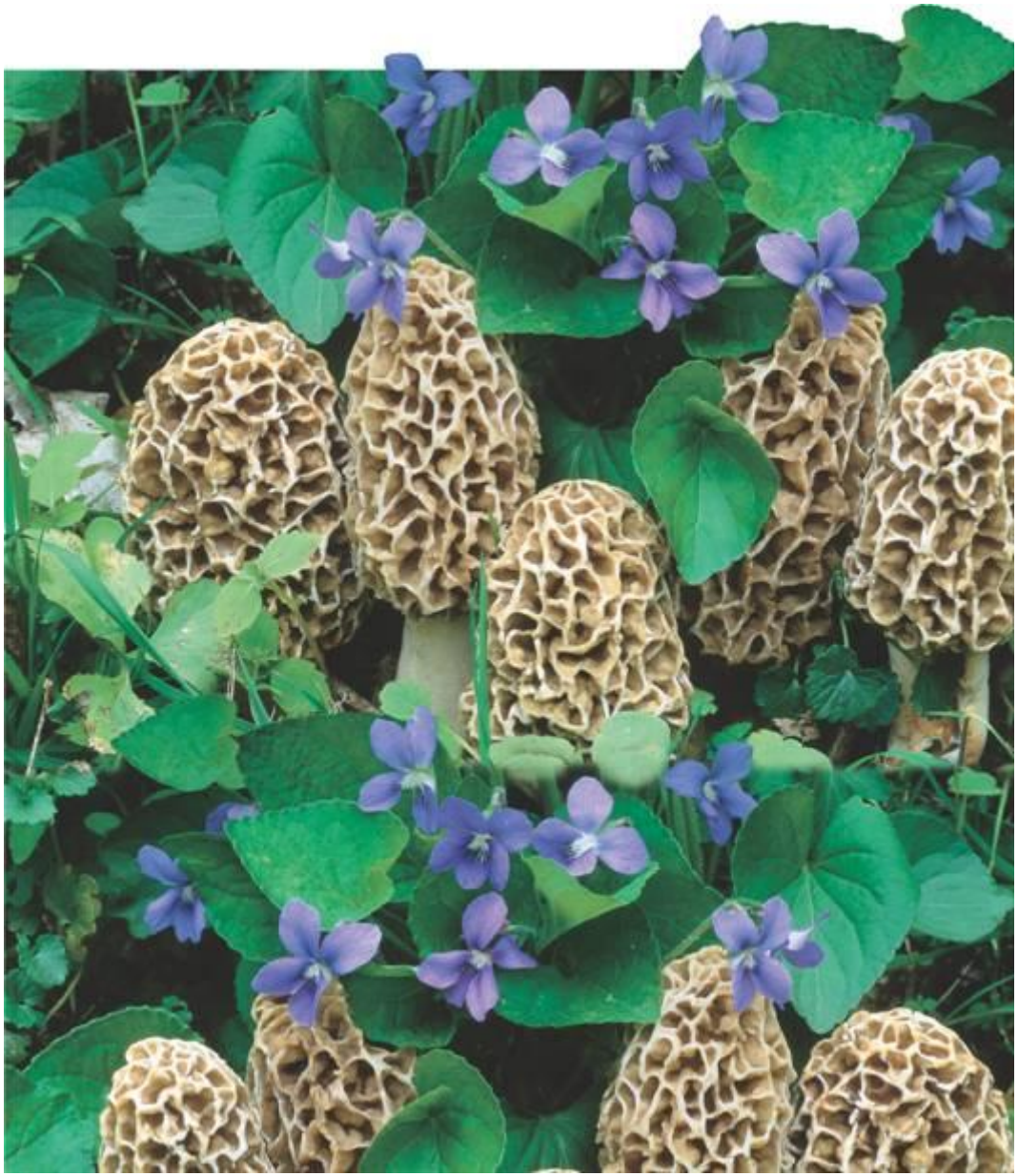
21-2 Classification of Fungi



Fungi are classified according to their structure and method of reproduction.

The four main groups of fungi are:

- Common molds (Zygomycota)
- Sac fungi (Ascomycota)
- Club fungi (Basidiomycota)
- Imperfect fungi (Deuteromycota)

The Common Molds

What are the characteristics of the common molds?

Familiar molds that grow on meat, cheese, and bread are called zygomycetes.

Zygomycetes have life cycles that include a zygospore.

A **zygospore** is a resting spore that contains zygotes formed during the sexual phase of the mold's life cycle.

Structure and Function of Bread Mold

Black bread mold, *Rhizopus stolonifer*, is a zygomycete.

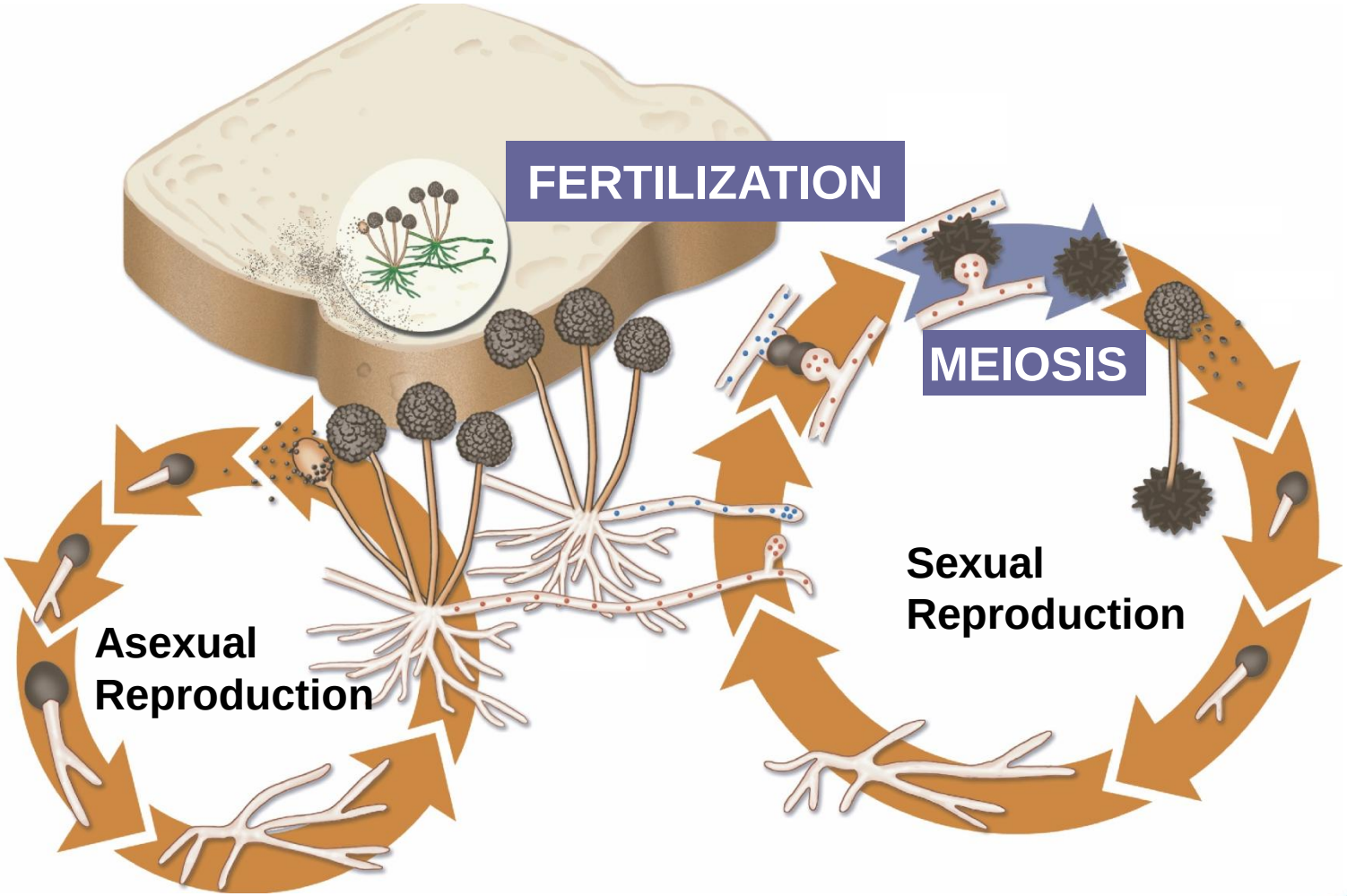
Black bread mold has two types of hyphae:

- **Rhizoids** are rootlike hyphae that penetrate the bread's surface.
- **Stolons** are stemlike hyphae that run along the surface of the bread.

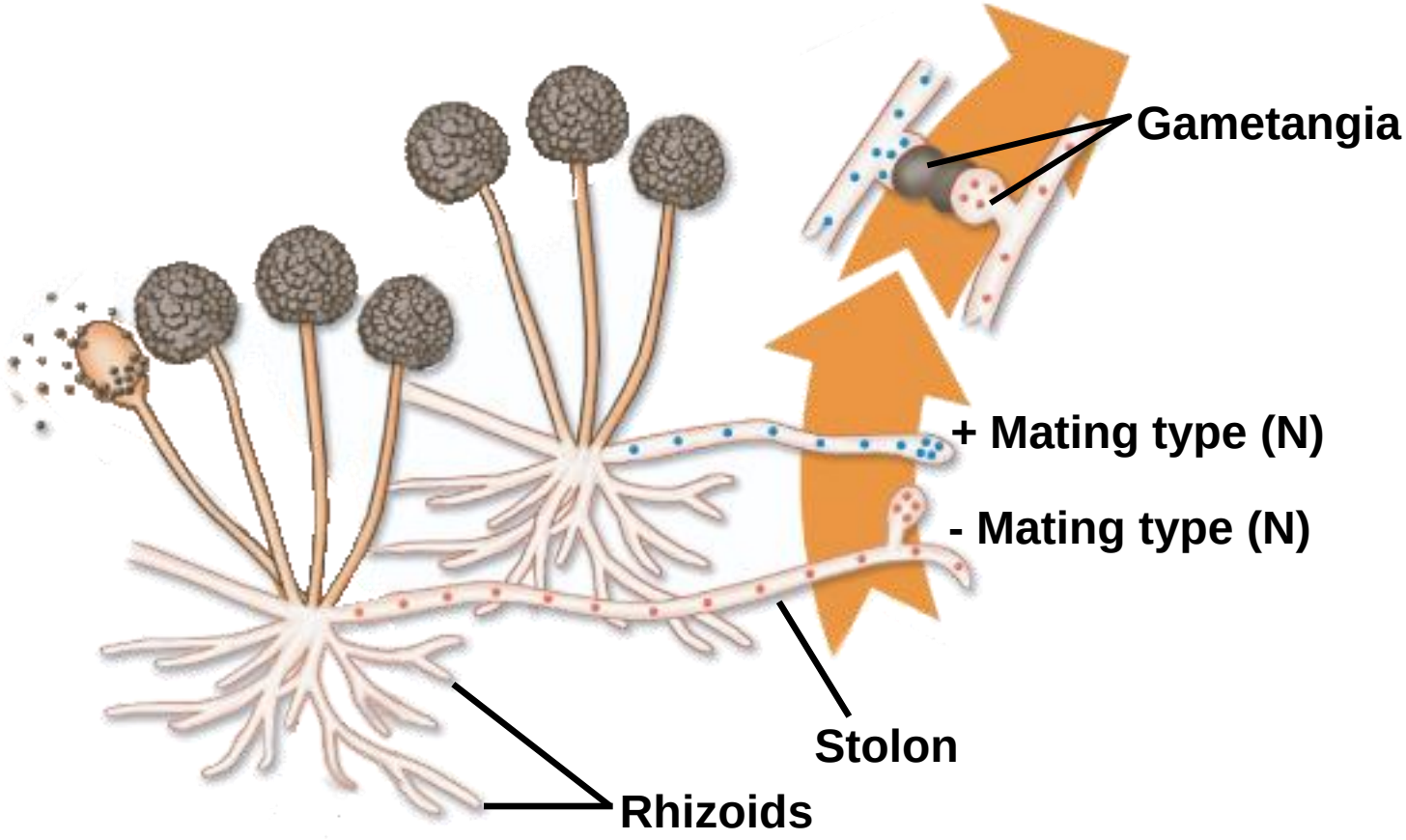
Life Cycle of Molds

Black bread molds reproduce both sexually and asexually.

Life Cycle of a Black Bread Mold

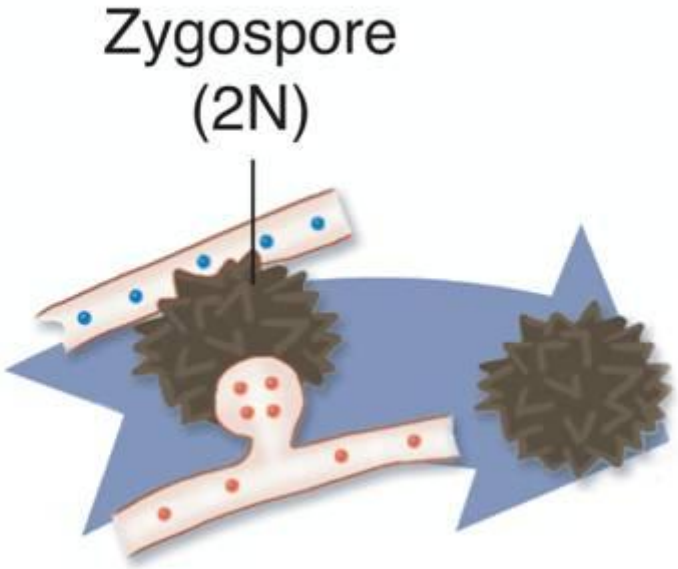


Hyphae from different mating types fuse and produce gamete-forming structures called **gametangia**.

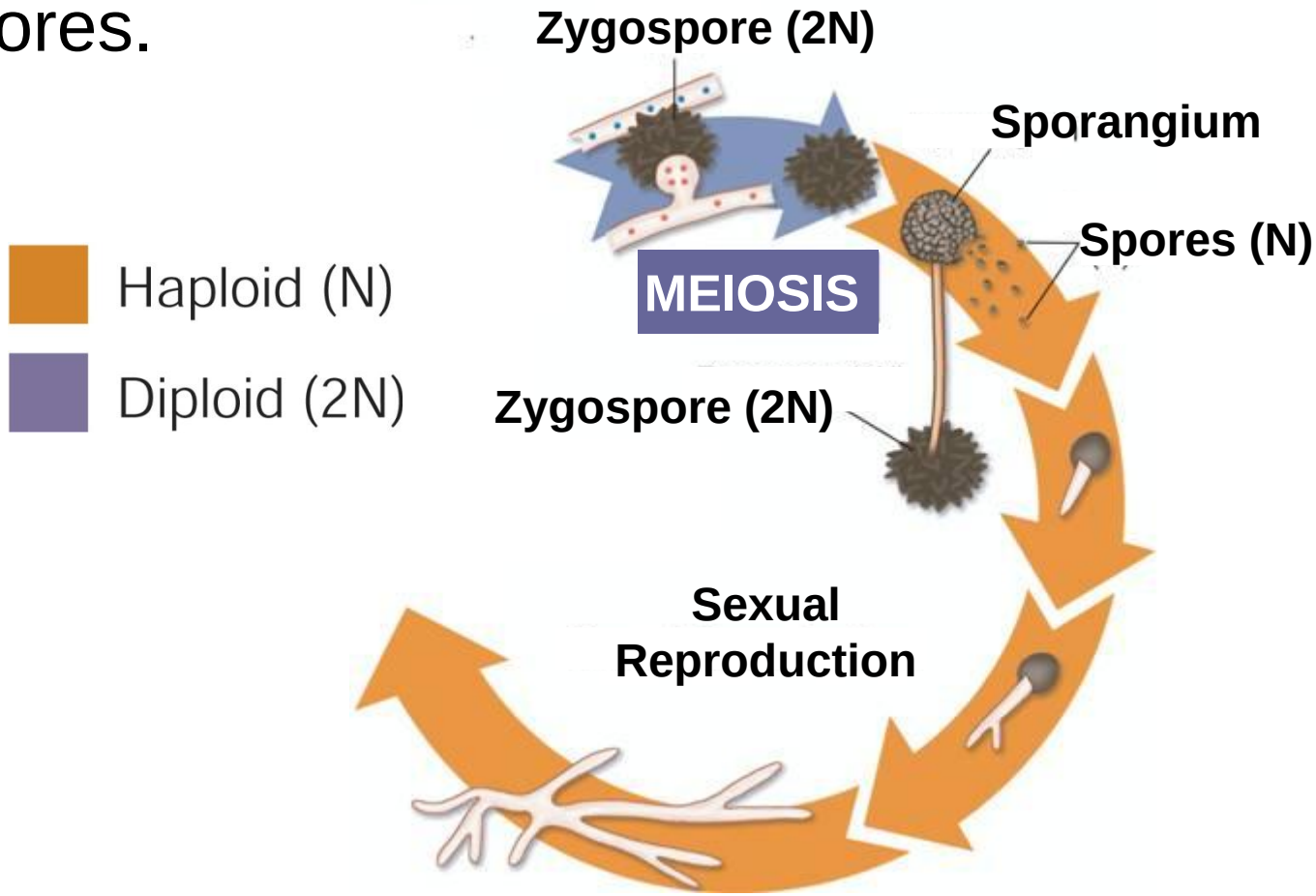


Haploid (N) gametes produced in the gametangia fuse with gametes of the opposite mating type to form diploid (2N) zygotes.

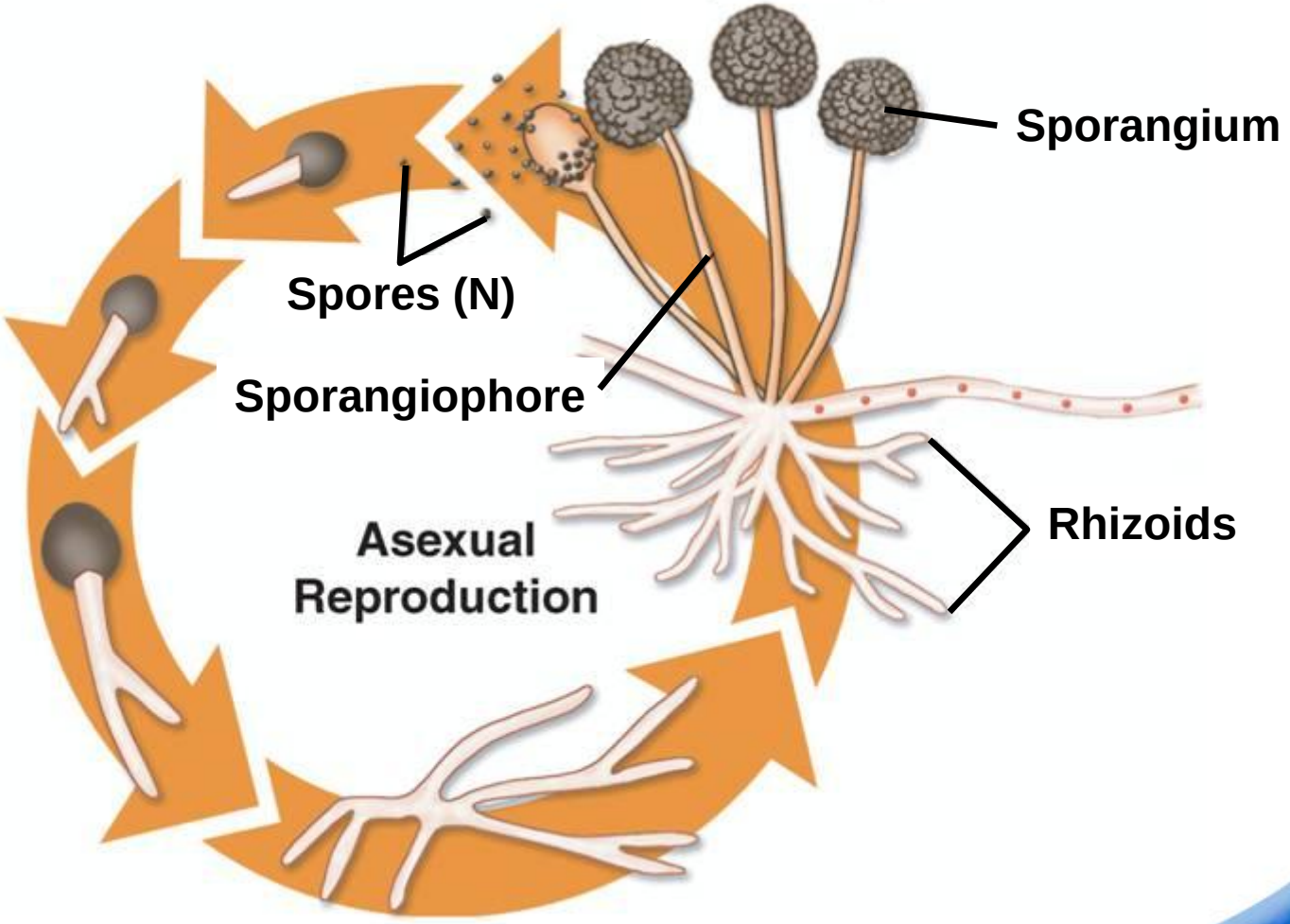
Zygotes develop into thick-walled zygospores.



In favorable conditions, the zygospore germinates, undergoes meiosis, and releases new haploid spores.



The sporangium reproduces asexually by releasing haploid spores produced by meiosis.



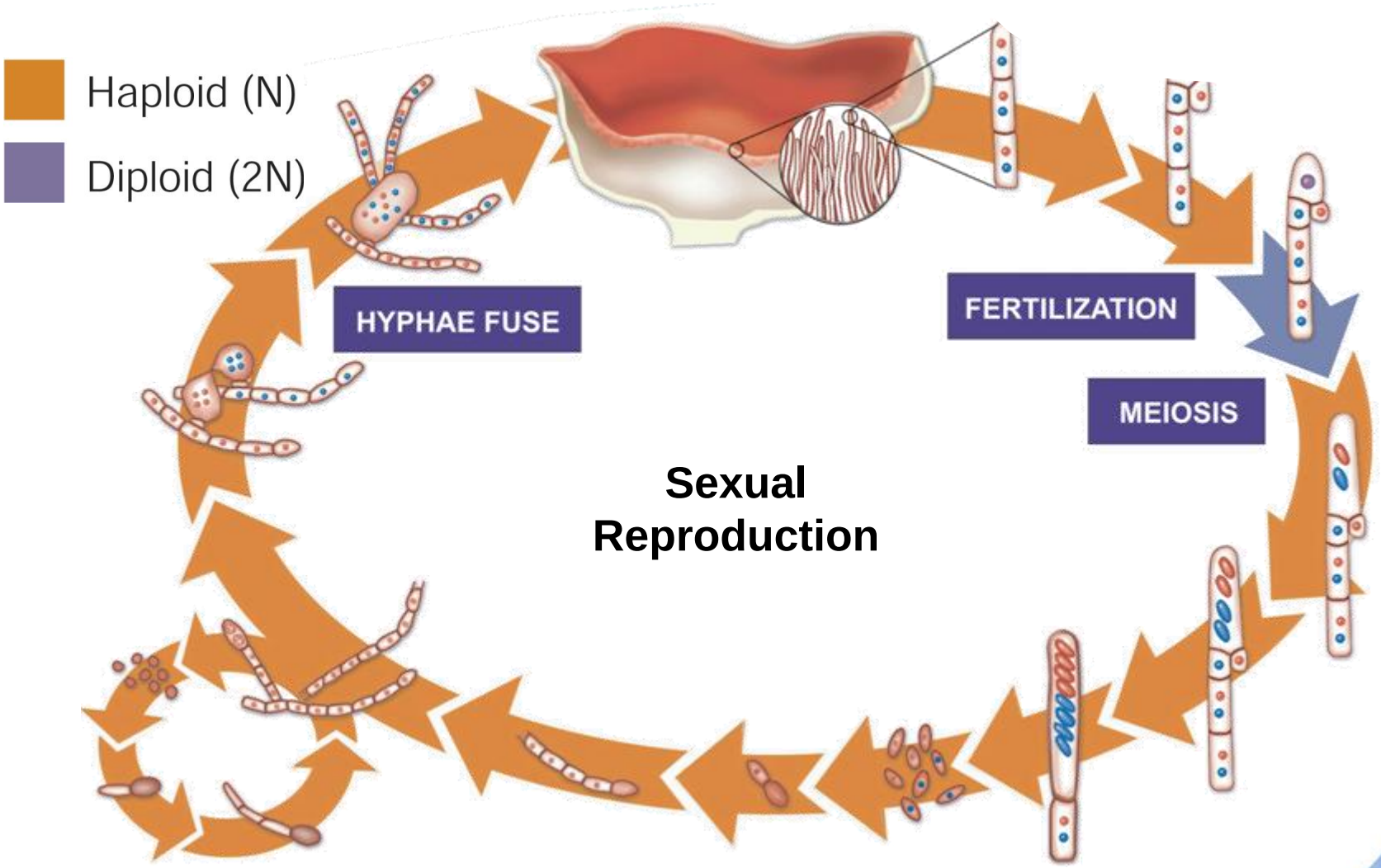
The Sac Fungi

What are the characteristics of the sac fungi?

The phylum Ascomycota is named for the ascus, a reproductive structure that contains spores.

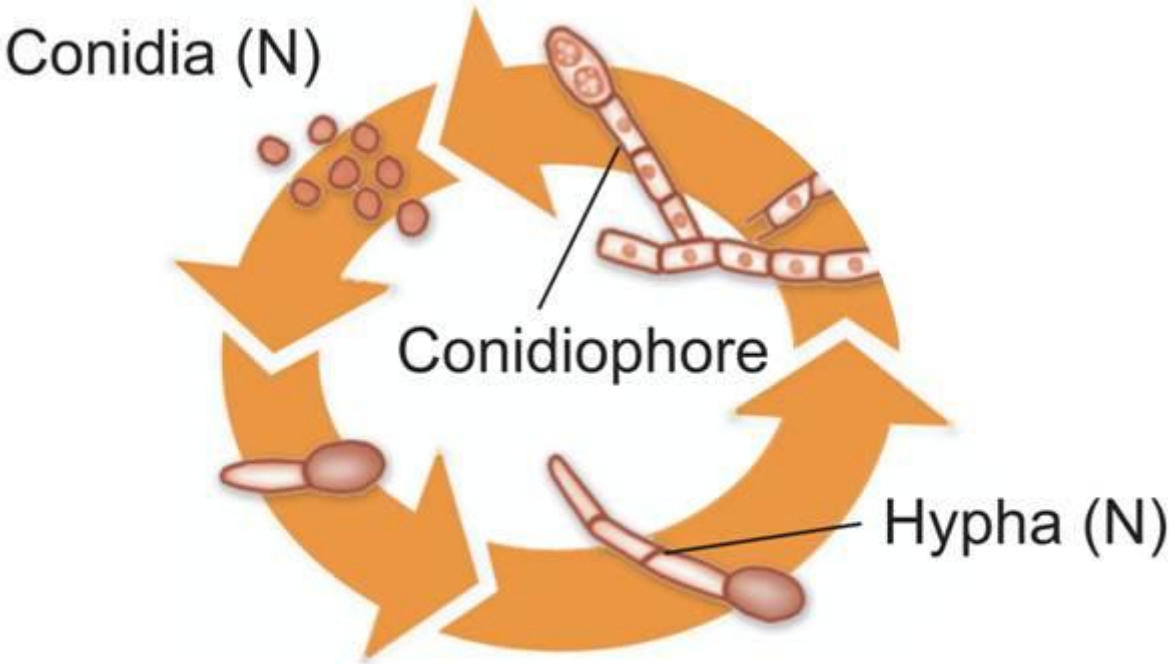
Life Cycle of Sac Fungi

The life cycle of an ascomycete usually includes both asexual and sexual reproduction.



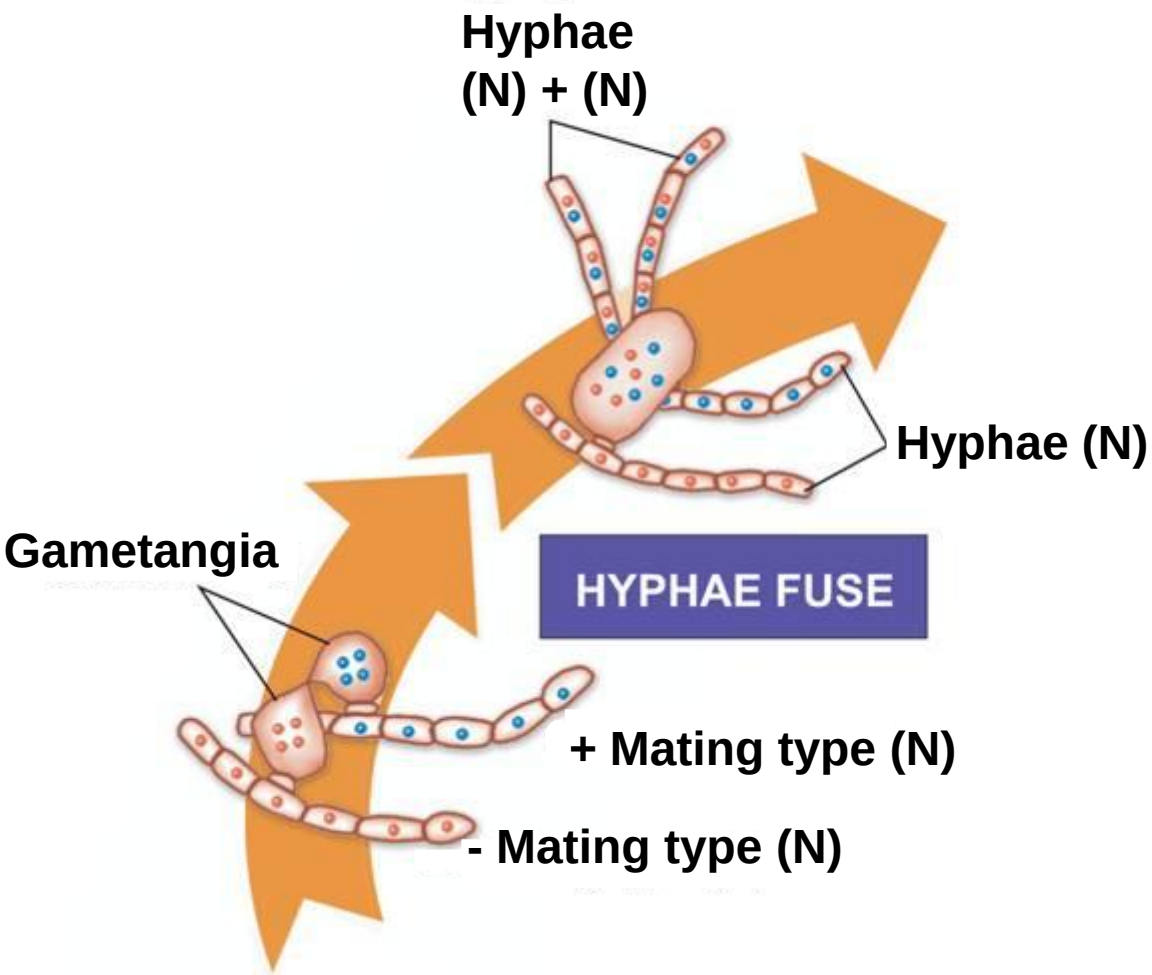
In asexual reproduction, spores called **conidia** form at tips of conidiophores.

Conidiophores are specialized hyphae.



Asexual Reproduction

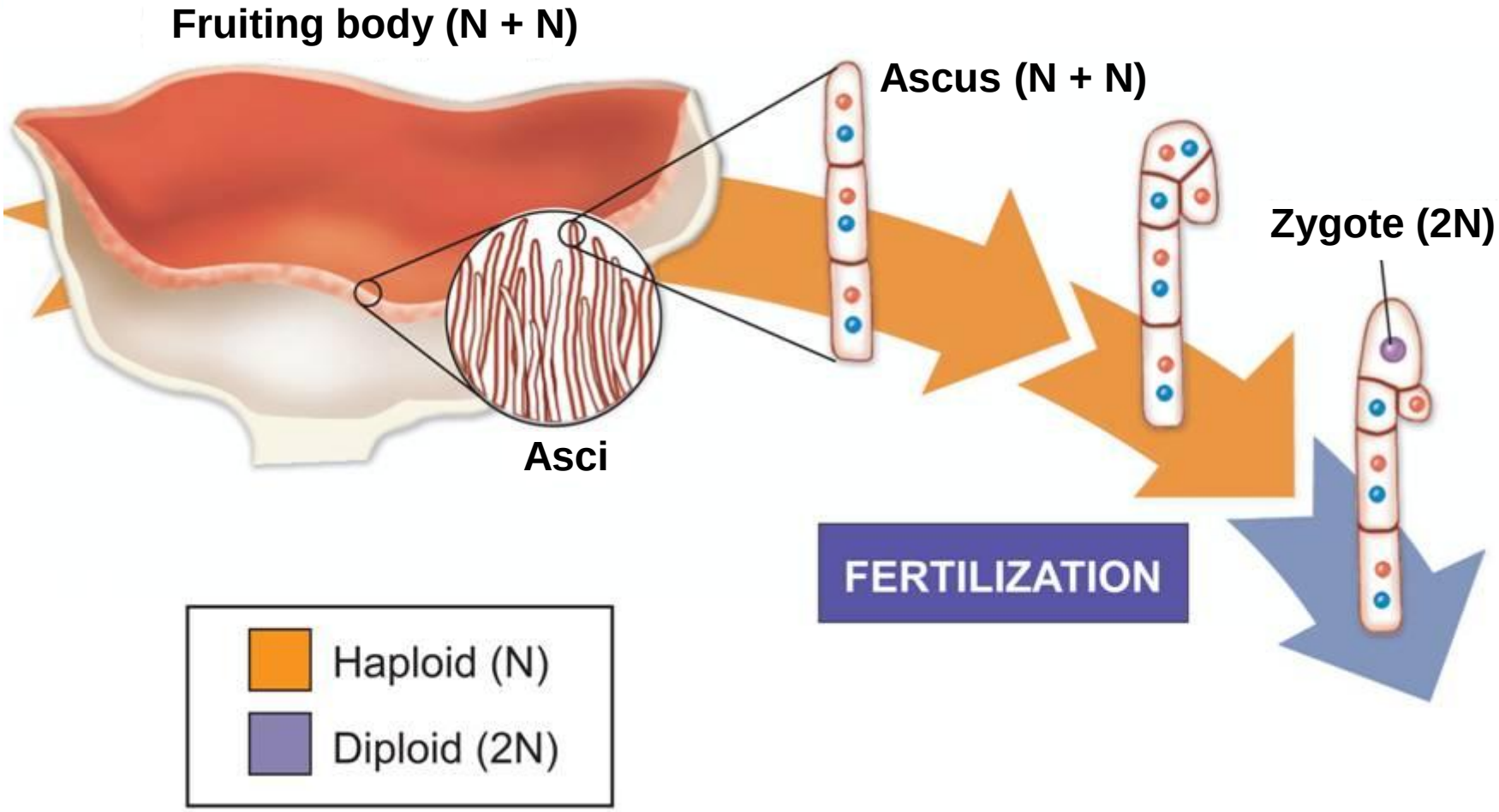
During sexual reproduction, haploid hyphae of two different mating types (+ and -) grow close together.



The N + N hyphae then produce a fruiting body in which sexual reproduction continues.

The ascus forms within the fruiting body.

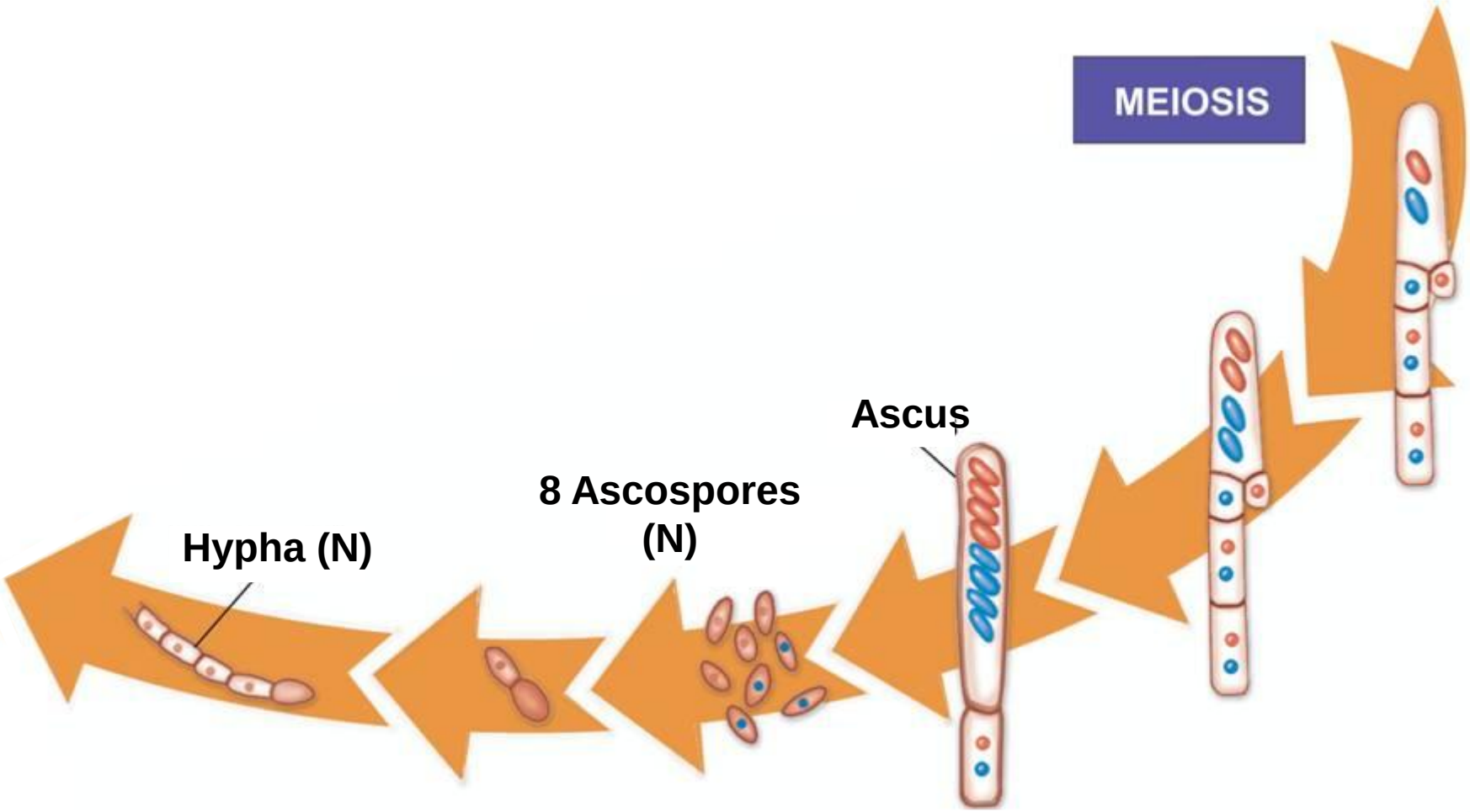
Within the ascus, two nuclei of different mating types fuse to form a diploid zygote (2N).



The zygote divides by meiosis, producing four haploid cells.

In most ascomycetes, meiosis is followed by mitosis, so that eight cells called **ascospores** are produced.

An ascospore can germinate and grow into a haploid mycelium.



Yeasts

Yeasts are unicellular fungi.

Yeasts reproduce asexually by budding.

Dry granules of yeast contain ascospores, which become active in a moist environment.

The Club Fungi

What are the characteristics of the club fungi?

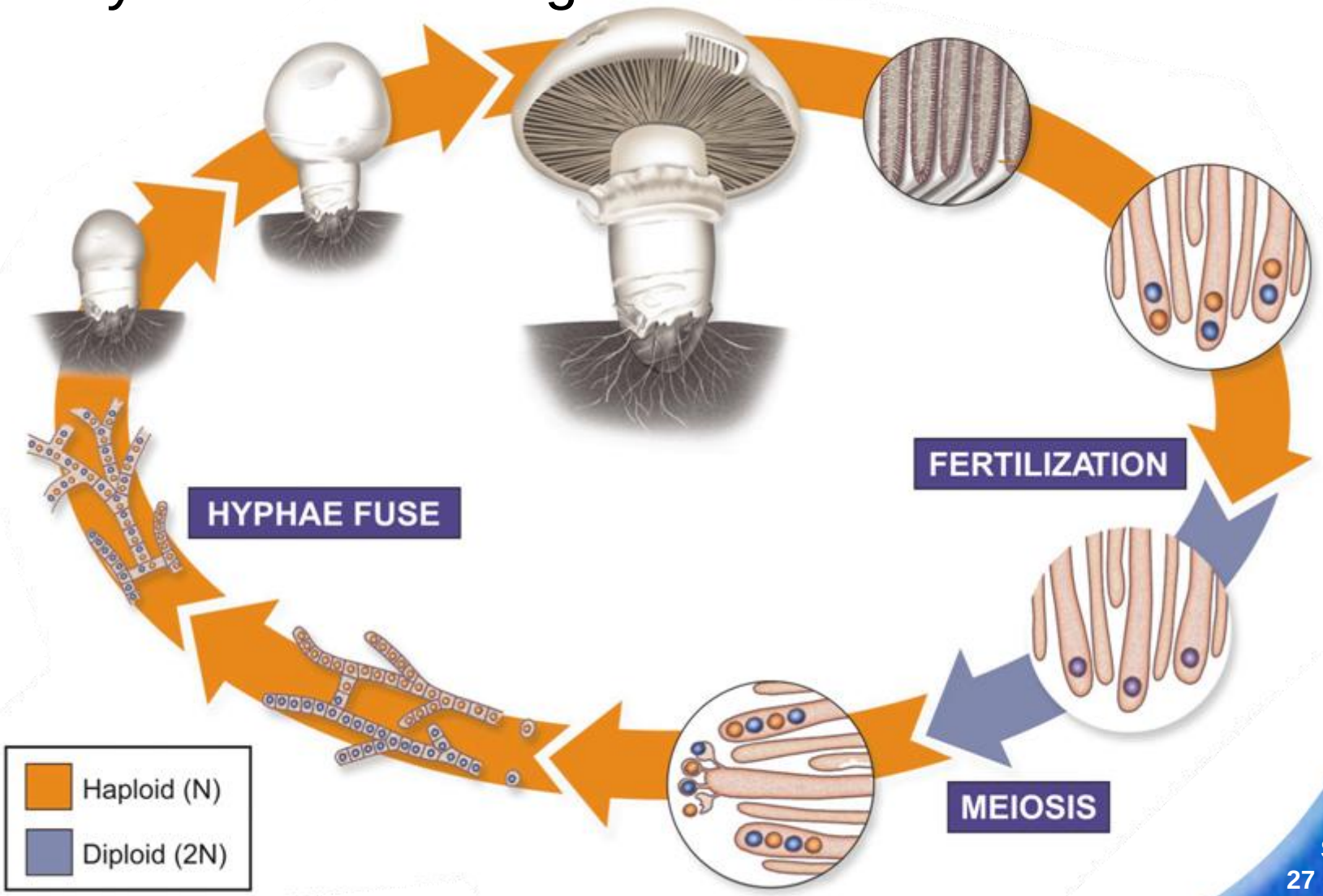
The phylum Basidiomycota, or club fungi, gets its name from a specialized reproductive structure that resembles a club.

The spore-bearing structure is called the **basidium**.

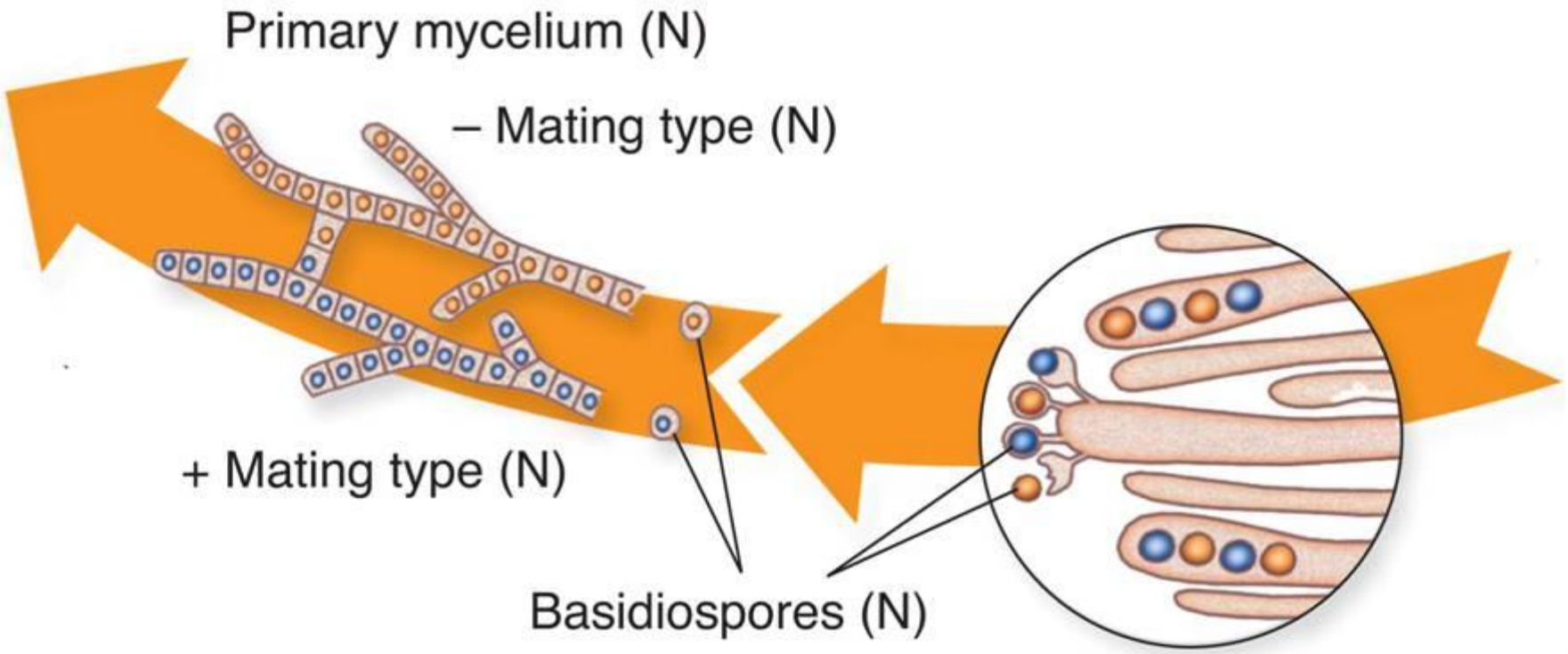
Life Cycle of Club Fungi

Basidiomycetes undergo an elaborate life cycle.

Life Cycle of Club Fungi

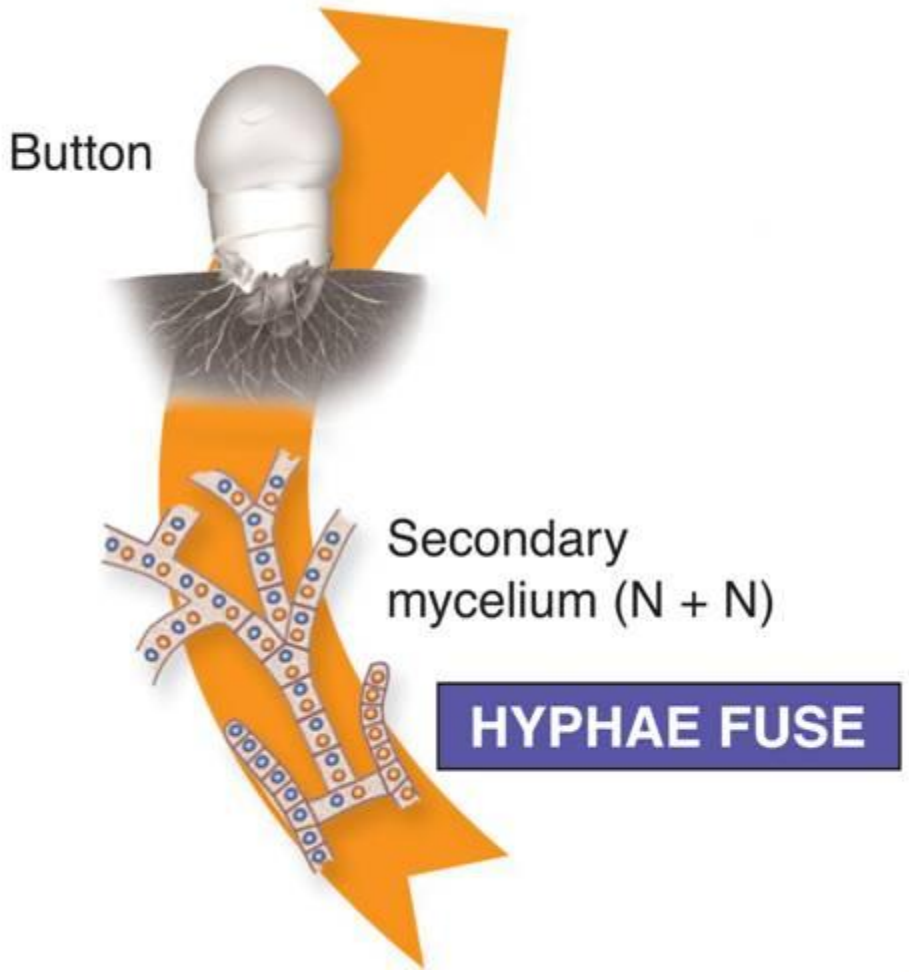


A basidiospore germinates to produce a haploid primary mycelium.

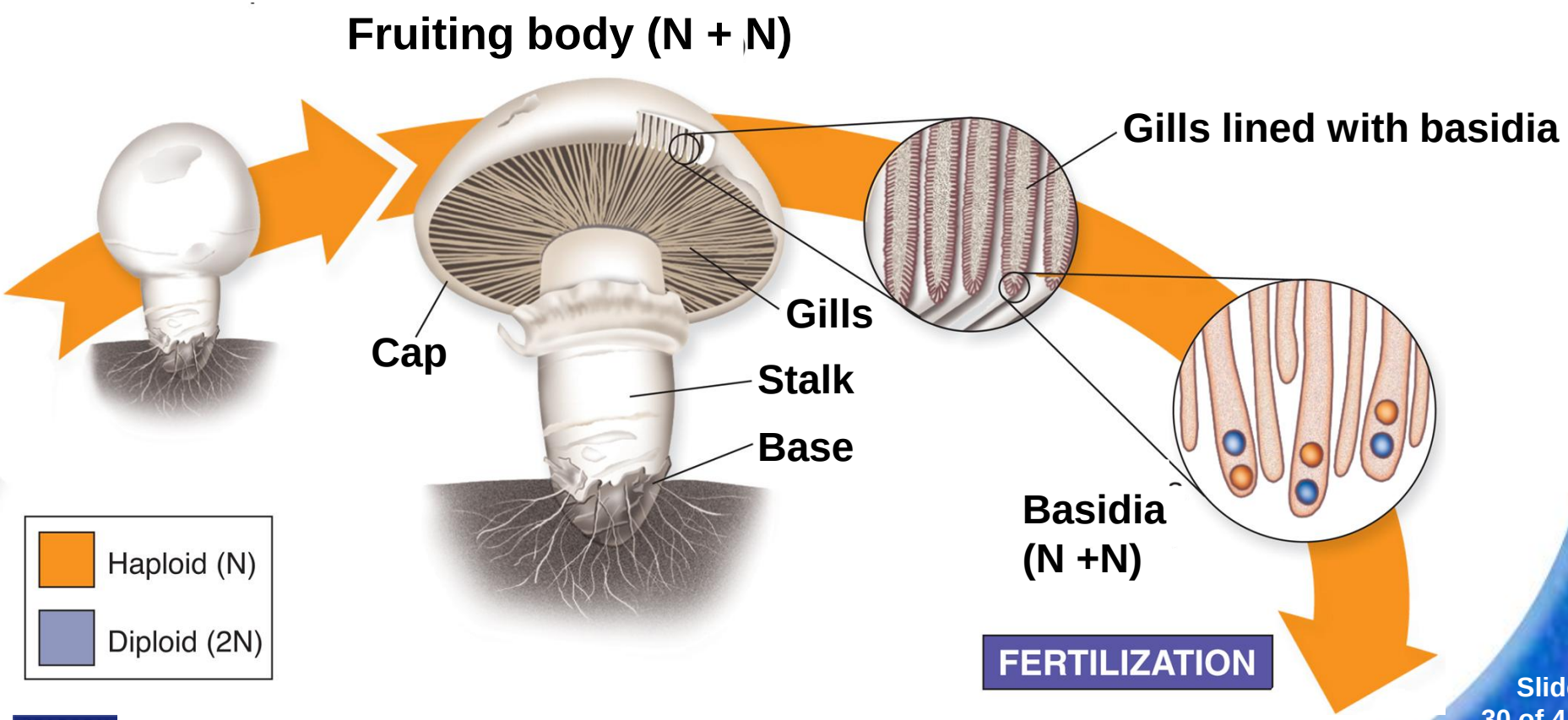


The mycelia of different mating types fuse to produce a secondary mycelium.

The cells of the secondary mycelium contain haploid nuclei of each mating type.

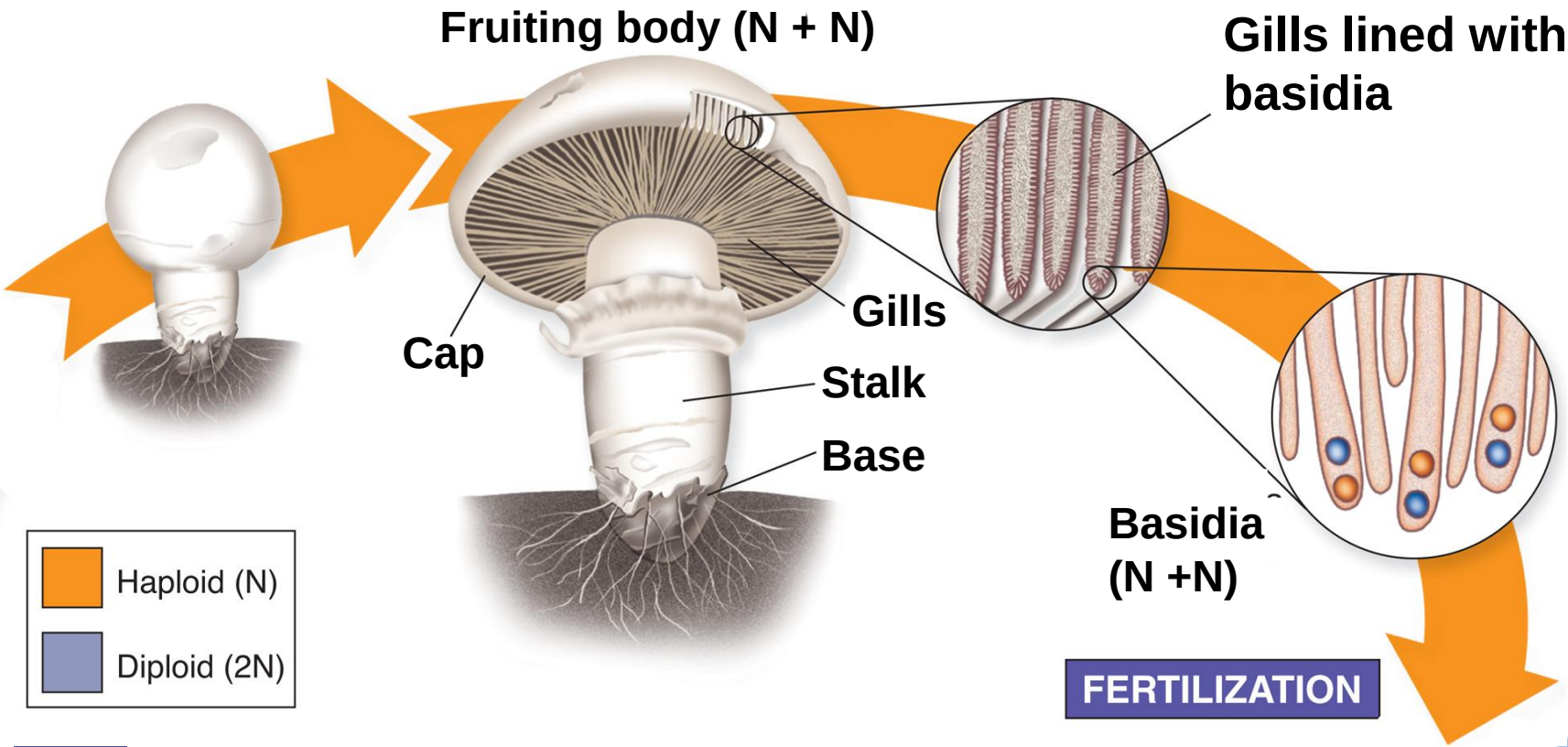


When the right combination of moisture and nutrients occurs, spore-producing fruiting bodies push above the ground.

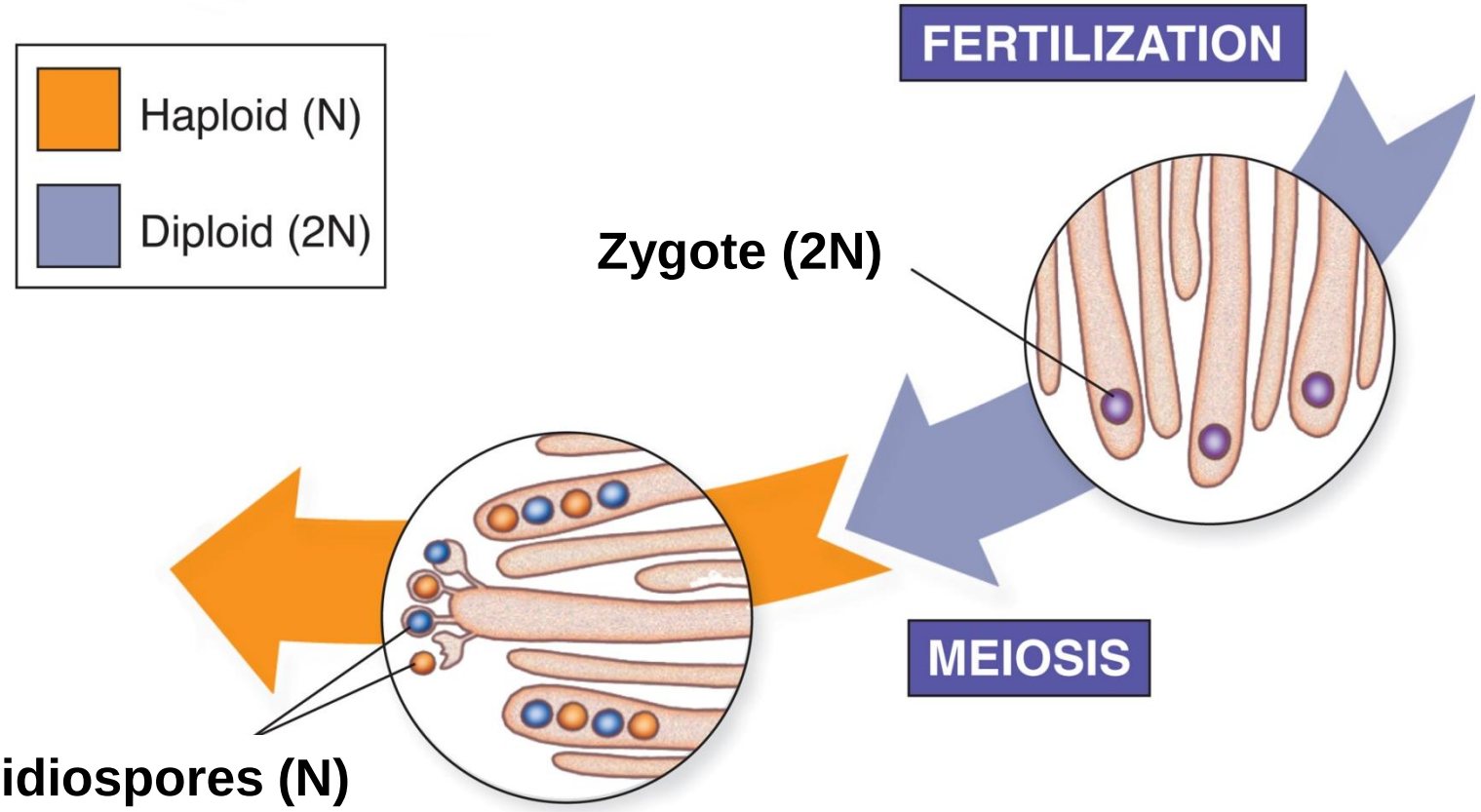


When the mushroom cap opens, it exposes hundreds of tiny gills on its underside.

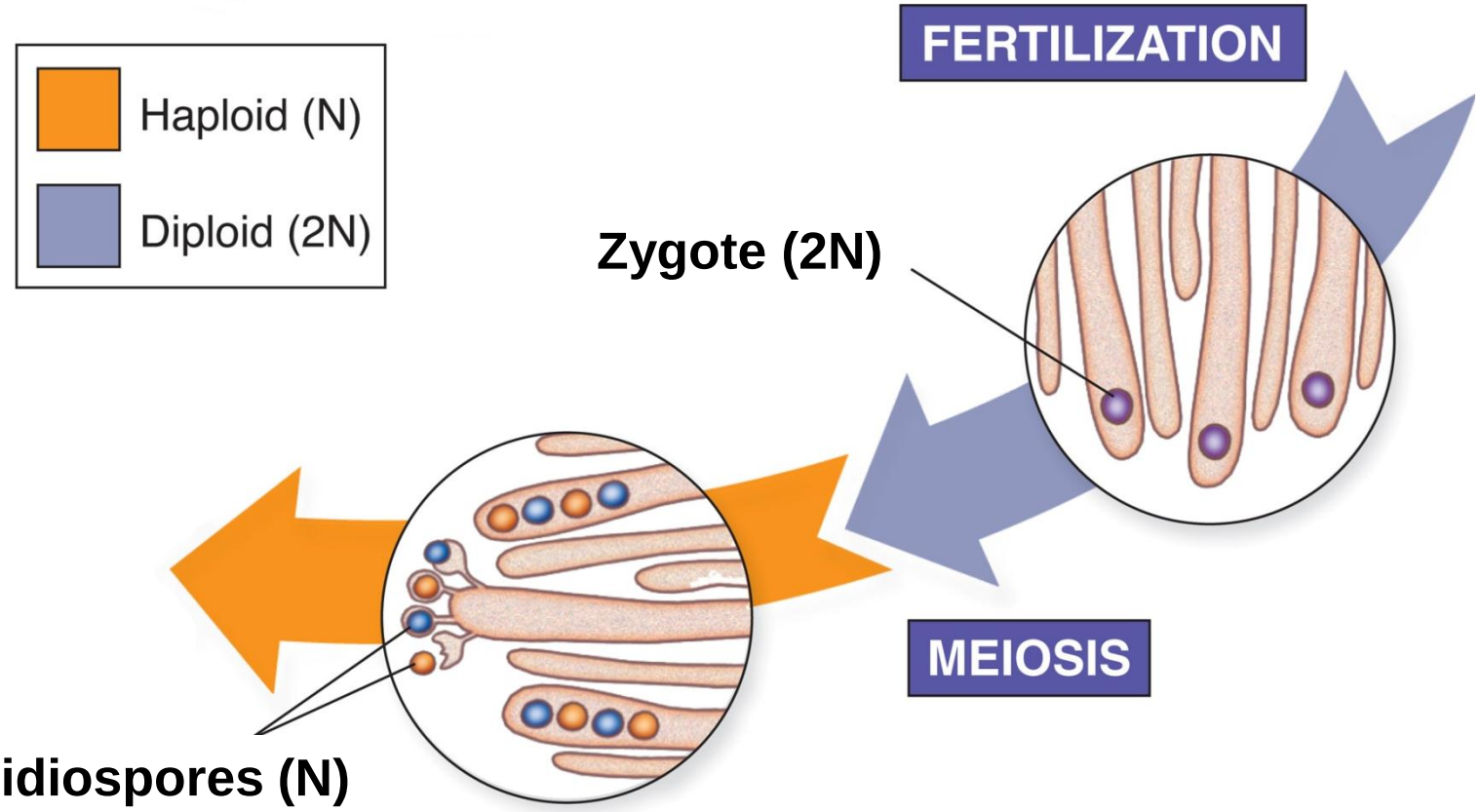
Each gill is lined with basidia.



Nuclei in each basidium fuse, forming a diploid zygote, which undergoes meiosis, forming clusters of haploid **basidiospores**.



Basidiospores form at the edge of each basidium and are ready to be scattered.



Diversity of Club Fungi

Basidiomycetes include shelf fungi, puffballs, earthstars, jelly fungi, and rusts.

The Imperfect Fungi

What are the characteristics of the imperfect fungi?

Imperfect fungi, or Deuteromycota, are fungi that cannot be placed in other phyla because researchers have never been able to observe a sexual phase in their life cycles.

A well-known genera of the imperfect fungi is *Penicillium*.

Penicillium notatum is a mold that is the source of the antibiotic penicillin.

21-2 Section QUIZ

Continue to:

Section QUIZ

- or -

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1 Fungi grow best in an environment that is

a. cool.

A b. moist.

c. dry.

d. salty.

2 Yeasts are

A a. ascomycetes.

b. zygomycetes.

c. basidiomycetes.

d. deuteromycetes.

3 *Penicillium* is a(an)

a. ascomycete.

b. basidiomycete.

A c. deuteromycete.

d. zygomycete.

4 Sac fungi have a characteristic reproductive structure called a(an)

A a. ascus.

b. basidium.

c. budding capsule.

d. sporophyte.

5 The basidiospores of club fungi are produced on thin structures called

a. fruiting bodies.

b. buttons.

A c. gills.

d. stalks.

END OF SECTION