

Physarum polycephalum (plasmodial slime mold)

Species: *polycephalum*
Genus: *Physarum*
Family: Physaraceae
Order: Physarales
Class: Myxomycetes
Phylum: Mycetozoa
Kingdom: Amoebozoa



Conditions for Customer Ownership

We hold permits allowing us to transport these organisms. To access permit conditions, [click here](#).

Never purchase living specimens without having a disposition strategy in place.

There are currently no USDA permits required for this organism. In order to protect our environment, never release a live laboratory organism into the wild.

Primary Hazard Considerations

Always wash your hands thoroughly before and after you handle your cultures, or anything it has touched. It is recommended to use gloves when working with mold, fungus, or bacteria.

Availability

Physarum is available year round.

Care

Habitat

- Plasmodial stage are shipped in a Petri dish on *Physarum* agar with oats. Your *Physarum* should be bright yellow in color, and fan shaped. If your *Physarum* takes on a different appearance it may be contaminated. Contaminated cultures occur when a foreign specimen (something other than *Physarum*) makes its way onto your culture. This culture should be stored at room temperature in a dark place. The culture should be viable for about 1–2 weeks in its current container.
- Sclerotia are hardened masses of irregular form consisting of many minute cell-like components. These are shipped on cut strips of filter paper in a tube. The culture should be stored at room temperature and can be stored in this stage for several months.

Care:

- *Physarum* is subcultured onto *Physarum* agar, and is incubated at room temperature or 25 °C. To maintain viability, plasmodial *Physarum* should be subcultured weekly.

***Physarum* agar:**

- To subculture plasmodial *Physarum* use a scalpel or sterile swab to remove a dime sized piece of the plasmodia and place it in the center of the *Physarum* agar plate. Incubate at 25 °C and within 5–8 hours actively growing plasmodia should be present spreading across the plate.

To subculture sclerotial stage *Physarum*, place a piece of the dried sclerotium (sclerotial side up) on a piece of moistened filter paper inside a Petri dish (no agar needed) after 24 hours or so growing plasmodia should be present.

Information

- Method of reproduction: Primarily asexual, but sexual under some conditions.

Life Cycle

The multiple nuclei in the macroplasmodium are diploid and all divide together (at the same time) without cytokinesis. This results in a multi-nucleate syncytium. Under adverse conditions, where temperature and moisture are not suitable for continued growth, the plasmodium is converted into a resting structure termed a sclerotium. Sclerotia are hardened masses of irregular form consisting of many minute cell-like components. Under favorable conditions, the sclerotium is reactivated (converted) to actively growing plasmodial stage. Under conditions of starvation in sunlight, fruiting bodies can form that will release haploid spores. When the spores germinate under moist conditions, they will germinate as either amoeboid cells or as flagellates if they germinate in a liquid environment. Two haploid amoeboid cells and their nuclei can fuse to begin growth into the multinucleated (with diploid nuclei) plasmodium.

Wild Habitat

Hundreds of species of slime molds are known and most of these are universally distributed throughout the world. Plasmodial slime mold will be found under cool, humid, and dark conditions on forest floors. They are found in nature on moist dung, wood, soil, and other vegetation. They feed on bacteria, protozoa, fungal spores, and other decaying organic material. The plasmodium of *Physarum polycephalum* is a bright yellow glistening multinucleate mass that can move in an amoeboid fashion. It ingests solid food particles in the same manner as an amoeba and can also absorb dissolved nutrients. It crawls towards its food, surrounds it, and secretes enzymes to digest the food. As the food is digested, *Physarum* deposits waste particles and moves away from them.

Special Notes

Physarum is an acellular slime mold, meaning it is syncytial; nuclei are separate but there are no cell walls or membranes. The multinucleated organism moves and behaves like a giant amoeba. Migrating plasmodia of *Physarum* are typically fan-shaped and are composed of a network of vein-like strands or tubules. Toward the base of the fan these tubules are large with very few branches, but they become smaller and more frequently branched toward their tips. At the advancing margin, no vein-like organization is seen; instead, a continuous layer of protoplasm is present. Each tubular strand of the plasmodium consists of a hyaline (glassy, transparent, or translucent) semisolid outer layer of protoplasm and a fluid inner portion. Within the tubules, the more fluid portion of the protoplasm undergoes rapid rhythmic streaming: it flows in one direction for a few seconds, slows to a stop, then reverses and flows in the opposite direction. The streaming portion is usually granular in appearance due to the presence of pigment granules, bacteria cells and other matter ingested by the plasmodium. If conditions remain favorable, the plasmodium continues to take in food and other material as it enlarges.

All slime molds are characterized by naked assimilative stages. The assimilative body is multinucleated in *Physarum*, which is a true slime mold. In contrast to bacteria, the nuclei of slime molds are enclosed within nuclear membranes and are like the nuclei in higher plants and animals.

Disposition

- When finished with your *Physarum* please dispose of it in one of the following ways:
 - Use a 20% bleach solution for 10 minutes (ensure the culture does not open until the culture is submerged in solution in order to ensure no releasing of any of the organisms into the environment).
 - Place the organism in 70% isopropyl alcohol for 24 hours (ensure the culture does not open until the culture is submerged in solution in order to ensure no releasing of any of the organisms into the environment).
 - Autoclave the organism @ 121°C for 15 minutes in an autoclavable bag. The Petri dish it is contained in will melt in an autoclave, so be sure to bag your organism.