

MOTILE CELL

Characters and Character States

Location code / cell type

ZO, zoospore

Flagellar apparatus

Flagellum

1. Number of flagella

0, none (Chytridiomycota, Chytridiomycetes: incertae sedis- *Hyaloraphidium curvatum*);
1, one (Chytridiomycota, Blastocladiomycota);
2, multiple (Neocallimastigomycota).

2. Electron-opaque plug in axoneme core and between axoneme and flagellar membrane

0, absent;
1, present (Chytridiomycota: Chytridiomycetes: Chytridiales, Lobulomycetales, Cladochytriales, incertae sedis: *Synchytrium endobioticum*, *Polychytrium* clade; Monoblepharidomycetes).

3. Flagellum coating

0, absent (all taxa except *Polyphagus euglenae*);
1, present (*Polyphagus euglenae*).

Kinetosome

4. Electron-opaque core in kinetosome

0, absent (all taxa except *Kappamyces*)
1, present (Chytridiomycota: Chytridiomycetes: Rhizophydiales- *Kappamyces*).

5. Scalloped ring within kinetosome, extensions of the A, B, or C microtubule

0, absent;
1, present (*Lacustromyces hiemalis*).

Kinetosome-associated structures

6. Kinetosome support

0, absent (*Thallassochytrium gracilariopsidis*);
1, kinetosome props;
2, broken kinetosome props (incertae sedis: *Olpidium radicale*);
3, skirt-like structure surrounding kinetosome (Neocallimastigomycota).

7. Kinetosome-associated plates

0, absent;
1, present (Chytridiomycota: Chytridiomycetes: Chytridiales- Group I type zoospore [Barr 1980]).

8. Kinetosome-associated saddle

0, absent;

1, present (Chytridiomycota: Chytridiomycetes: Chytridiales- Group II type zoospore [Barr 1980]- *Chytridium olla*, *C. lagenaria*, *Phlyctochytrium planicorne*, *Polyphlyctis unispina*).

9. Kinetosome-associated shield

0, absent;

1, present (Chytridiomycota: Chytridiomycetes: Rhizophydiales: *Rhizophlyctis harderi*, *Coralloidiomyces digitatus*).

10. Kinetosome-associated spur

0, absent;

1, present (Chytridiomycota: Chytridiomycetes: Rhizophydiales- *Rhizophyidium*, *Boothiomyces*, *Terramyces*; Spizellomycetales- *Spizellomyces*, *Kochiomyces*, *Triparticalcar*).

11. Kinetosome-associated straited disc

0, absent;

1, present (Chytridiomycota: Monoblepharidomycetes).

12. Primary microtubule root

0, absent;

1, 2-5 laterally-oriented, parallel, stacked microtubules arising from side of kinetosome (Chytridiomycota: Chytridiomycetes: Rhizophydiales: *Alphamyces*, *Aquamyces*, *Globomyces*, *Urceomyces*, *Gorgonomyces*, *Pateramyces*, *Protrudomyces*, *Rhizophyidium*, *Terramyces*, *Coralloidiomyces*);

2, approx. 6-7 laterally-oriented, parallel, bundled microtubules arising from side of kinetosome (Chytridiomycota: Chytridiomycetes: Chytridiales);

3, more than 20 laterally-oriented, parallel, bundled microtubules with linkers between them, arising from side of kinetosome (Chytridiomycota: Chytridiomycetes: Cladochytriales);

4, multiple microtubules extending anteriorly from kinetosome, parallel to kinetosome triplets (Chytridiomycota: Chytridiomycetes: Rhizophydiales- *Batrachochytrium*);

5, microtubules in cone arising from a spur at the anterior end of kinetosome (Chytridiomycota: Chytridiomycetes: Spizellomycetales- *Spizellomyces*);

6, microtubules extending anteriorly without regular arrangement from spur on kinetosome (Chytridiomycota: Chytridiomycetes: Spizellomycetales- *Kochiomyces*);

7, microtubules in cone arising from a double bar at the anterior end of kinetosome (Chytridiomycota: Chytridiomycetes: Spizellomycetales- *Gaertneriomyces*);

8, microtubules in cone arising from two concave discs at the anterior end of kinetosome (Chytridiomycota: Chytridiomycetes: Spizellomycetales- *Powellomyces*);

9, microtubules extending parallel and anteriorly from the kinetosome and adjacent to an elongated tripartite spur (Chytridiomycota: Chytridiomycetes: Spizellomycetales- *Triparticalcar*);

a, root of two parts: a striated disk extending part way around kinetosome, and microtubules extending anteriorly from kinetosome; (Chytridiomycota: Monoblepharidomycetes);

b, up to 27 microtubules in groups of 3 extending anteriorly from kinetosome (Blastocladiomycota).

c, multiple microtubules emanating from spurs on multiple kinetosomes

(Neocallimastigomycota)

13. Primary microtubule root absolute configuration

- 0, absent;
- 1, 20 degrees left;
- 2, 10 degrees right;
- 3, 50 degrees left.

14. Striated rhizoplast between kinetosome and nucleus

- 0, absent;
- 1, present (Chytridiomycota: Chytridiomycetes: Rhizophlyctidales- *Rhizophlyctis rosea*, *Sonoraphlyctis ranzonii* ; incertae sedis: *Caulochytrium protostelioides*, *Olpidium brassicae*).

Non-flagellated centriole

15. Non-flagellated centriole

- 0, absent (incertae sedis: *Thalassochytrium gracilariopsidis*);
- 1, parallel to kinetosome (Chytridiomycota: Chytridiomycetes: Chytridiales, Lobulomycetales, Cladochytriales, most Rhizophydiales; Monoblepharidomycetes; incertae sedis: *Polyphagus euglenae*);
- 2, oblique to kinetosome (Chytridiomycota: Chytridiomycetes: most Spizellomycetales; incertae sedis: *Synchytrium macrosporum*; *Caulochytrium protostelioides*);
- 3, at right angle to kinetosome (Chytridiomycota: Spizellomycetales- some *Spizellomyces*; Blastocladiomycota).

16. Length of non-flagellated centriole (NfC) compared to length of kinetosome (K)

- 0, NfC < K (Chytridiomycota: Monoblepharidomycetes; Chytridiomycetes: Rhizophydiales- *Kappamyces*; Chytridiales);
- 1, NfC = K;
- 2, NfC > K (Chytridiomycota: Chytridiomycetes: *Polychytrium* clade- *Lacustromyces hiemalis*).

17. Kinetosome-NfC fibrillar bridge

- 0, absent;
- 1, fibers perpendicular to NfC and K;
- 2, fibers parallel to NfC and K.

18. Non-flagellated centriole-associated veil

- 0, absent;
- 1, present (Chytridiomycota: Chytridiomycetes- Chytridiales).

Other cell features

19. Paracrystalline inclusion

- 0, absent;
- 1, present (Chytridiomycota: Chytridiomycetes- Chytridiales; *Polychytrium* clade).

20. Ribosome organization

- 0, scattered ribosomes (Chytridiomycota: Chytridiomycetes: incertae sedis: *Synchytrium macrosporum*, *Caulochytrium protostelioides*; Spizellomycetales; Rhizophlyctidales;

Rhizophlyctis rosea, *Sonoraphlyctis ranzonii*);

- 1, core area of compacted ribosomes partially or completely enclosed by endoplasmic reticulum (Chytridiomycota: Chytridiomycetes: Chytridiales, Rhizophydiales, Cladochytriales, Lobulomycetales; incertae sedis: *Polyphagus euglenae*; Monoblepharidomycetes);
- 2, aggregated as a nuclear cap (Blastocladiomycota);
- 3, loosely enclosed by endoplasmic reticulum and surrounding nucleus (Chytridiomycota: Chytridiomycetes: Rhizophlyctidales: *Arizonaphlyctis*, *Borealophlyctis*).

21. Mitochondrion

- 0, absent (hydrogenosomes: Neocallimastigomycota);
- 1, single;
- 2, multiple.

22. Cisterna

- 0, absent (Chytridiomycota: Chytridiomycetes: Rhizophydiales- *Batrachochytrium dendrobatidis*);
- 1, simple;
- 2, fenestrated (Chytridiomycota: Chytridiomycetes: Chytridiales; Rhizophydiales: *Alphamyces*, *Aquamyces*, *Globomyces*, *Urceomyces*, *Gorgonomyces*, *Pateramyces*, *Protrudomyces*, *Rhizophyidium*, *Terramyces*, *Coralloidiomyces*; Cladochytriales; *Synchytrium macrosporum*; incertae sedis: *Polyphagus euglenae*; Monoblepharidomycetes [“rumposome”]).
- 3, annular (Chytridiomycota: Monoblepharidomycetes).

23. Paraxonemal structure

- 0, absent;
- 1, present (Chytridiomycota: Monoblepharidomycetes- *Gonapodya polymorpha*).

24. Water expulsion vacuole

- 0, absent; (Chytridiomycota: Chytridiomycetes- Chytridiales);
- 1, present (Chytridiomycota: Chytridiomycetes- Spizellomycetales; Monoblepharidomycetes; *Caulochytrium protostelioides*).

25. Golgi apparatus morphology

- 0, stacked cisternae (Chytridiomycota; Blastocladiomycota- *Physoderma*);
- 1, absence of stacked cisternae (all Blastocladiomycota except *Physoderma*).

26. Golgi apparatus location

- 0, absent;
- 1, associated with flagellar rootlet (Chytridiomycota: Chytridiomycetes- Chytridiales);
- 3, not associated with flagellar rootlet.

27. Relationship of microbodies to lipid(s) or nucleus

- 0, microbody associated with a single lipid (Chytridiomycota: Chytridiomycetes- Chytridiales, Cladochytriales, Lobulomycetales, Rhizophydiales);
- 1, microbody associated with multiple lipids (Chytridiomycota: Chytridiomycetes- Spizellomycetales, Rhizophlyctidales, Rhizophydiales: *Batrachochytrium*; incertae sedis: *Caulochytrium protostelioides*);
- 2, microbody associated with nucleus (Chytridiomycota: Chytridiomycetes: Rhizophlyctidales:

Rhizophlyctis rosea, *Sonoraphlyctis ranzonii*)

28. Location of cisterna to lipid(s)

0, Adjacent to lipids (Chytridiomycota: Chytridiomycetes: Chytridiales);
1, Backs microbody (Blastocladiomycota);
2, Fenestrated cisternae (rumposome) backed by microbody (Chytridiomycota: Monoblepharidomycetes);
3, absent (Chytridiomycota: Chytridiomycetes: Rhizophydiales: *Batrachochytrium*; *Polychytrium* clade: *Lacustromyces hiemalis*).

29. Location of mitochondria

0, outside ribosomal core;
1, within ribosomal core;
2, scattered in cytoplasm.

30. Nuclear heel

0, absent;
1, present.

31. Nuclear location

0, distal to kinetosome;
1, proximal to kinetosome;
2, connected to kinetosome.

32. Posterior dome composed of peripheral granules and array of megatubules

0, absent;
1, present (Neocallimastigomycota).

References associated with character state illustrations

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