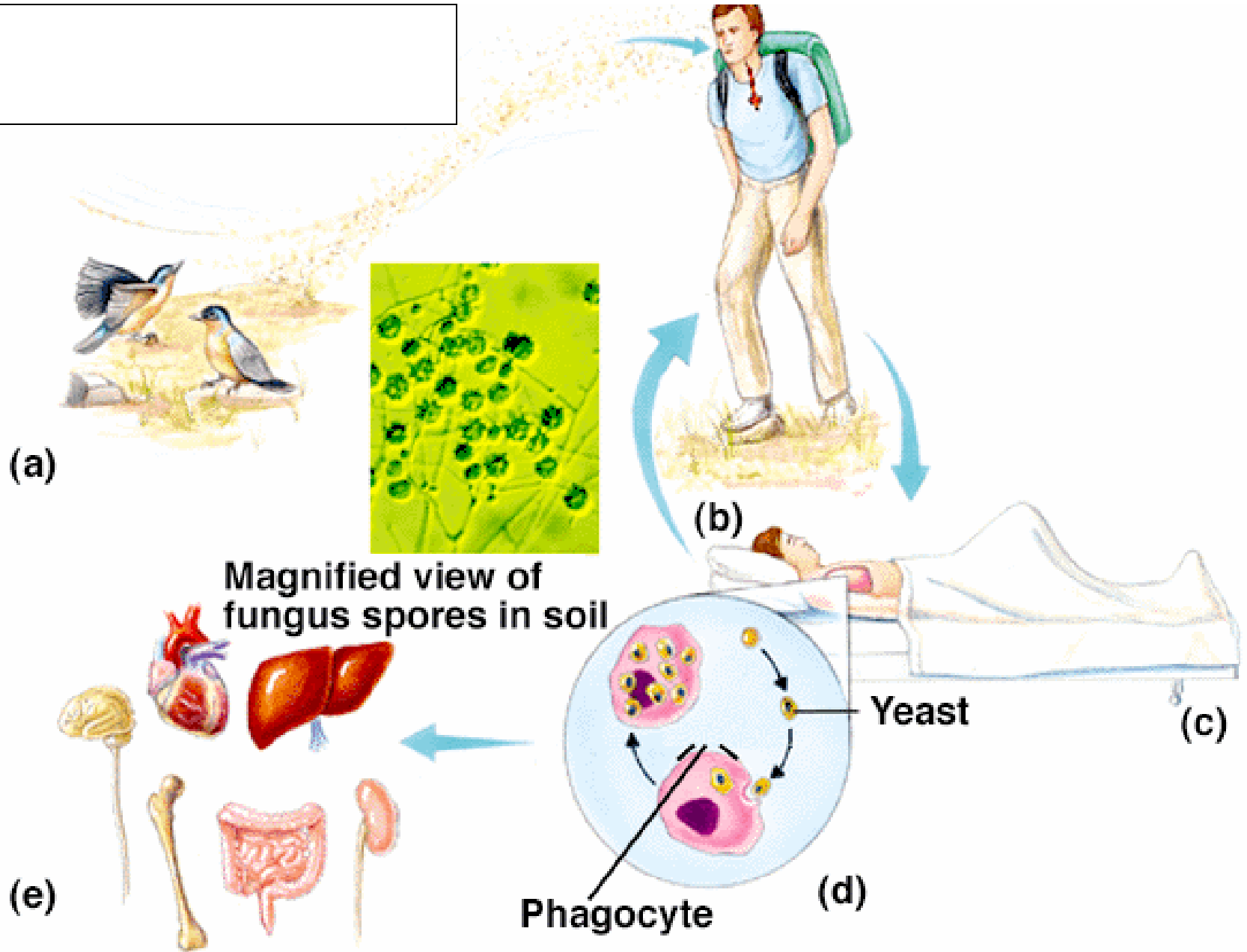
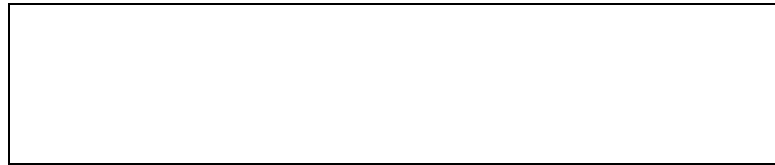
20  $\mu\text{m}$



(b)

50  $\mu\text{m}$

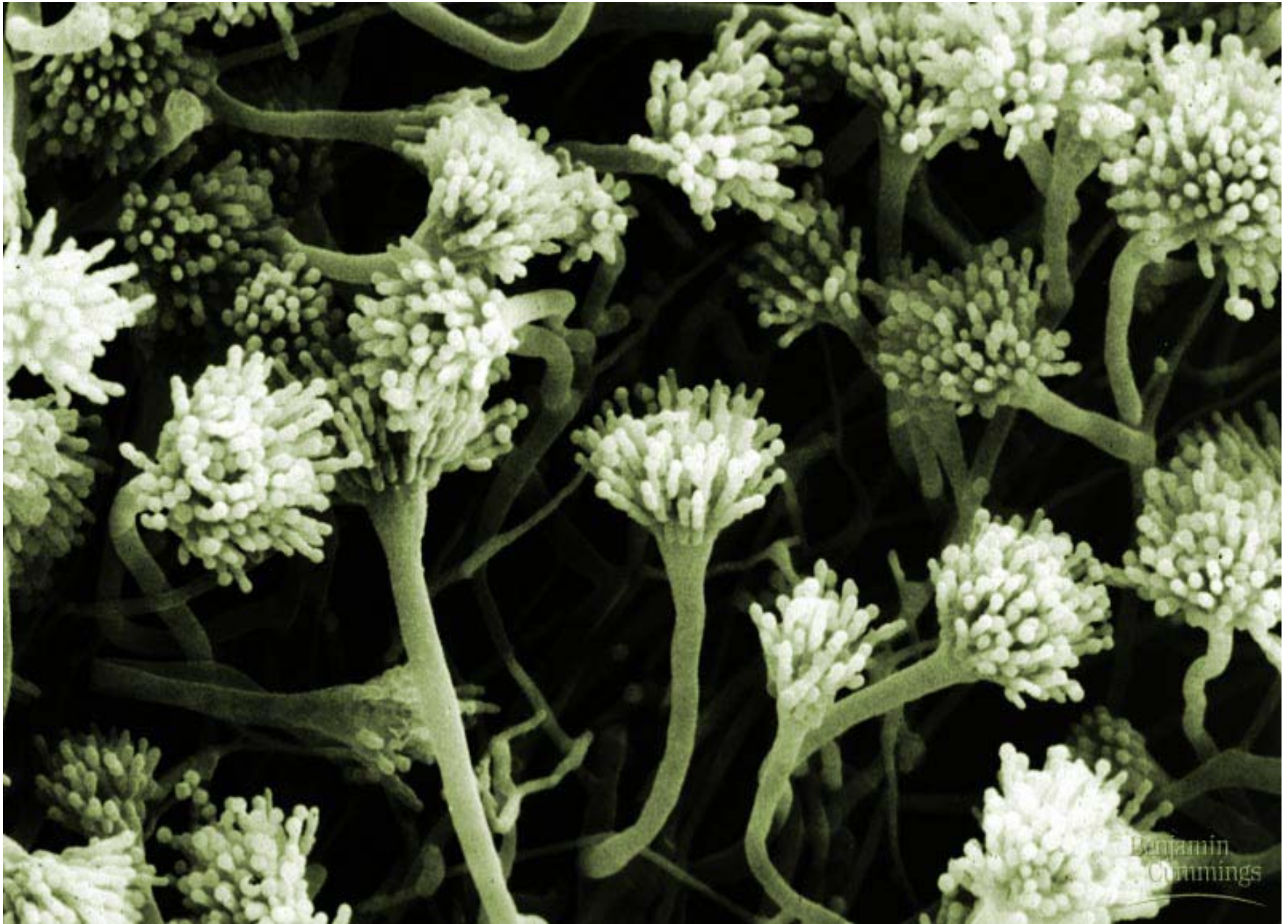
# *Histoplasma* infection cycle image



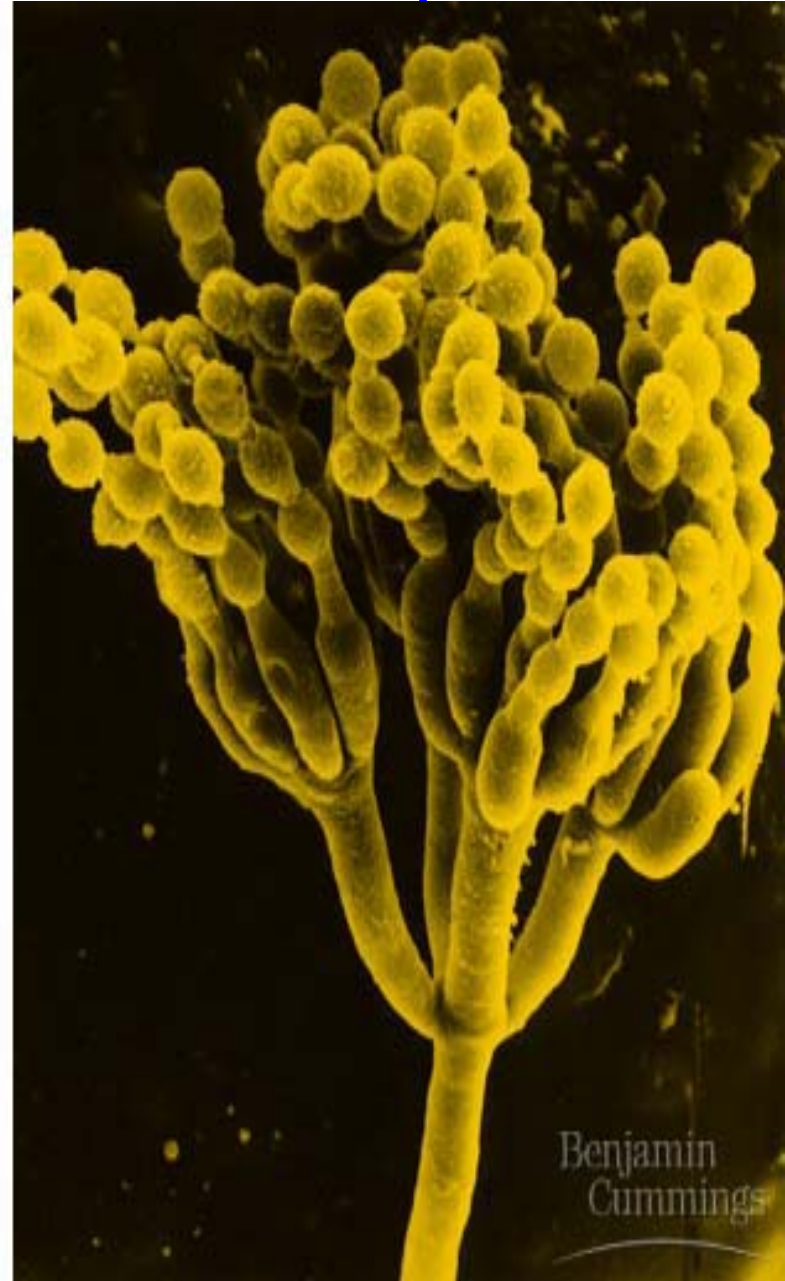
# *Rhizopus* photos



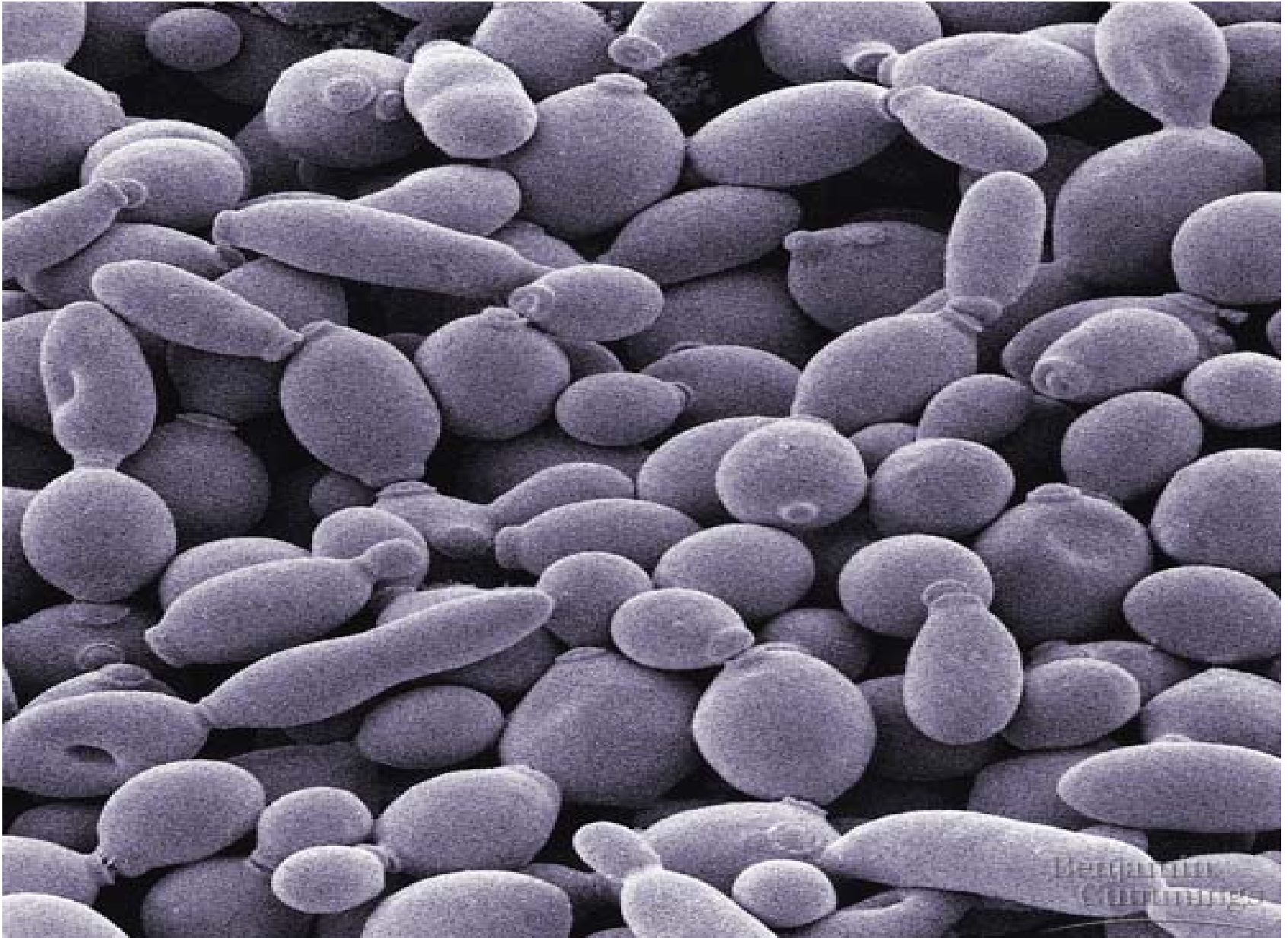
# *Aspergillus* photo - Food and produce



# *Penicillium* photos - Food and produce



# *Saccharomyces* photo



# Alcoholic fermentation by *Saccharomyces* image

