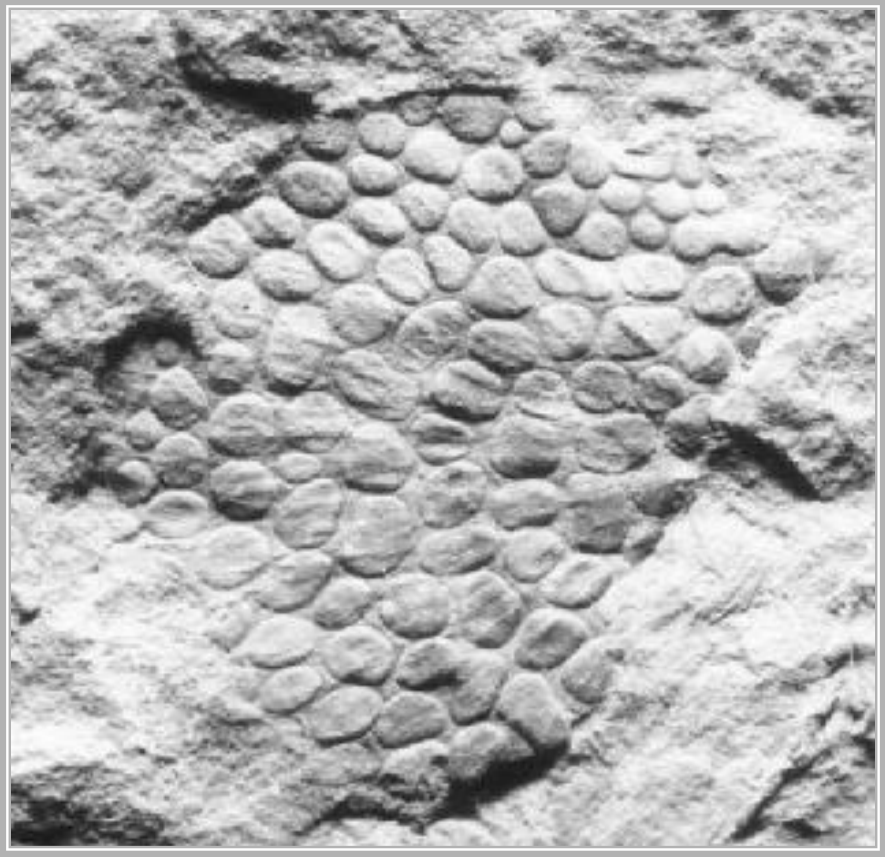


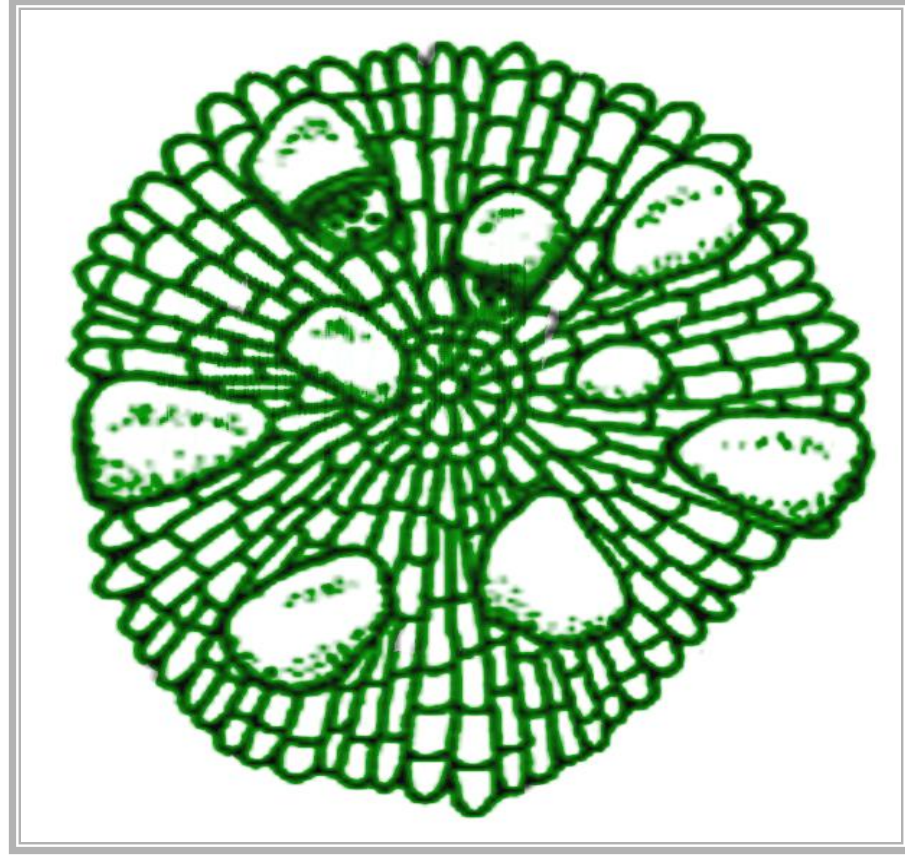


PARKA DECIPIENS
FOSSIL
CHAROPHYTA CEAE
ALGA

FOSSIL CHAROPHYCEAE



PARKA DECIPIENS



PARKA DECIPIENS



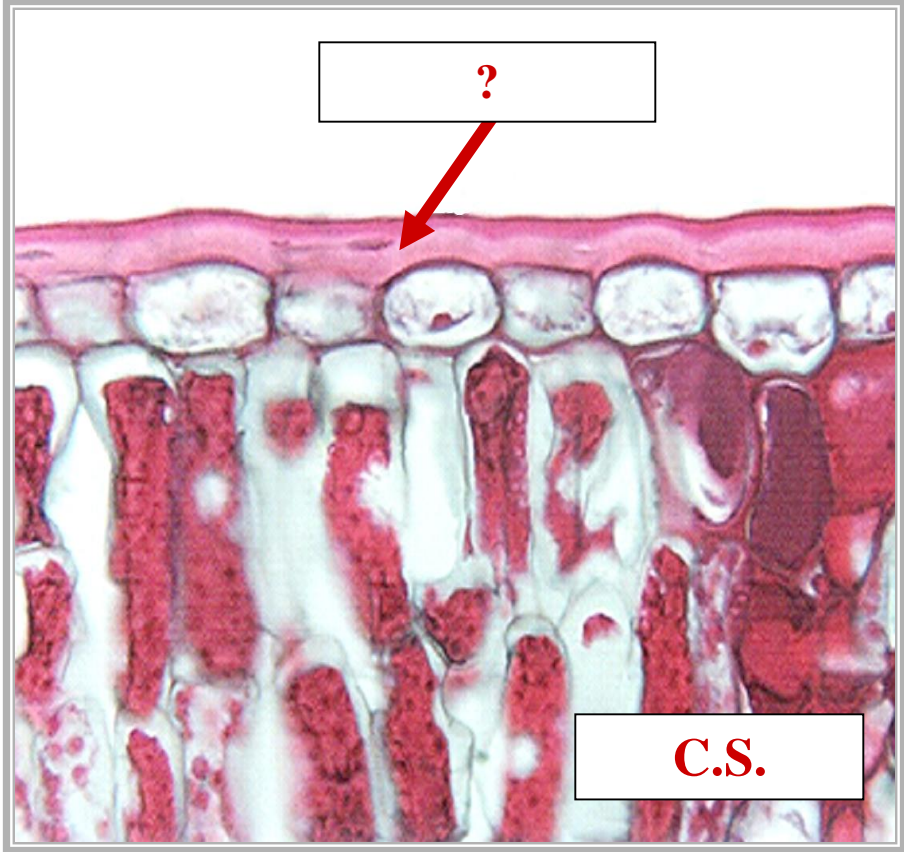
**~400
MILLION YEARS**



SILURIAN

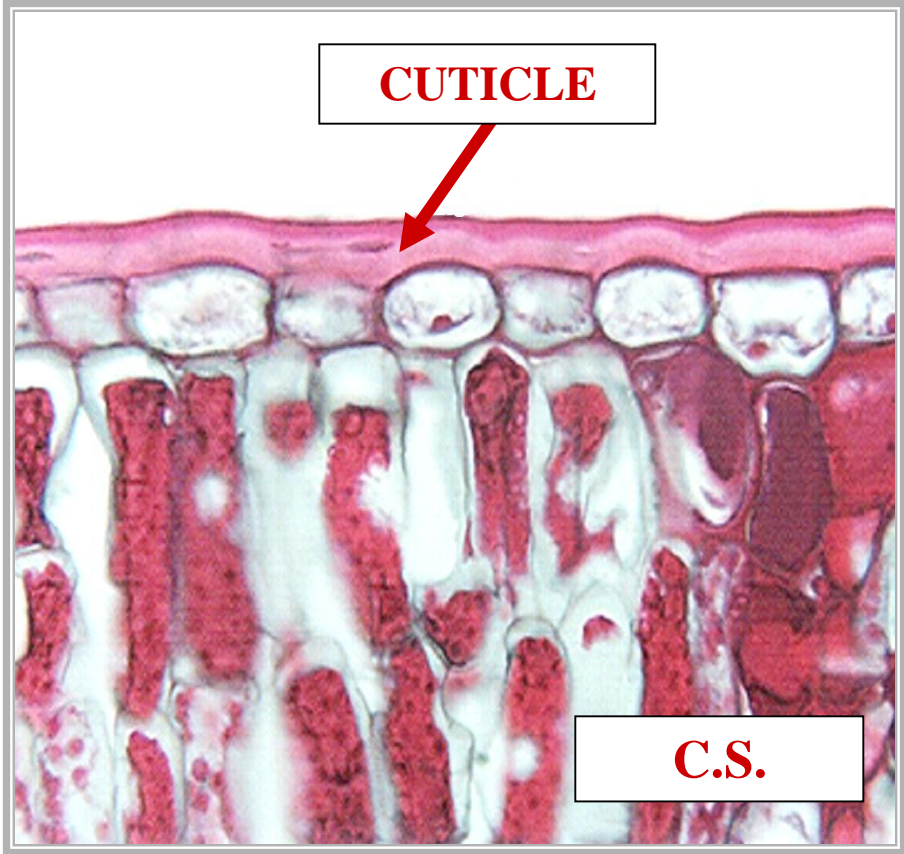


FOSSIL CHAROPHYCEAE



PARKA DECIPIENS

FOSSIL CHAROPHYCEAE



PARKA DECIPIENS

CUTICLE



CUTICLE

OUTER WAXY LAYER

CUTICLE



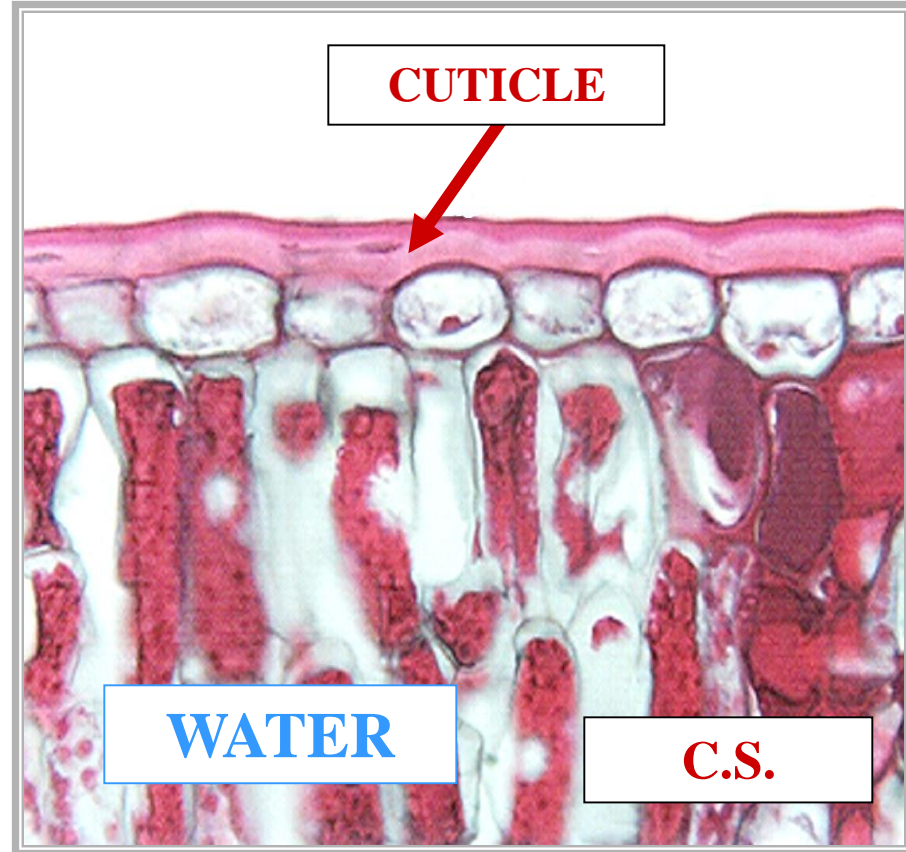
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OUTER WAXY LAYER

INHIBITS WATER LOSS

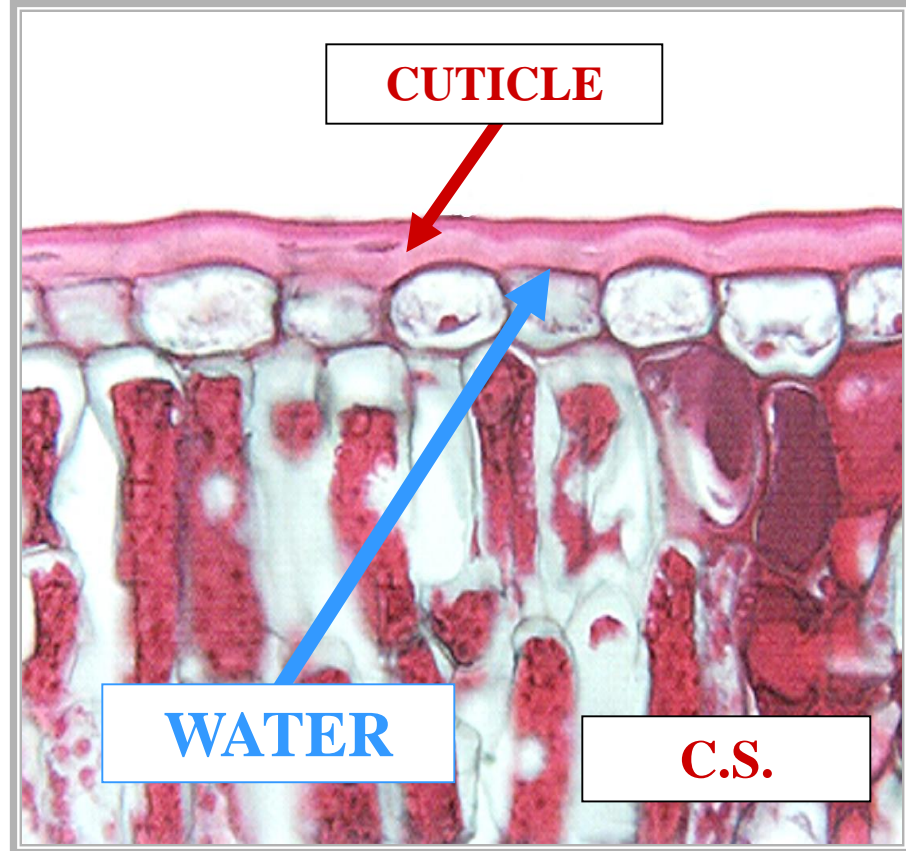
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FOSSIL CHAROPHYCEAE



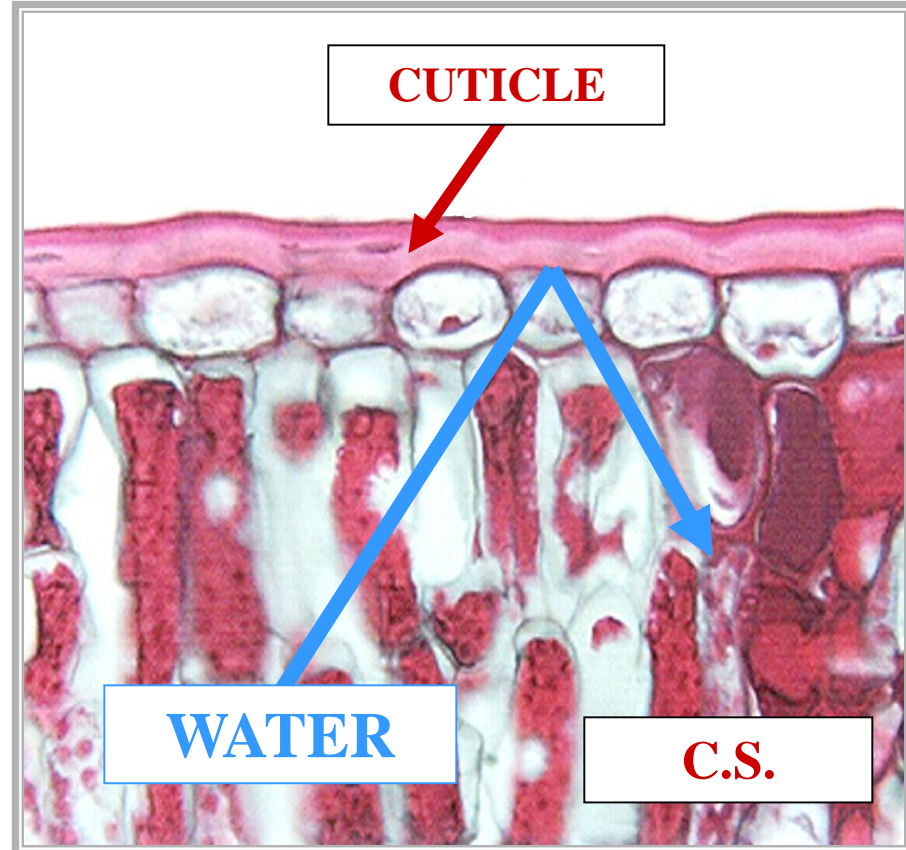
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FOSSIL CHAROPHYCEAE



PARKA DECIPIENS

FOSSIL CHAROPHYCEAE



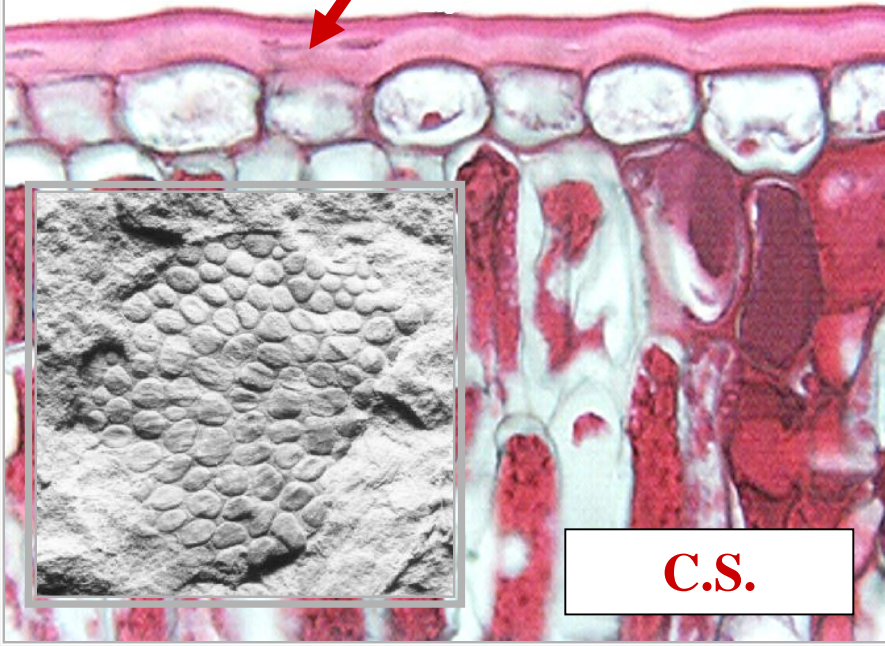
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FOSSIL CHAROPHYCEAE



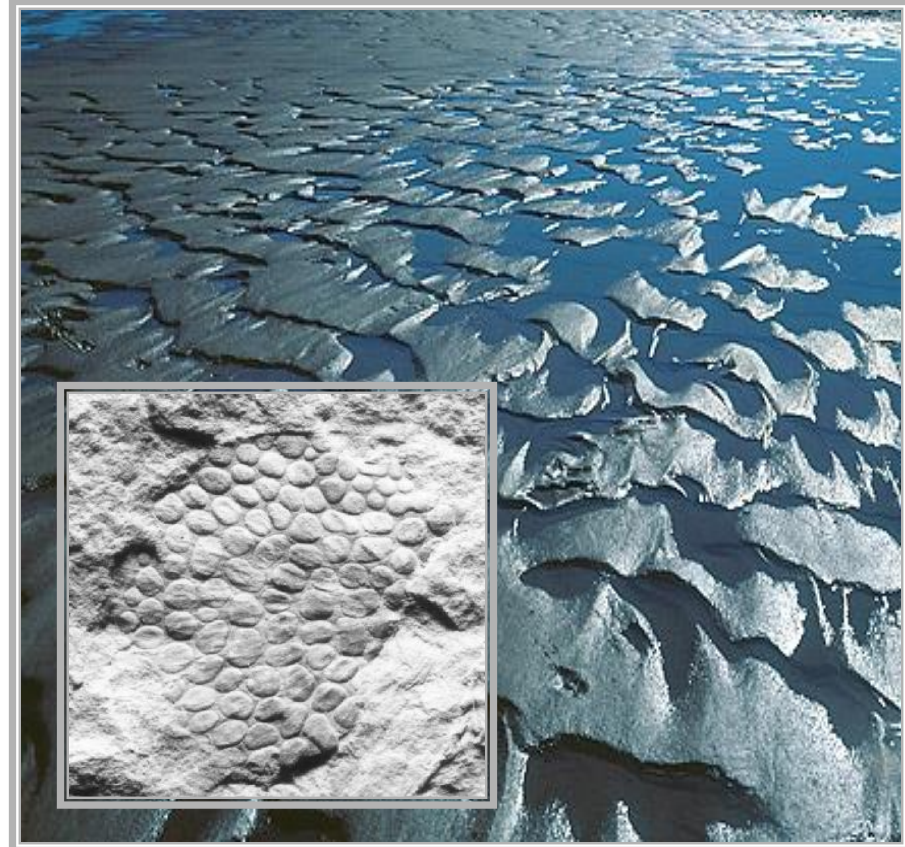
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CUTICLE



C.S.

PARKA DECIPIENS



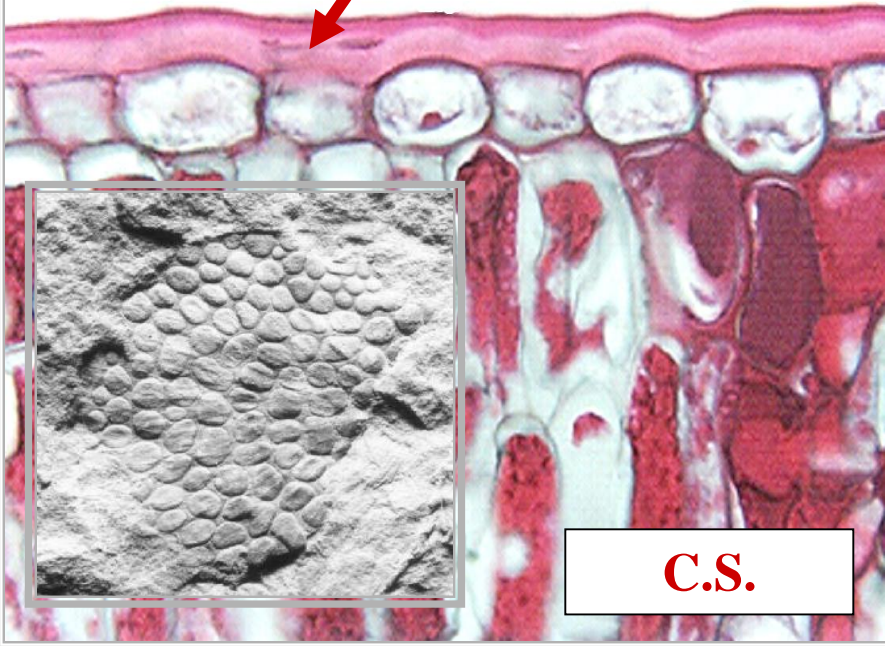
COASTAL MUDDFLAT

FOSSIL CHAROPHYCEAE



?

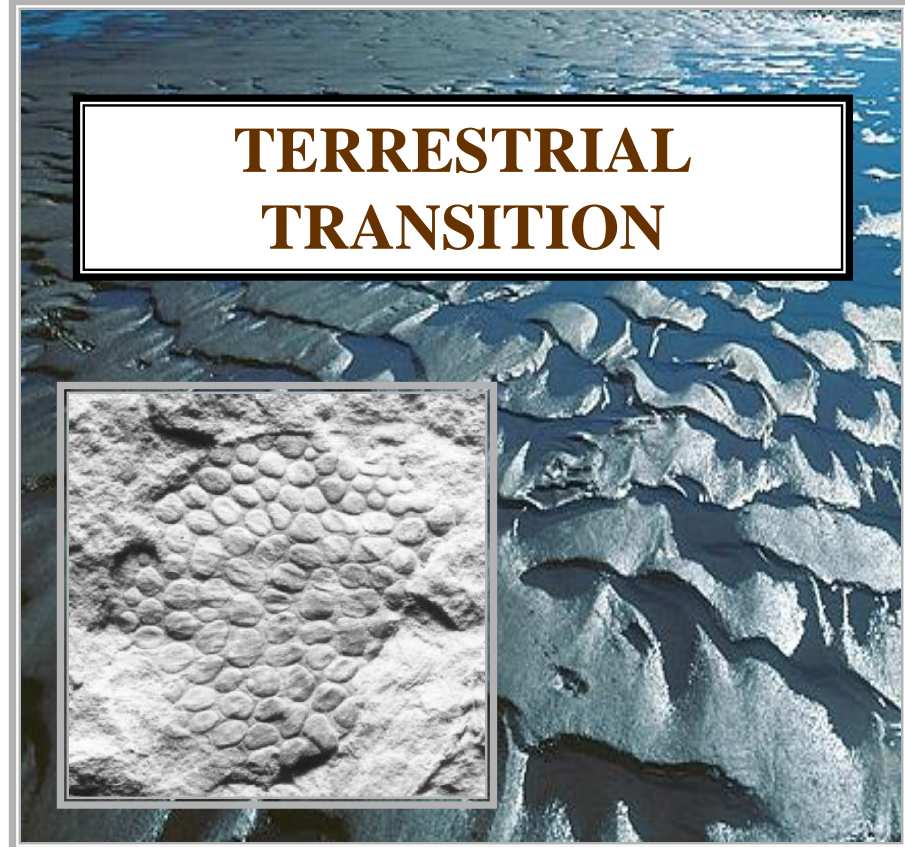
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C.S.

PARKA DECIPIENS

TERRESTRIAL
TRANSITION

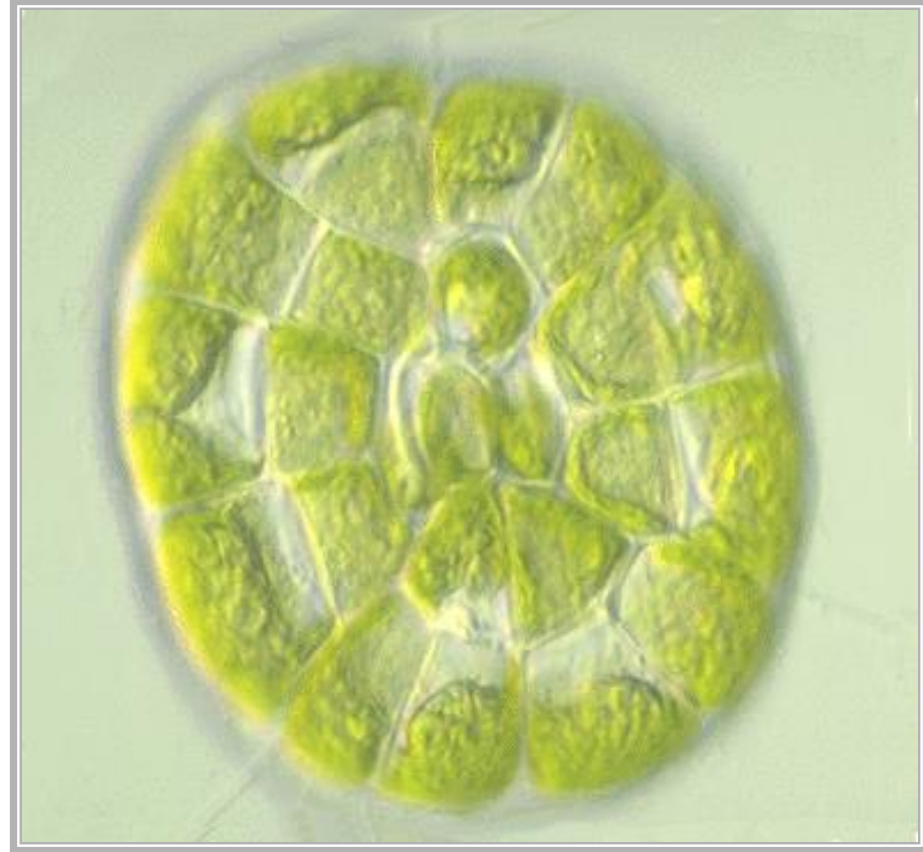


COASTAL MUDDLAT

FOSSIL CHAROPHYCEAE



PARKA DECIPIENS

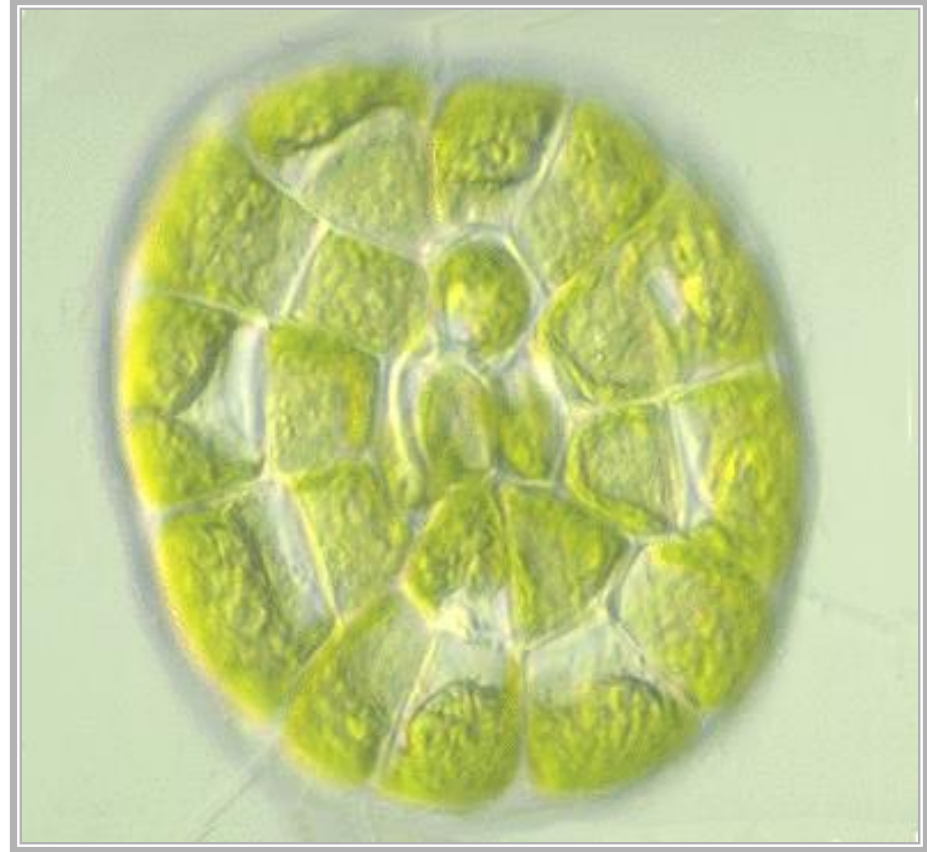


?

FOSSIL CHAROPHYCEAE



PARKA DECIPIENS



COLEOCHEATE

**FOSSIL
EVIDENCE
CHAROPHYCEAE
EMBRYOPHYTE
EVOLUTIONARY
LINK
CONCLUSION**

CONCLUSION

CYANOPHYTA

CONCLUSION

**ENDOSYMBIOTIC
THEORY**

>

CHLOROPHYTA

**PHYCOPLAST ABSENT
PHRAGMOPLAST ABSENT
FLAGELLA APICAL**

**PHYCOPLAST PRESENT
PHRAGMOPLAST ABSENT
FLAGELLA APICAL**

**PHYCOPLAST ABSENT
PHRAGMOPLAST PRESENT
FLAGELLA SUBAPICAL**

ULVOPHYCEAE

CHLOROPHYCEAE

CHAROPHYCEAE



PARKIA

COLEOCHAETE

**CONCLUSION:
Parka-Coleochaete-LIKE ALGA
EVOLVED
EMBRYOPHYTES**

EMBRYOPHYTES



DISTURBING



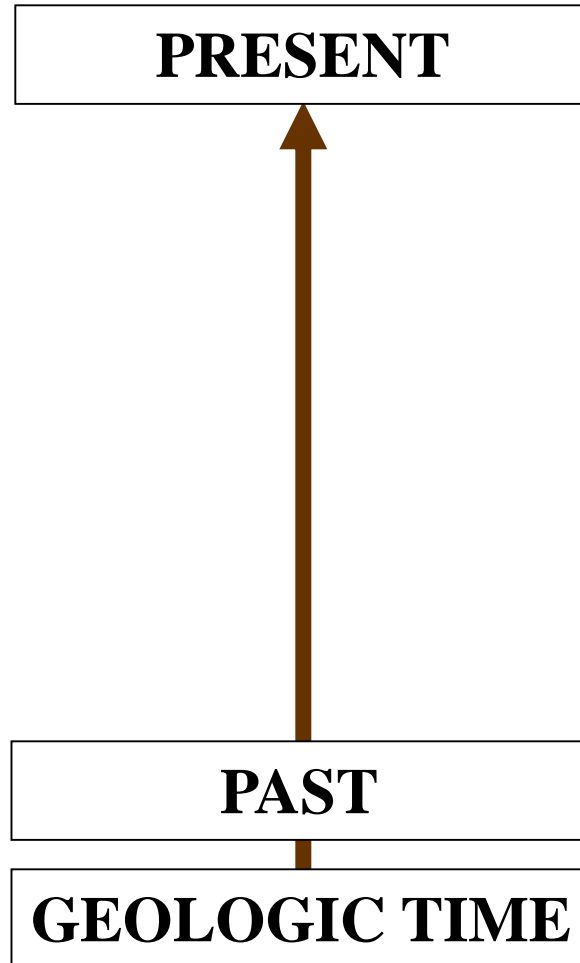
PARKA

CAVEAT



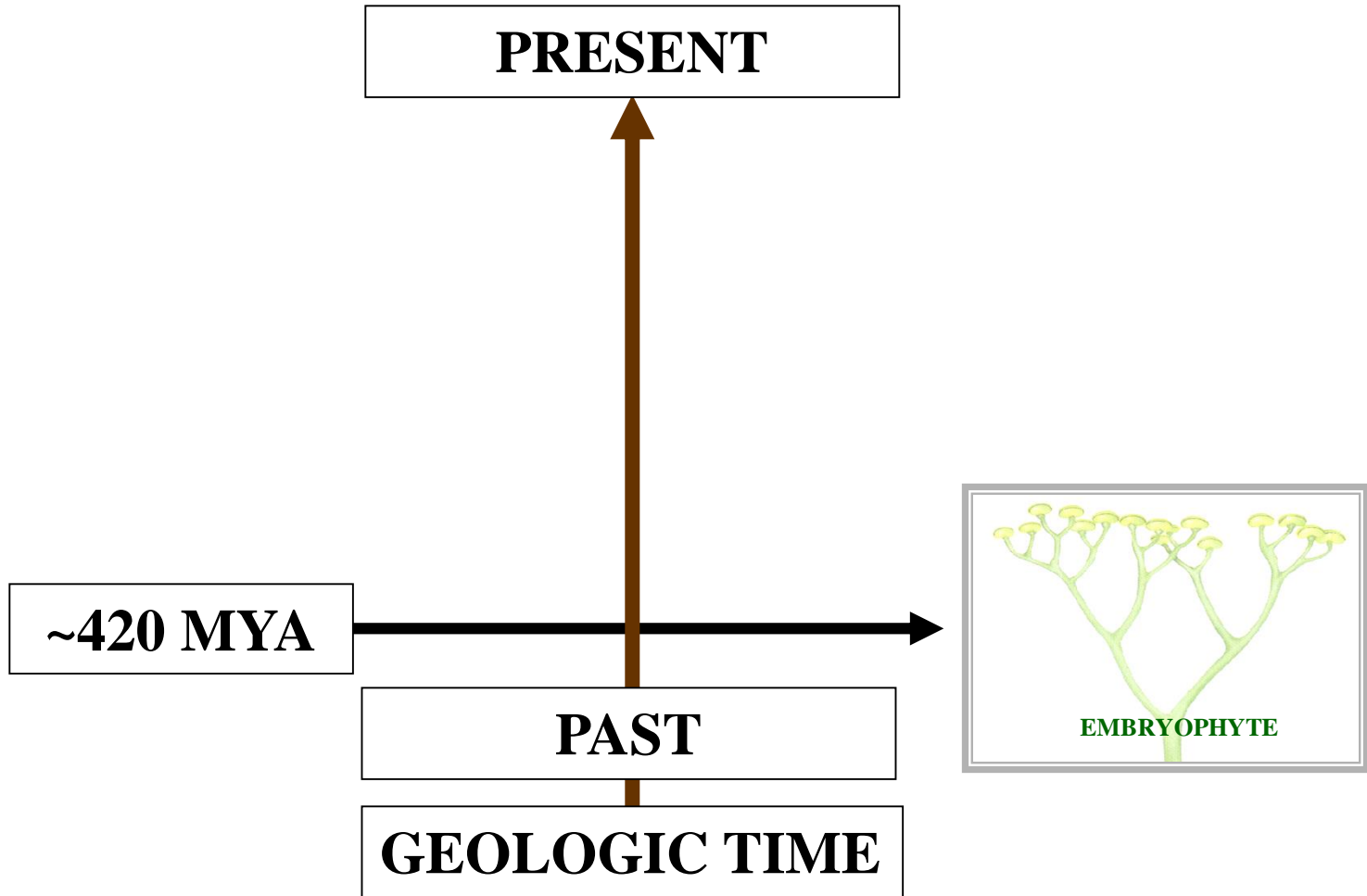
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DISTURBING CAVEAT



PARKA

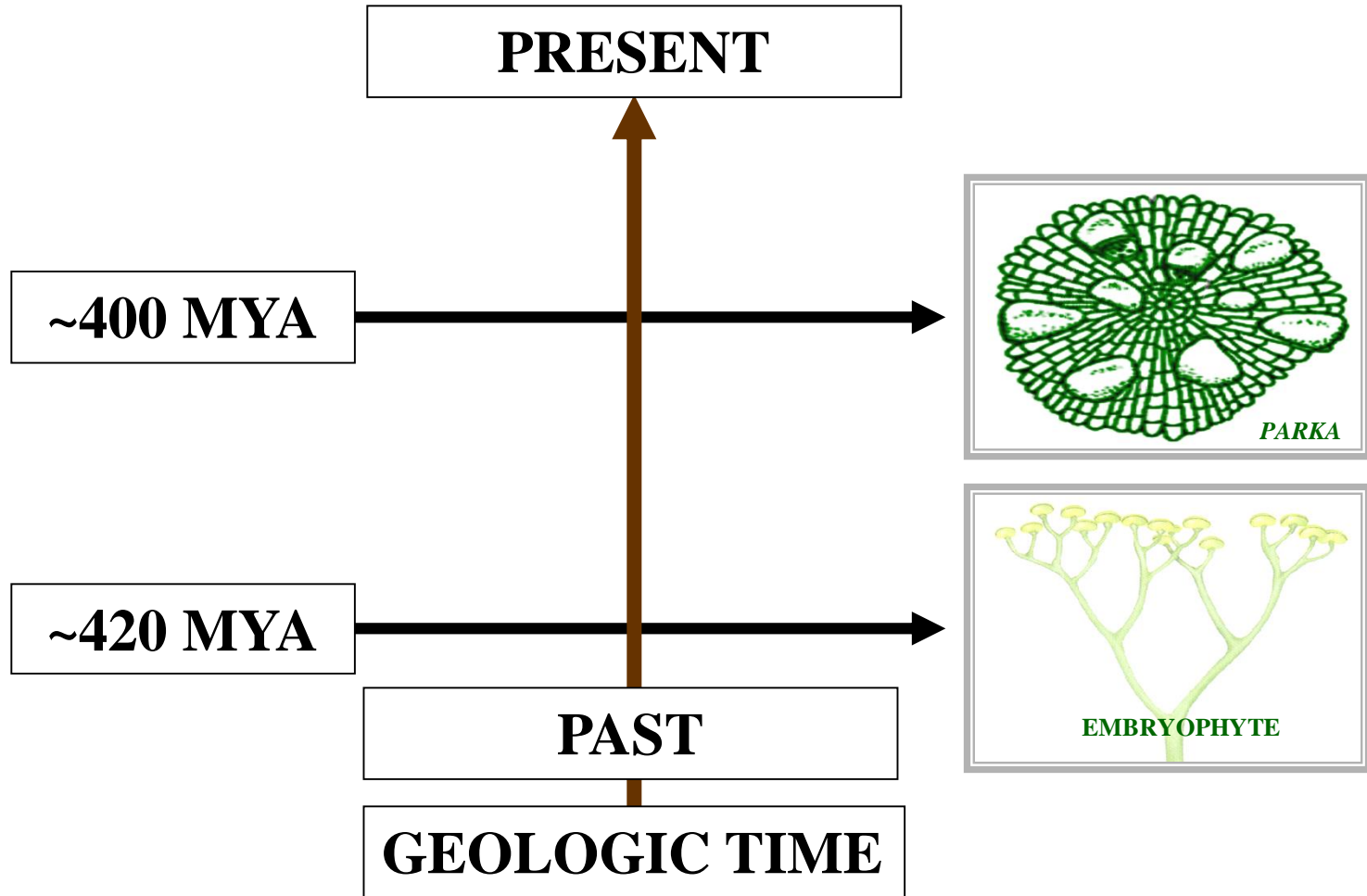
DISTURBING CAVEAT





PARKA

DISTURBING CAVEAT

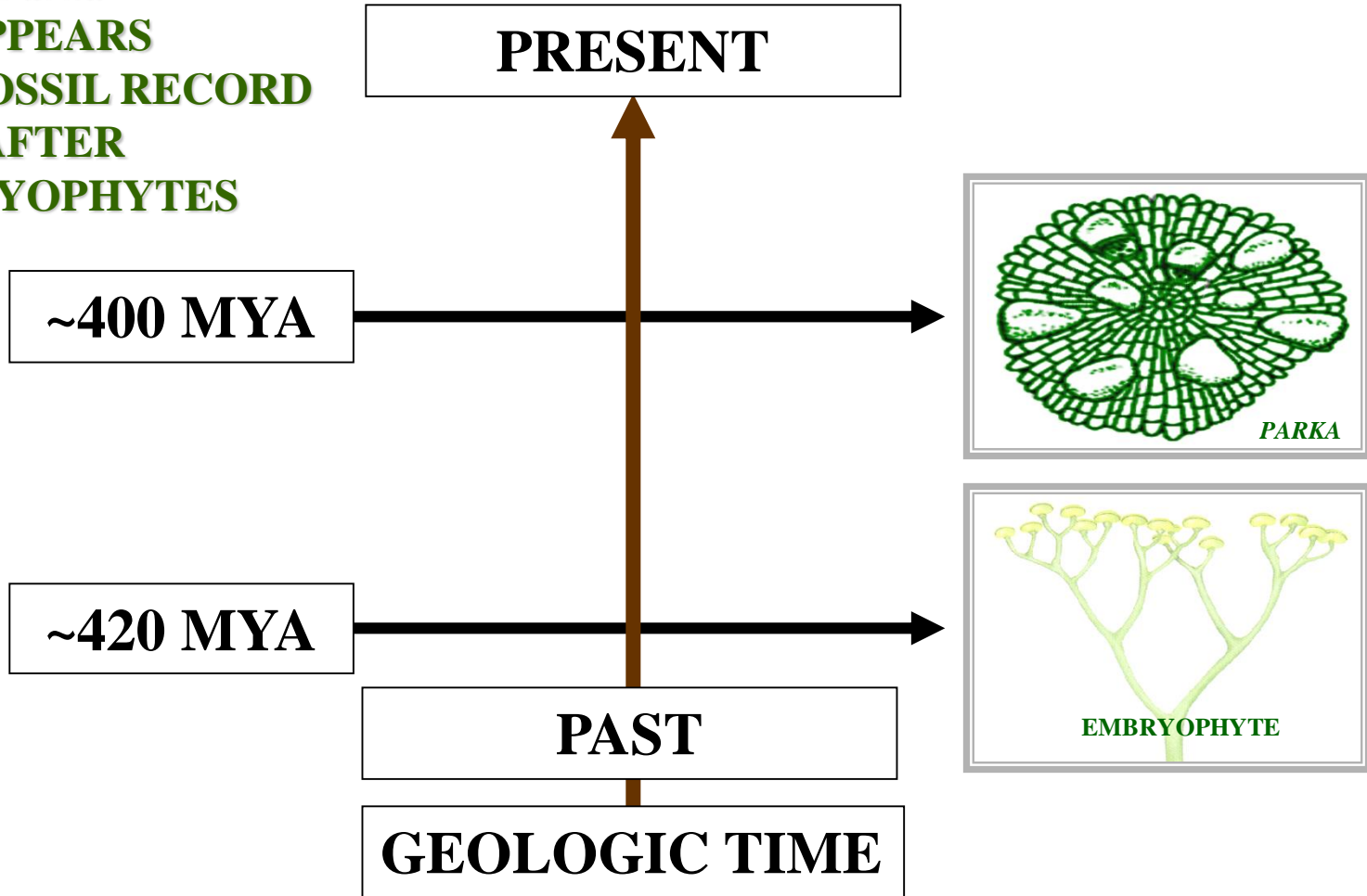




PARKA

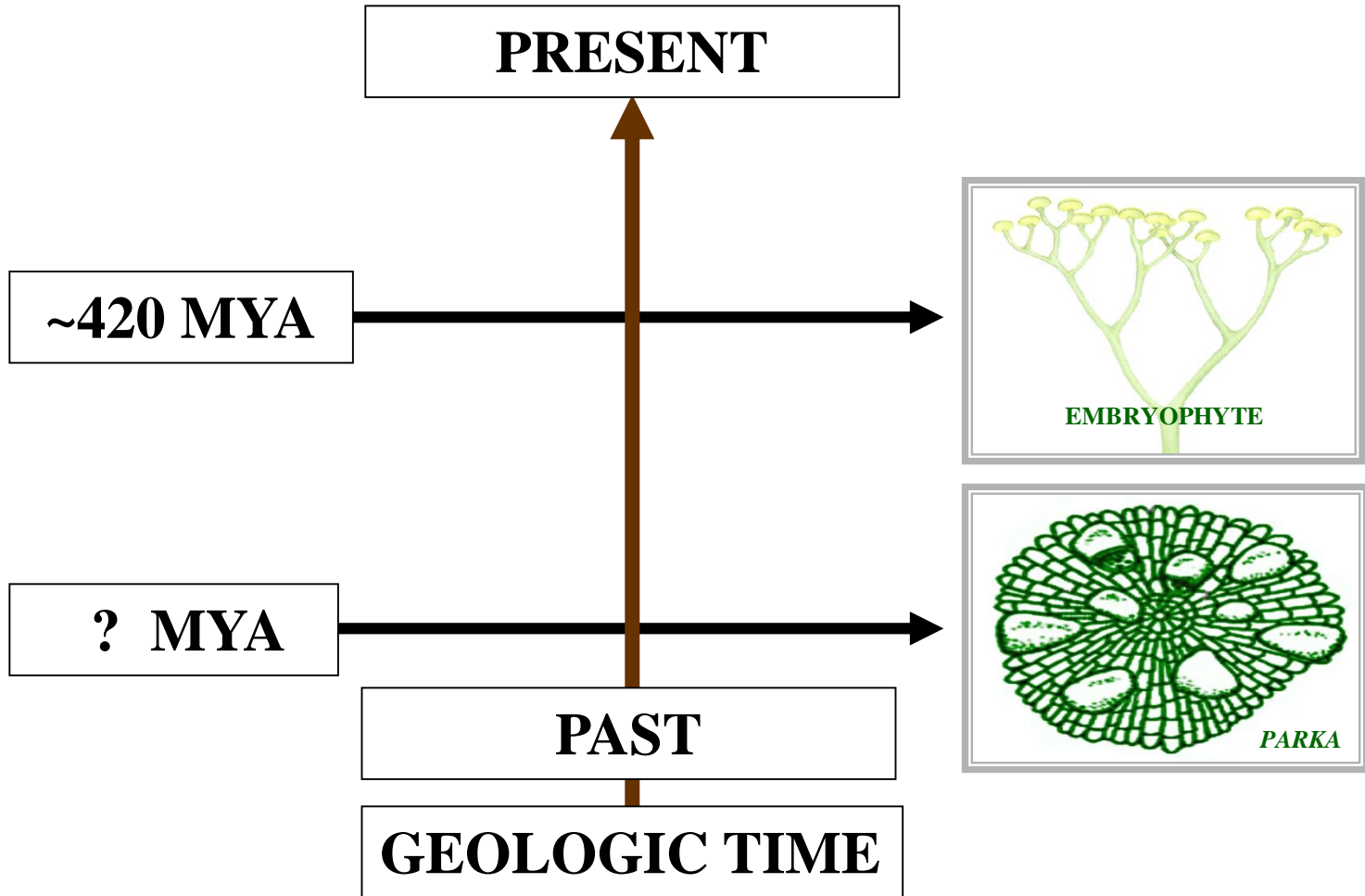
DISTURBING CAVEAT

Parka
APPEARS
IN THE FOSSIL RECORD
AFTER
EMBRYOPHYTES



PARKA

DISTURBING CAVEAT



QUESTION

FOSSIL RECORD

COMPLETE

OR

INCOMPLETE?

QUESTION

ANSWER



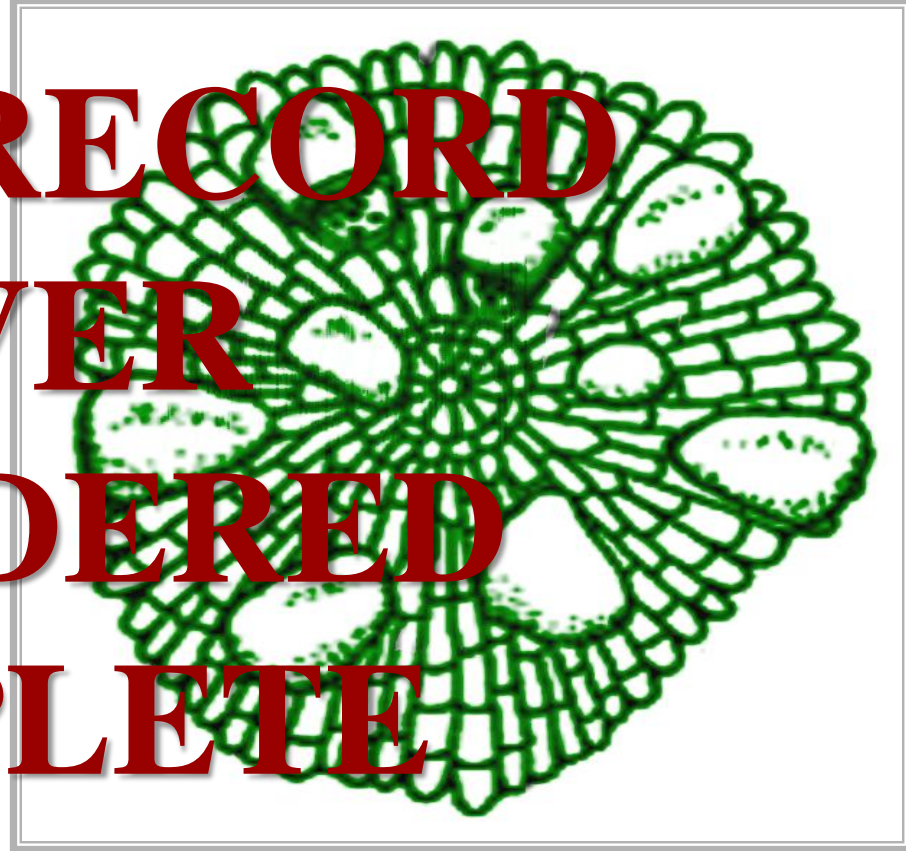
INCOMPLETE

ANSWER

FOSSIL CHAROPHYCEAE



**FOSSIL RECORD
NEVER
CONSIDERED
COMPLETE**



PARKA DECIPIENS

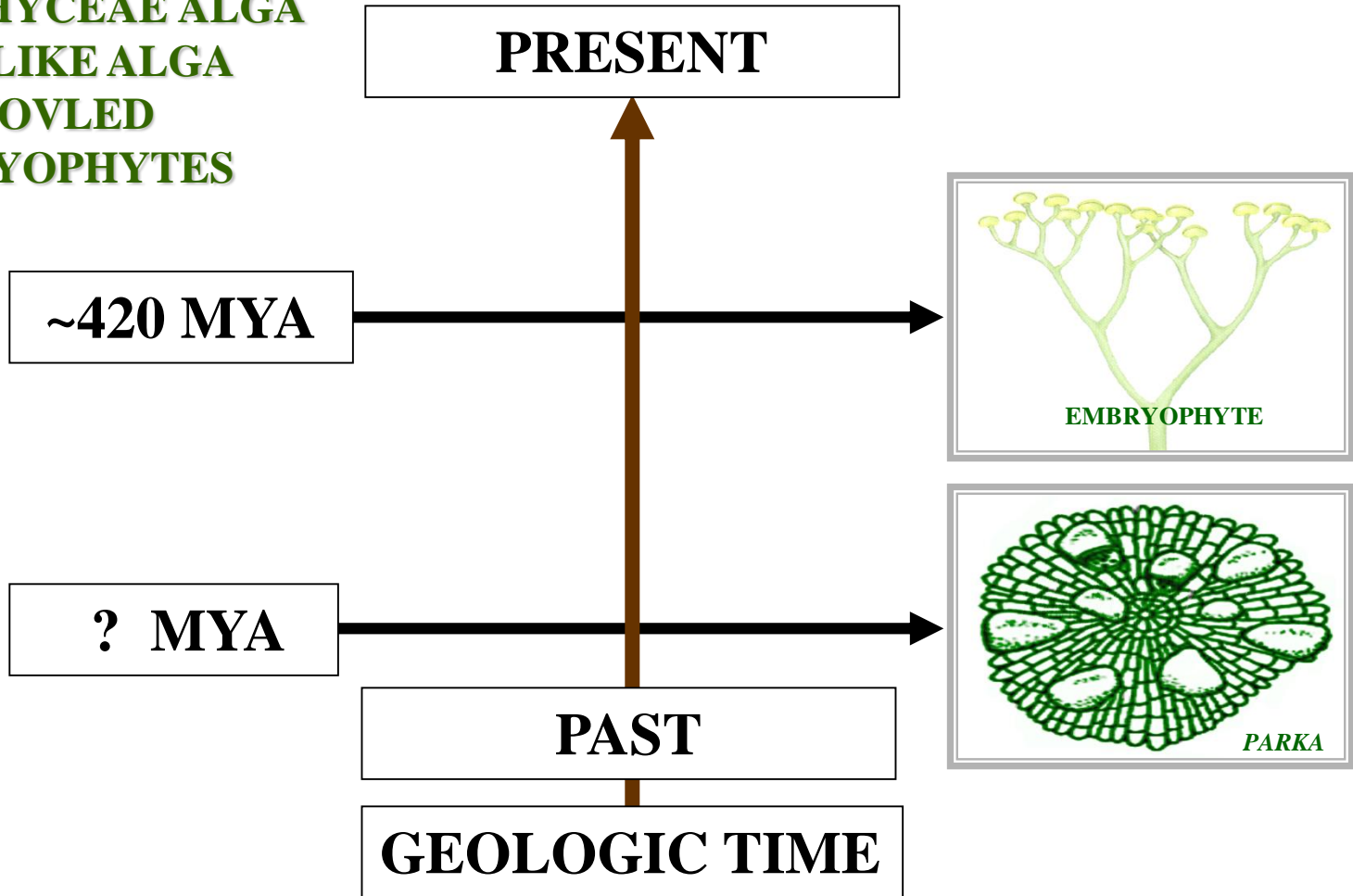
PARKA DECIPIENS



PARKA

DISTURBING CAVEAT

CHAROPHYCEAE ALGA
Parka-LIKE ALGA
EVOVLED
EMBRYOPHYTES





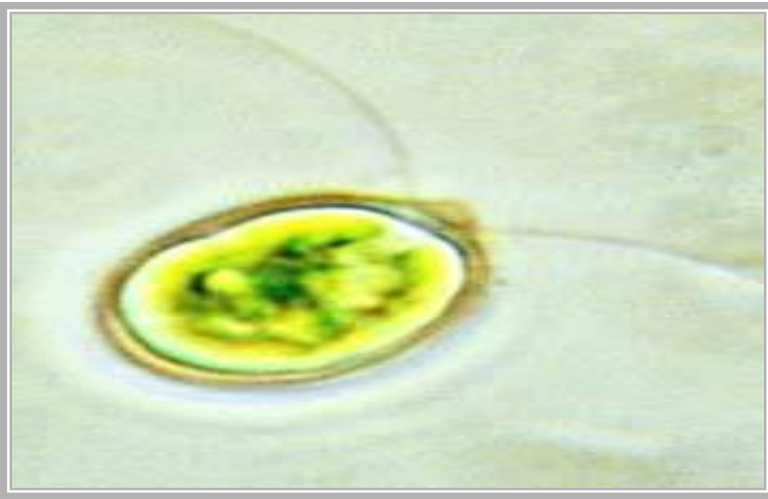
CHLOROPHYTA REPRODUCTION

ASEXUAL REPRODUCTION



ASEXUAL REPRODUCTION MITOSIS

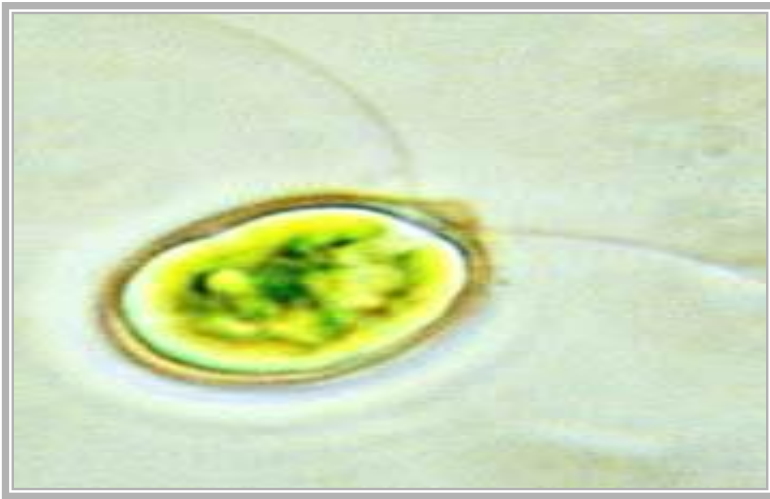
ASEXUAL REPRODUCTION



CHLAMYDOMONAS

UNICELLULAR SPECIES

ASEXUAL REPRODUCTION

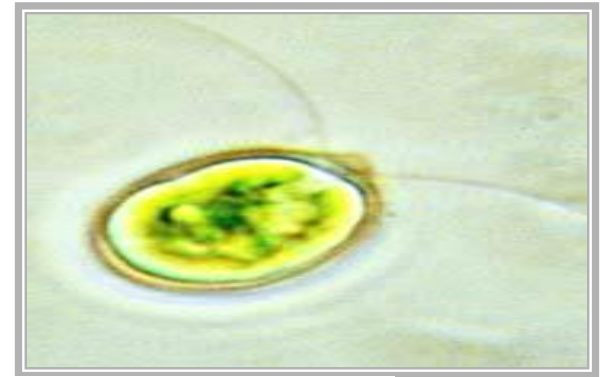
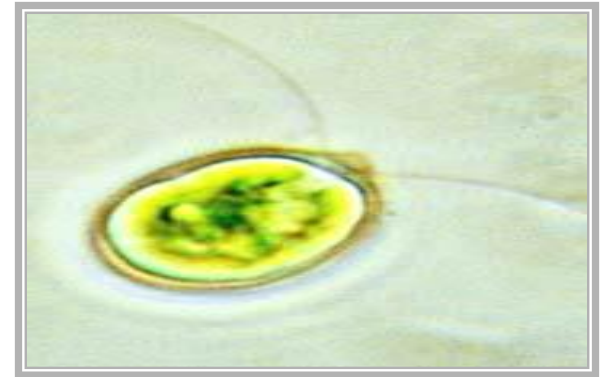
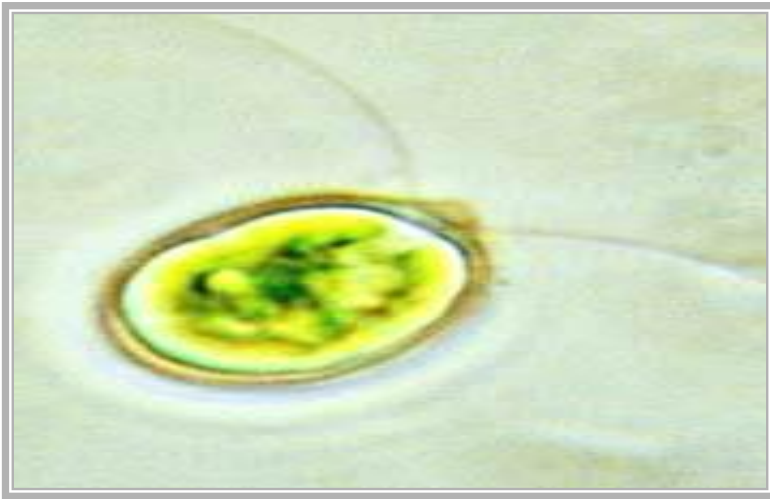


MITOSIS

CHLAMYDOMONAS

UNICELLULAR SPECIES

ASEXUAL REPRODUCTION

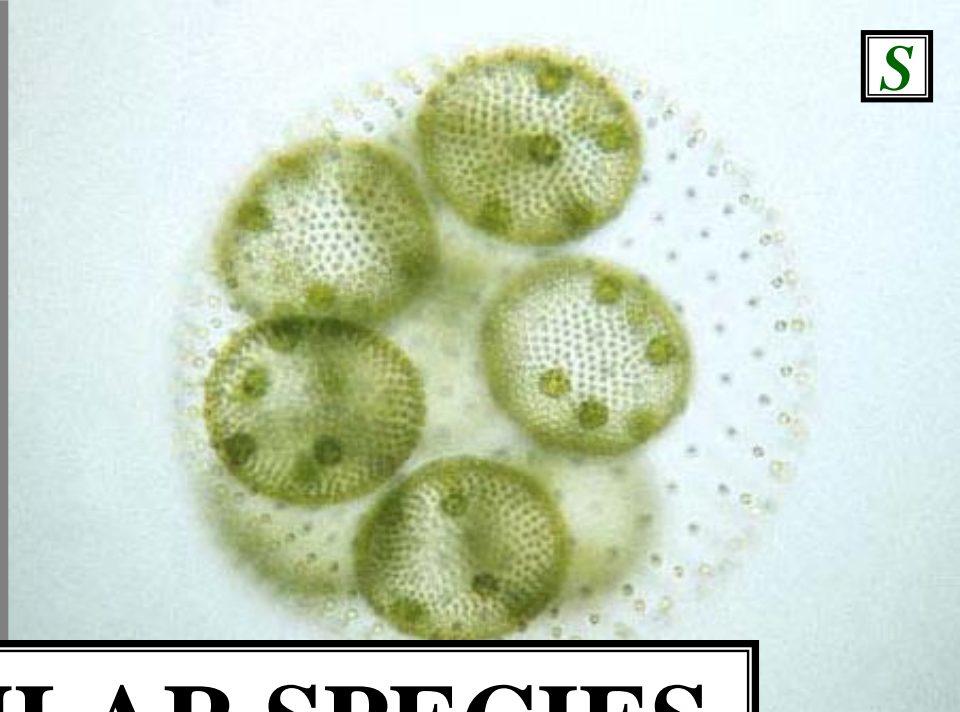


CHLAMYDOMONAS

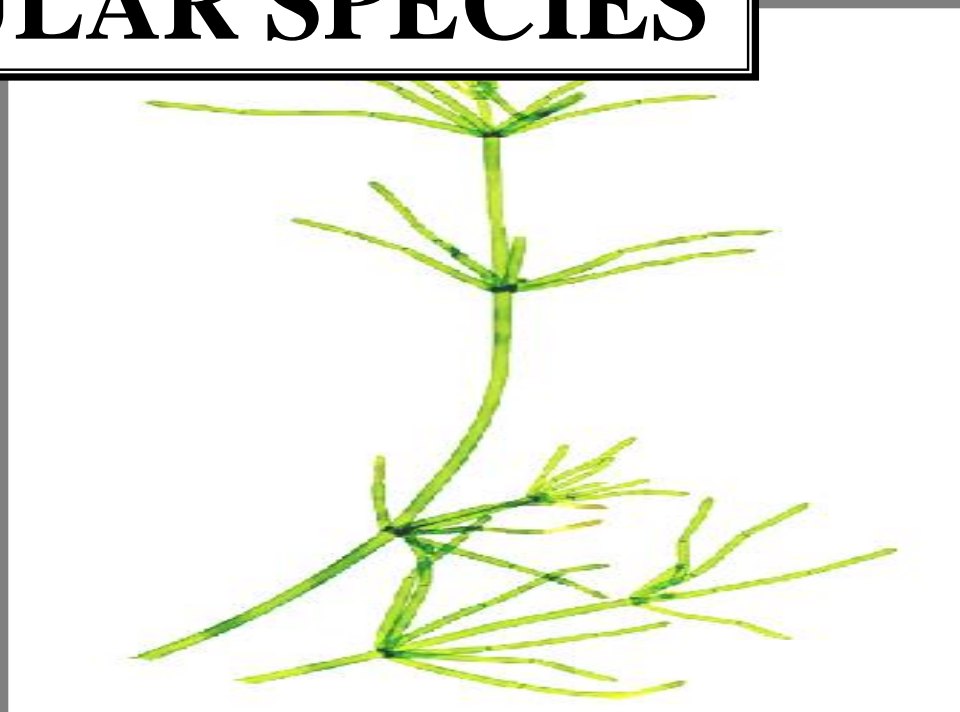
UNICELLULAR SPECIES



**ASEXUAL
REPRODUCTION
FRAGMENTATION**

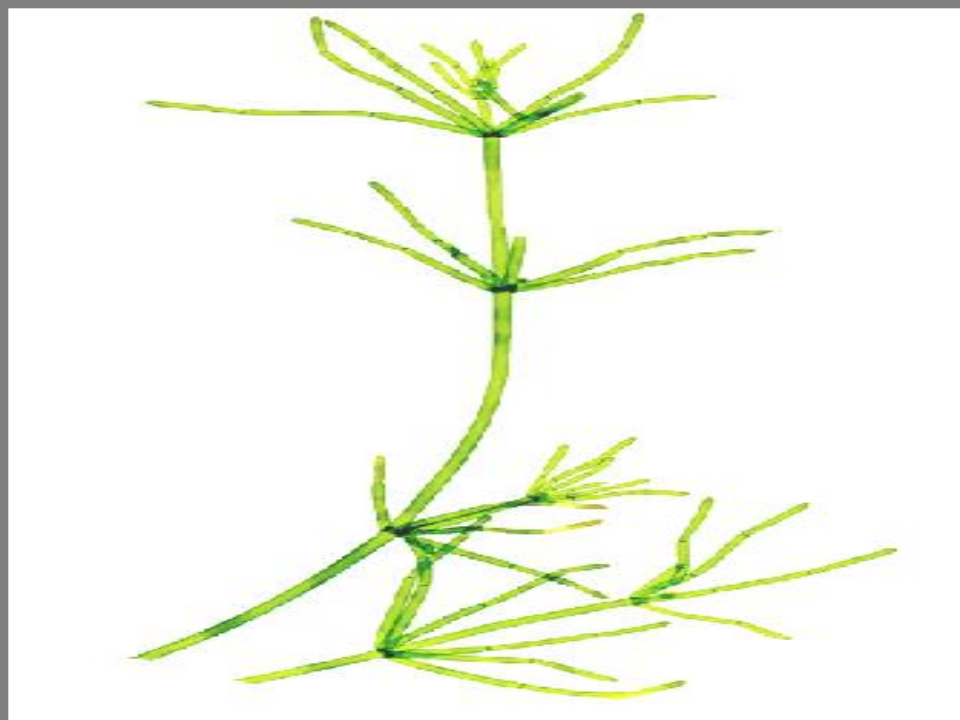


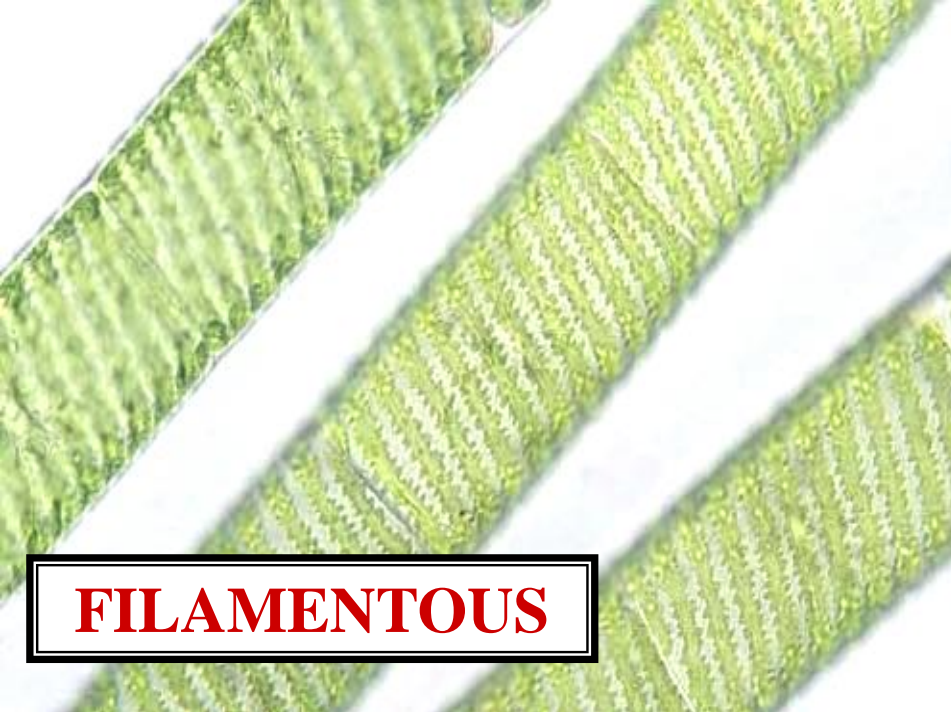
MULTICELLULAR SPECIES





SPIROGYRA

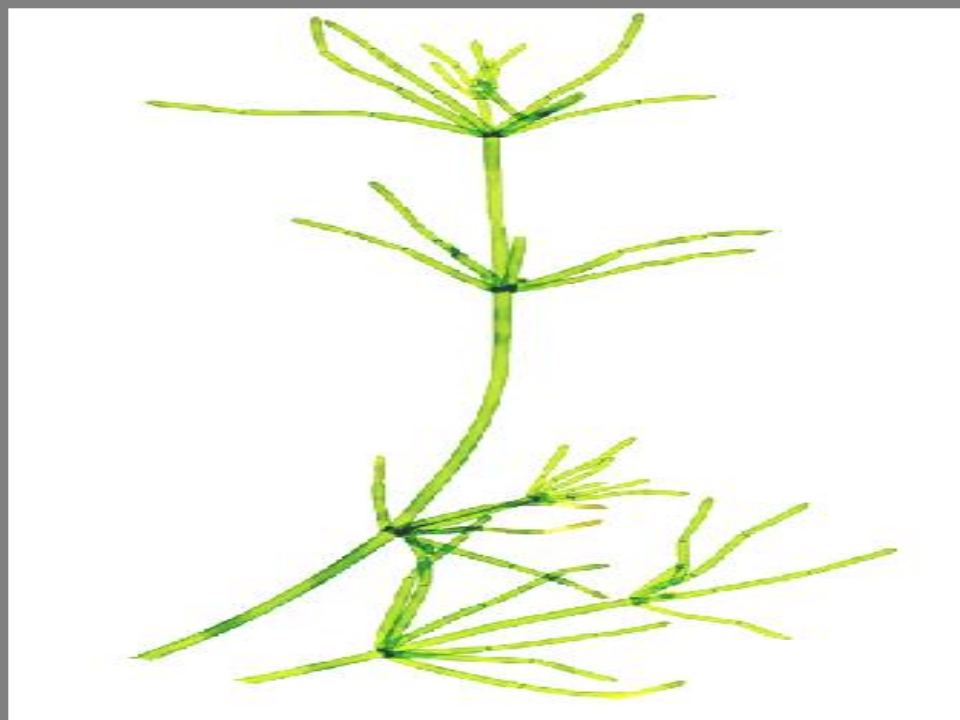


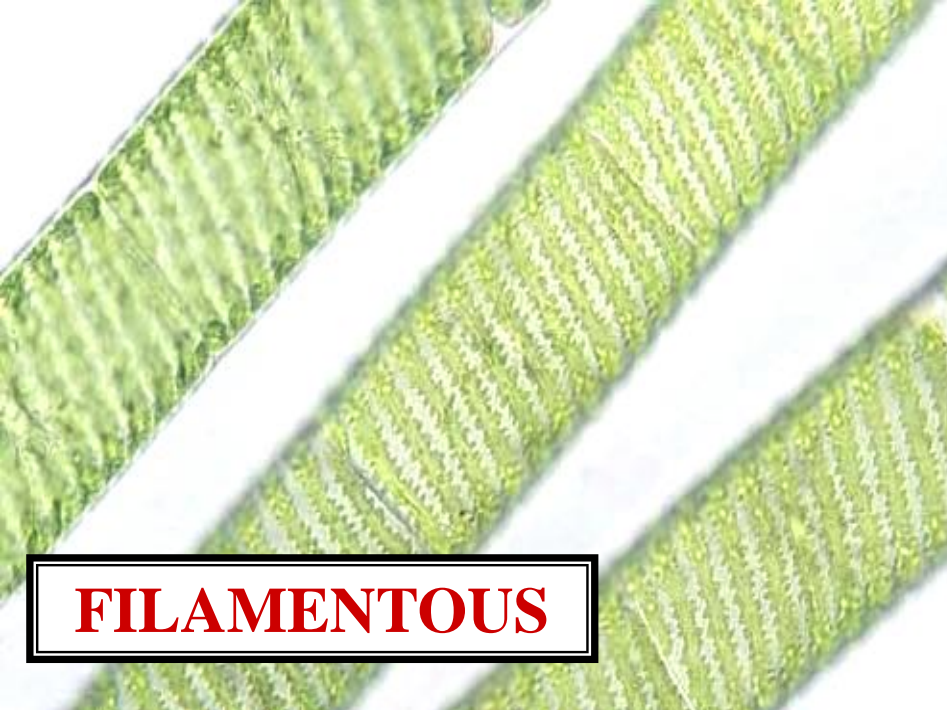


FILAMENTOUS

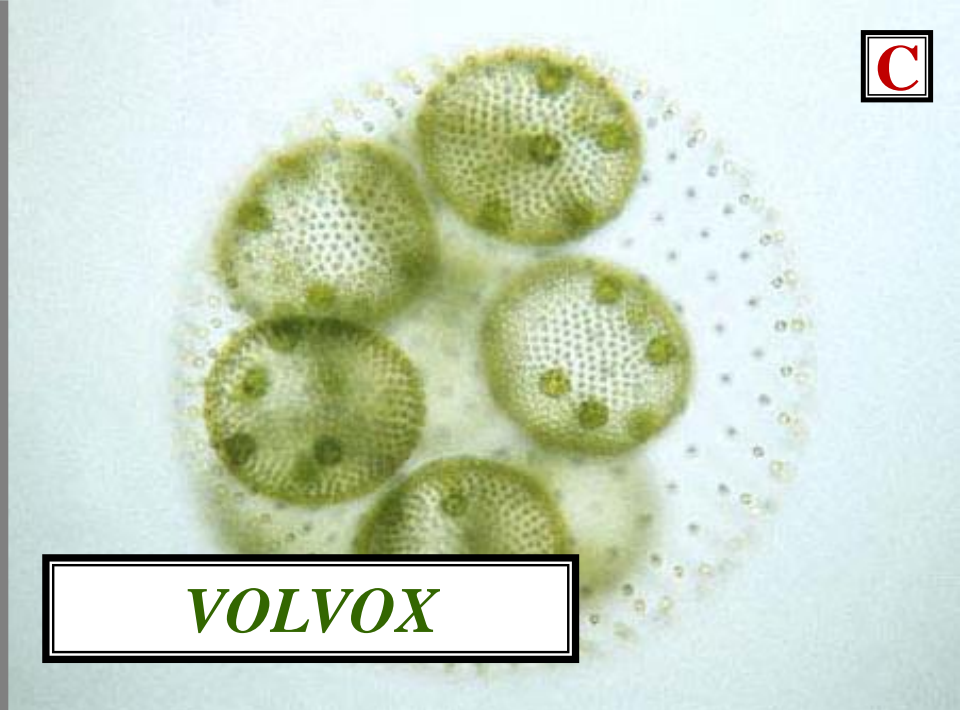


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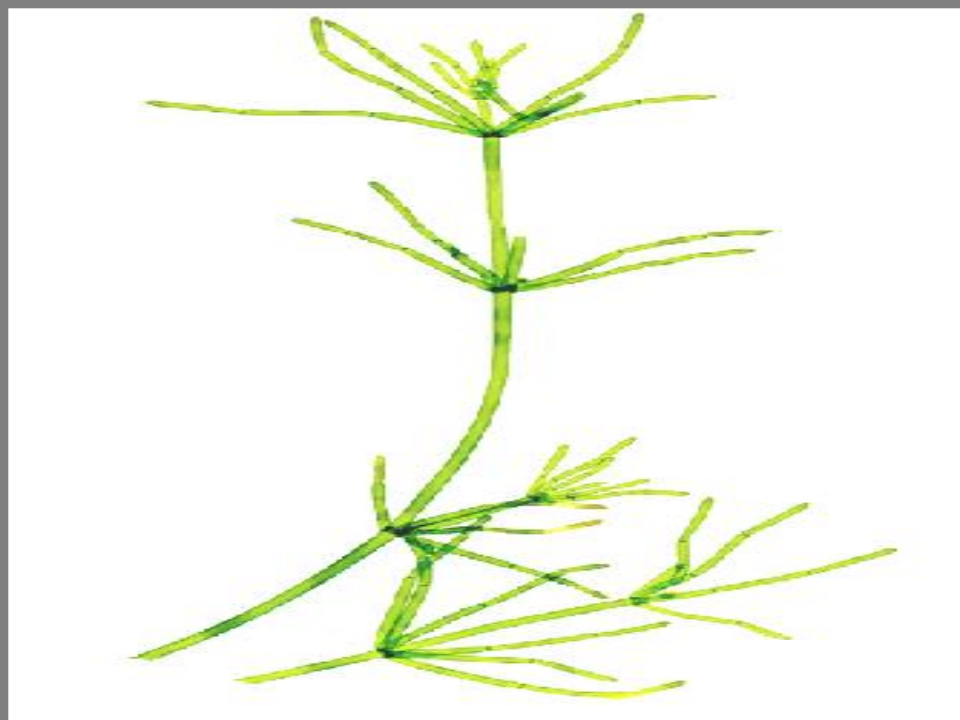


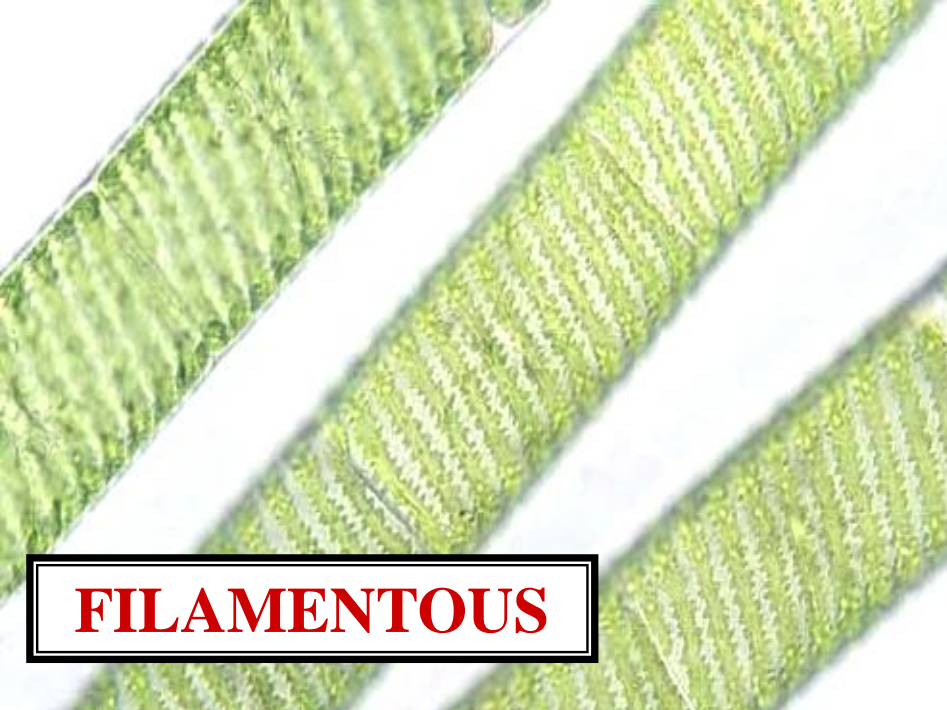


FILAMENTOUS



VOLVOX

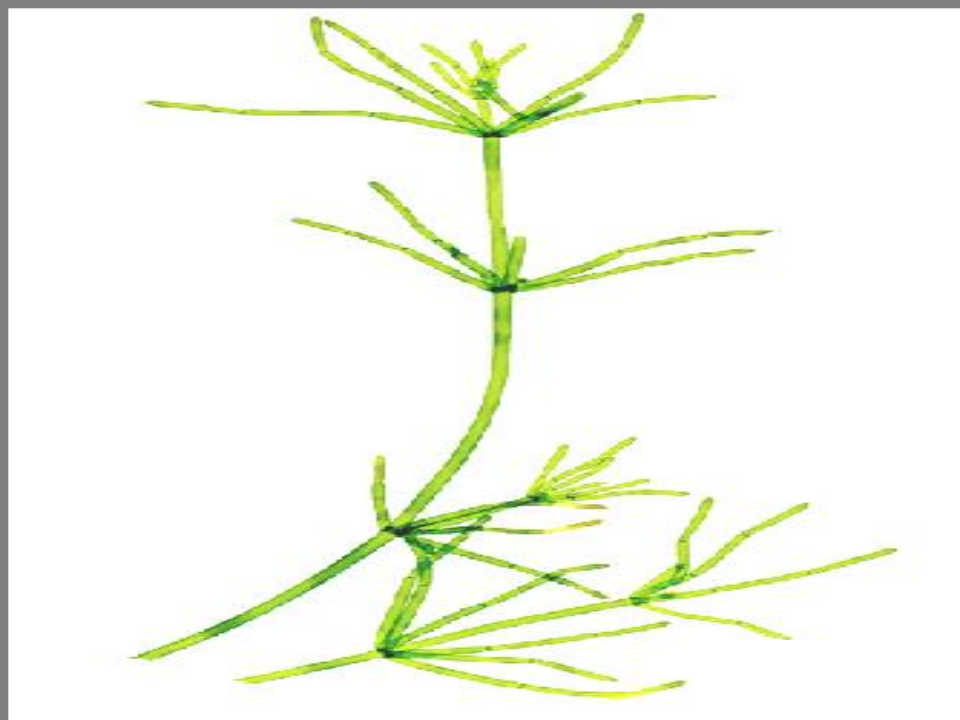


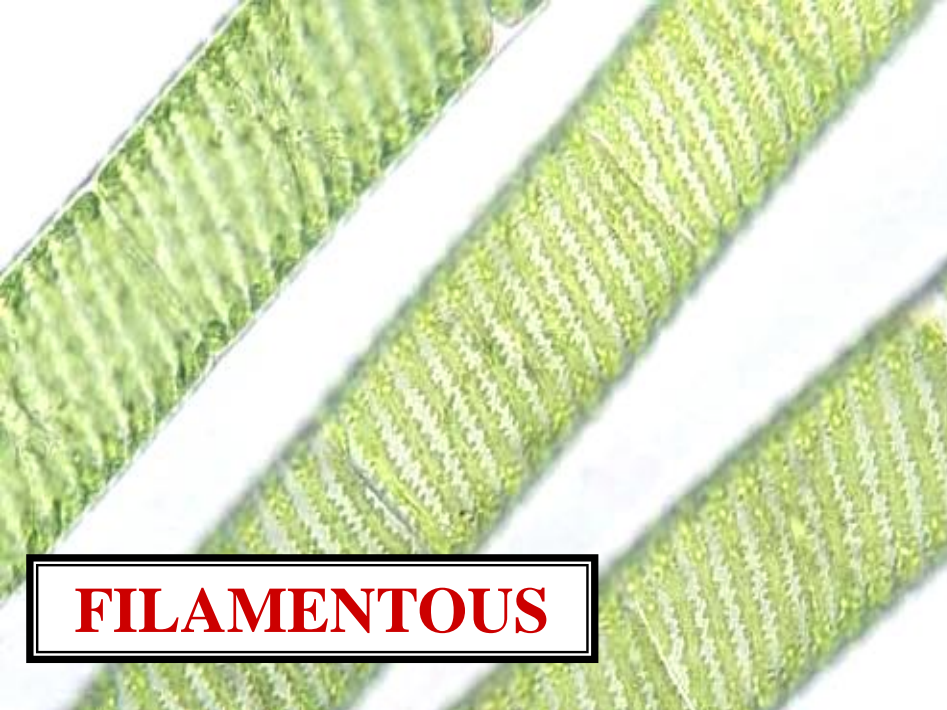


FILAMENTOUS



COLONIAL





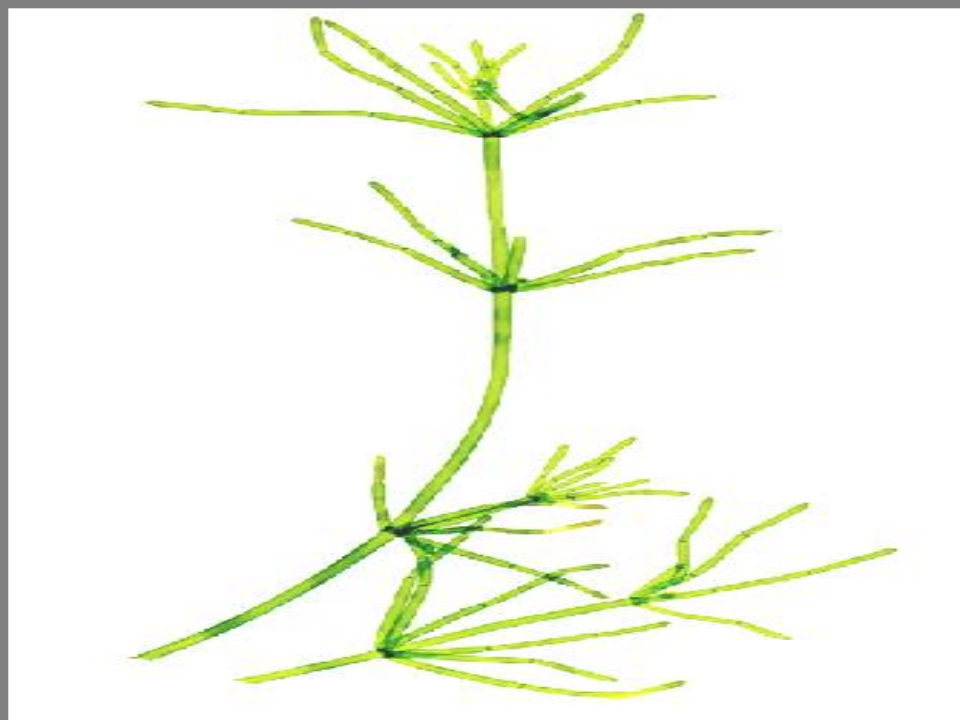
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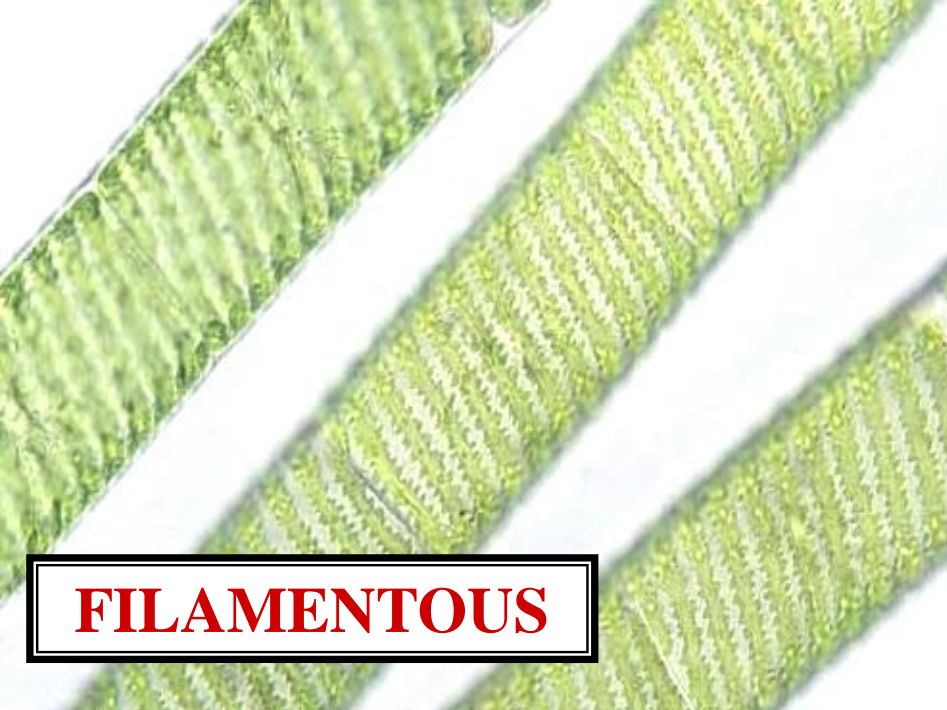


COLONIAL



ULVA





FILAMENTOUS

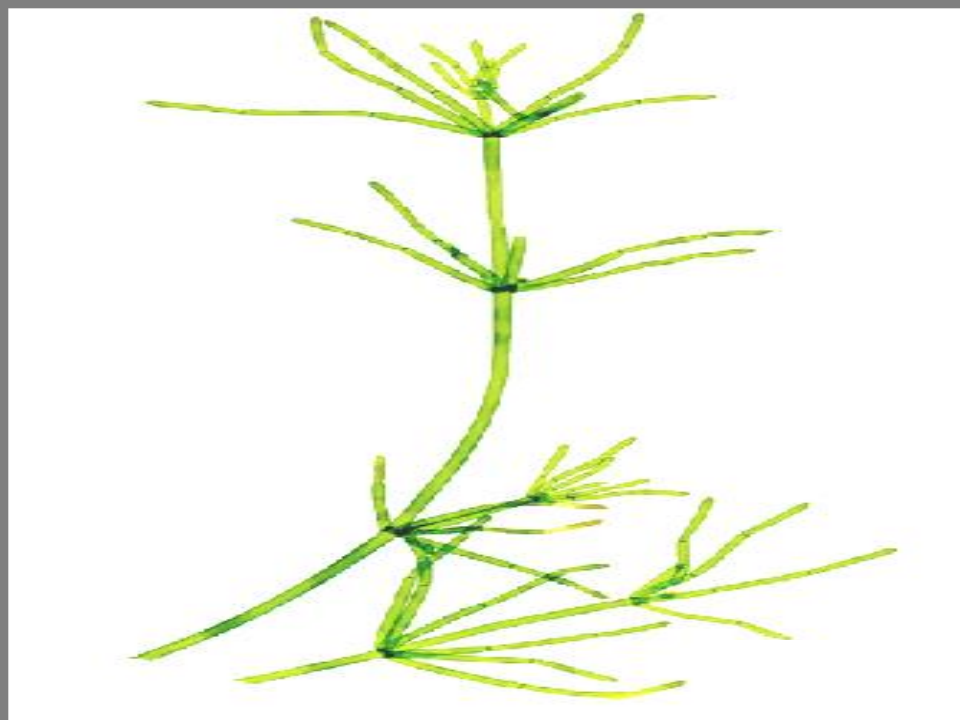


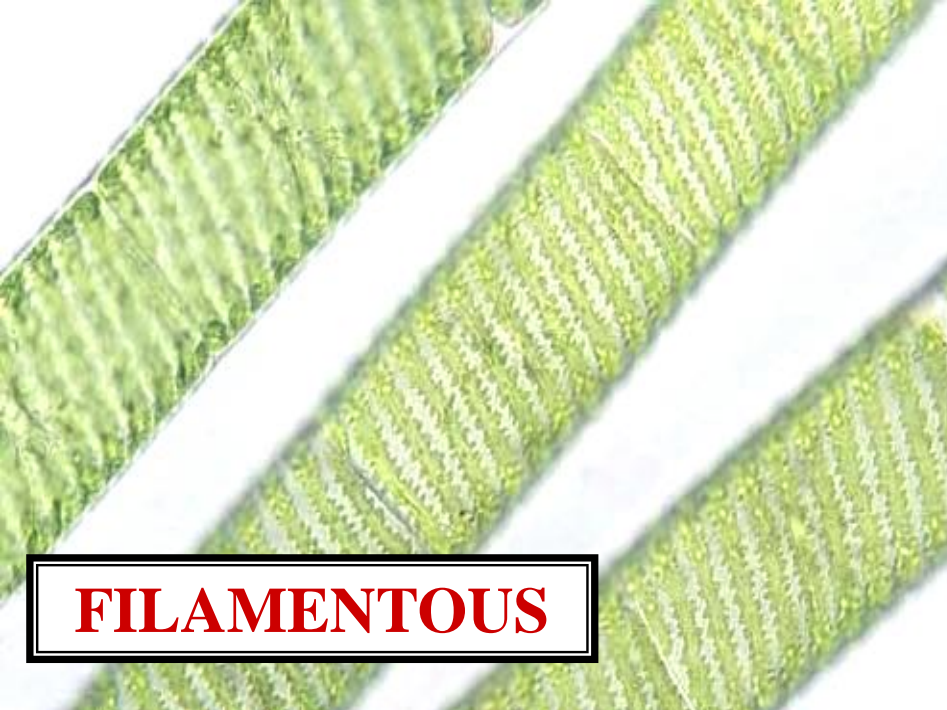
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COLONIAL



MEMBRANOUS





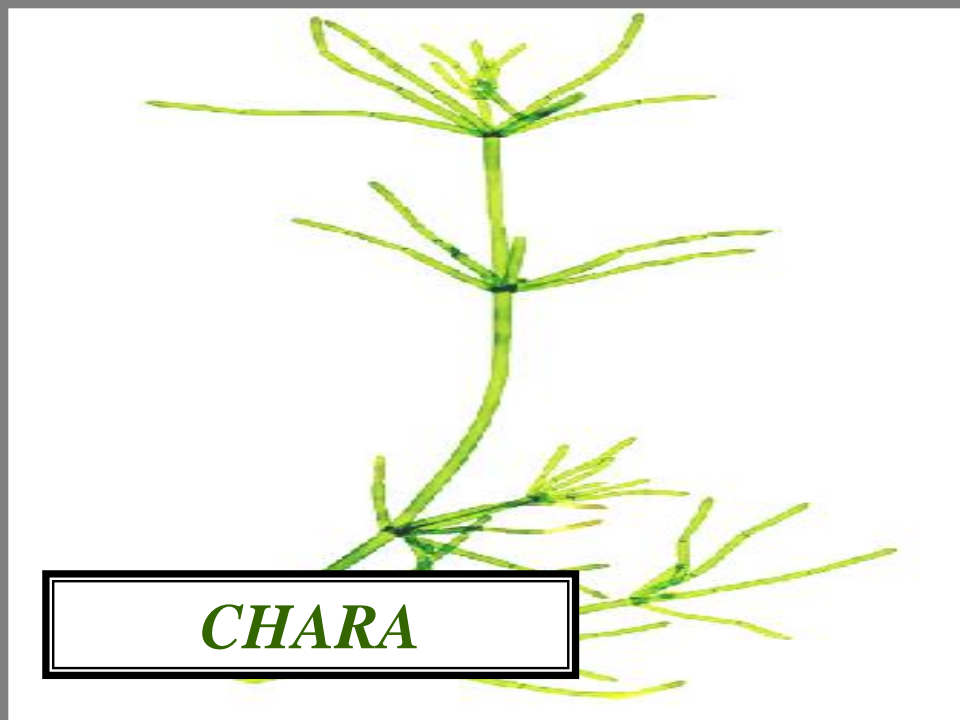
FILAMENTOUS



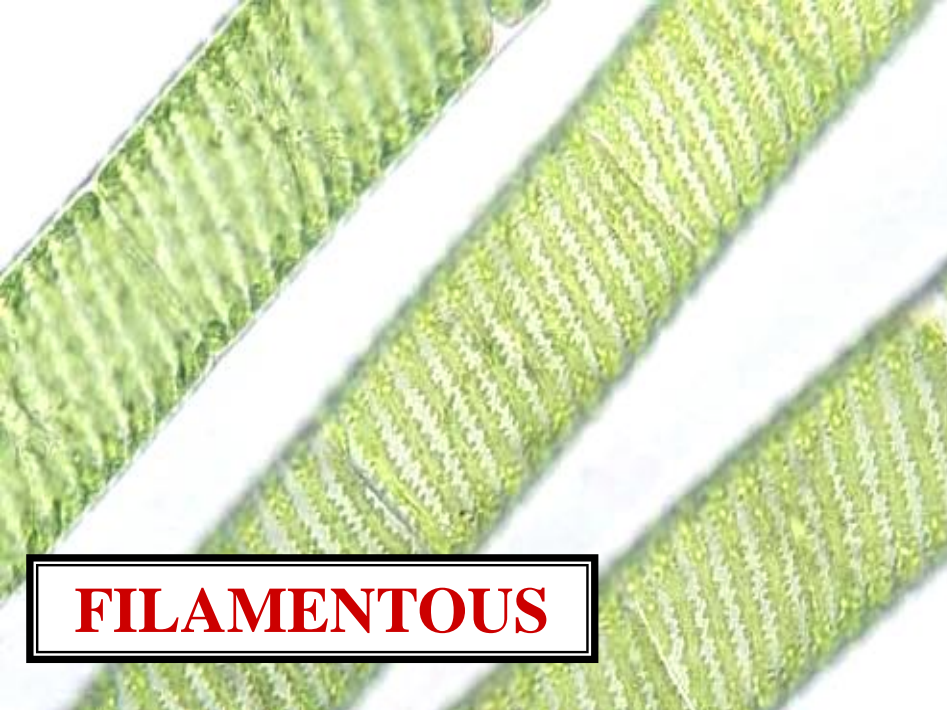
COLONIAL



MEMBRANOUS



CHARA



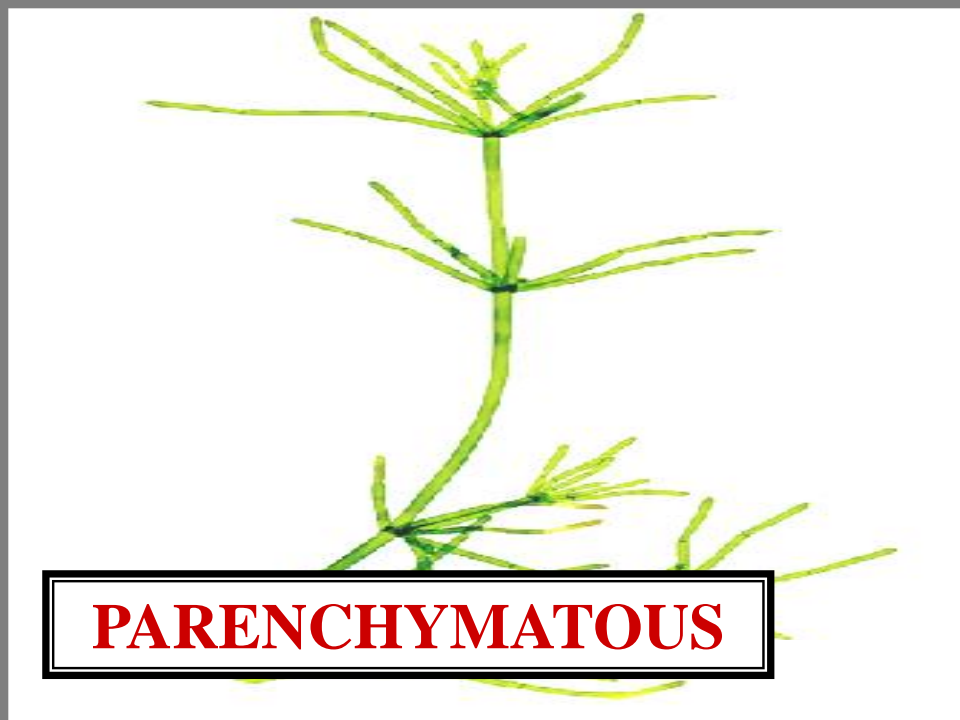
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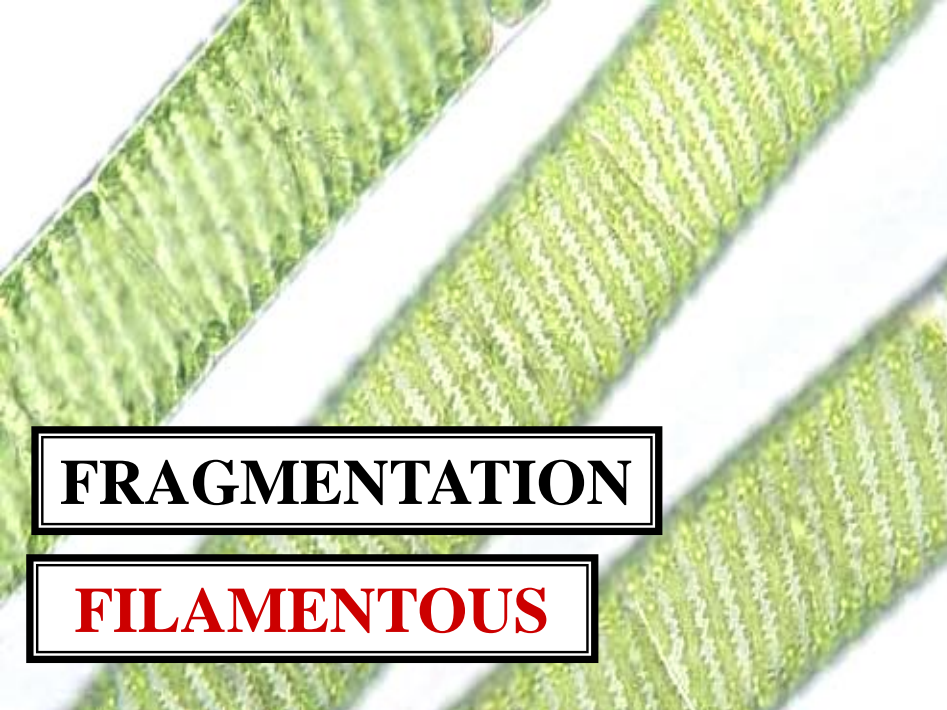
COLONIAL



MEMBRANOUS

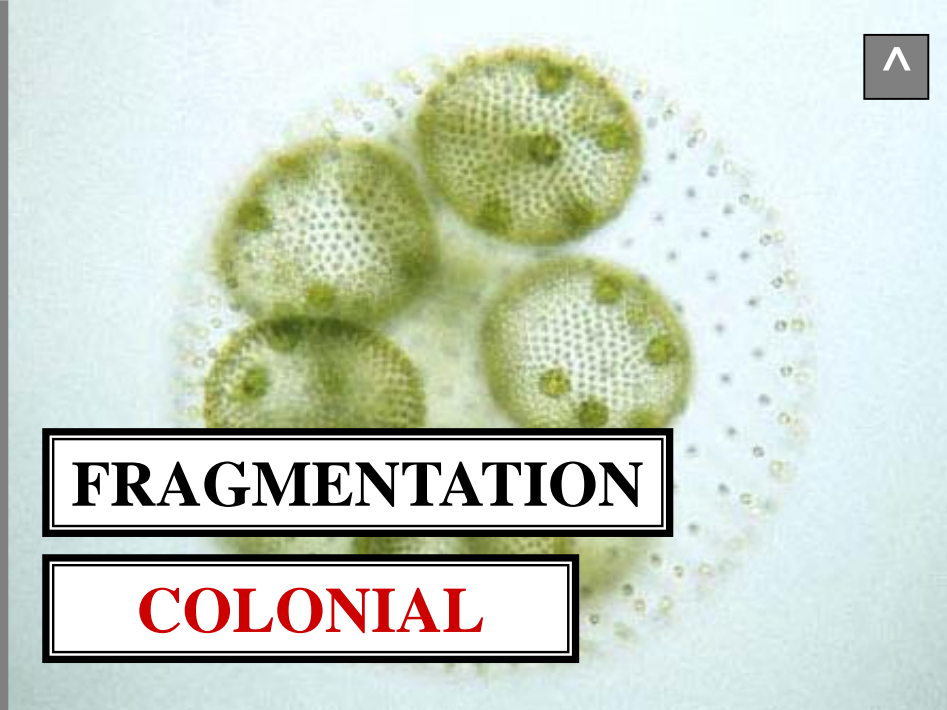


PARENCHYMATOUS



FRAGMENTATION

FILAMENTOUS



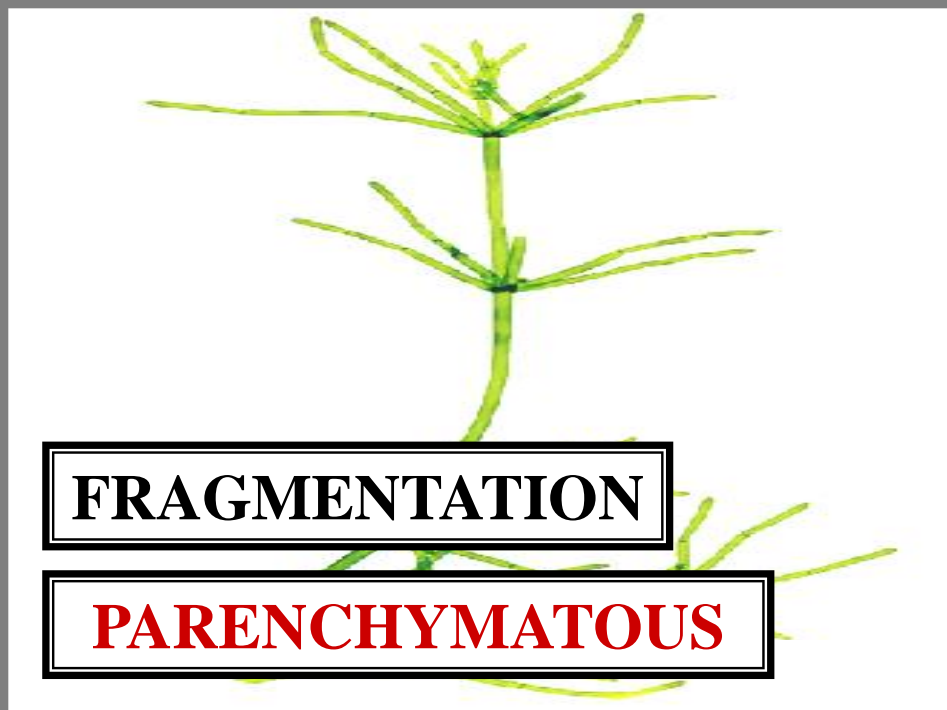
FRAGMENTATION

COLONIAL



FRAGMENTATION

MEMBRANOUS

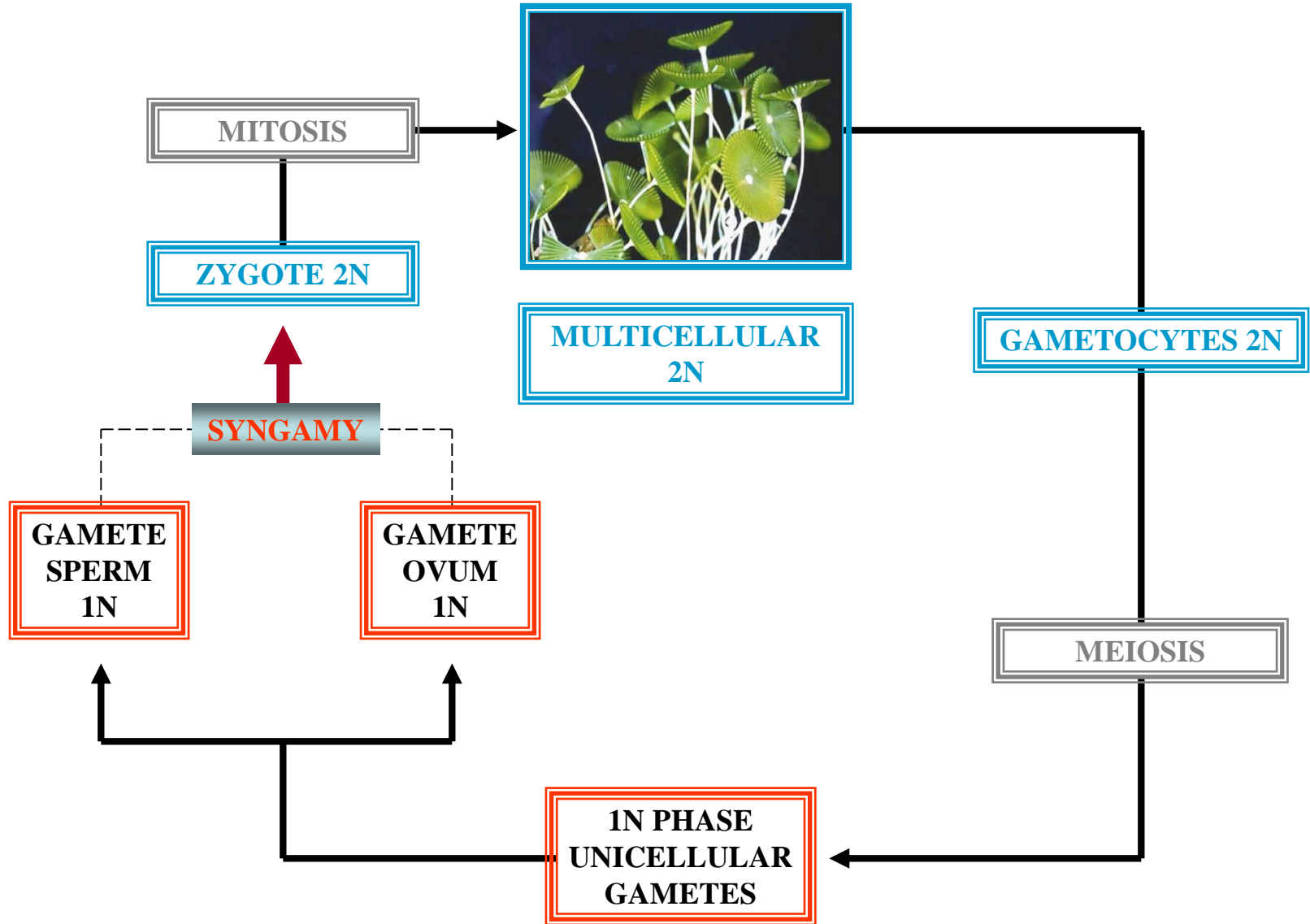


FRAGMENTATION

PARENCHYMATOUS

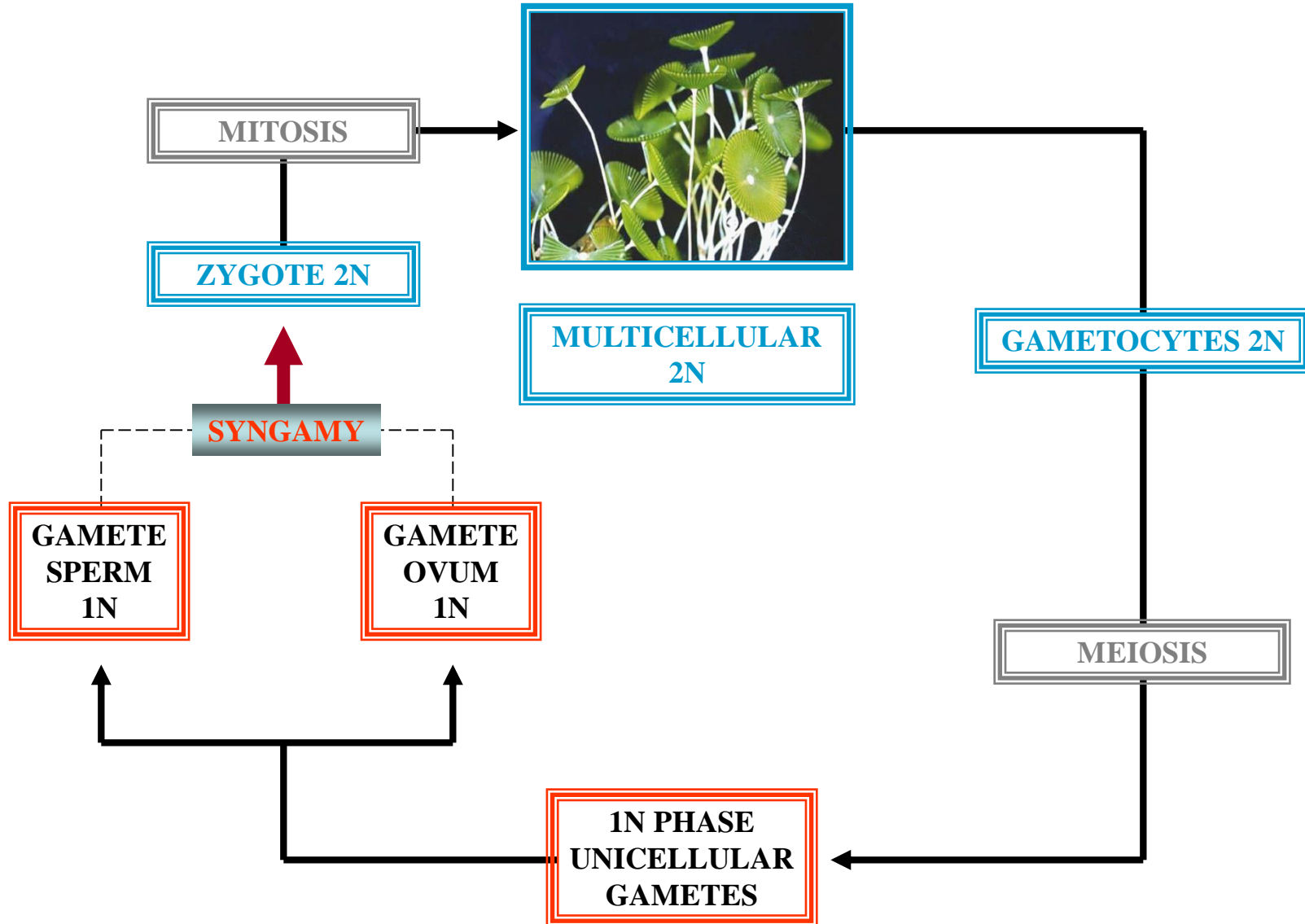
SEXUAL REPRODUCTION

ACETABULARIA LIFE CYCLE

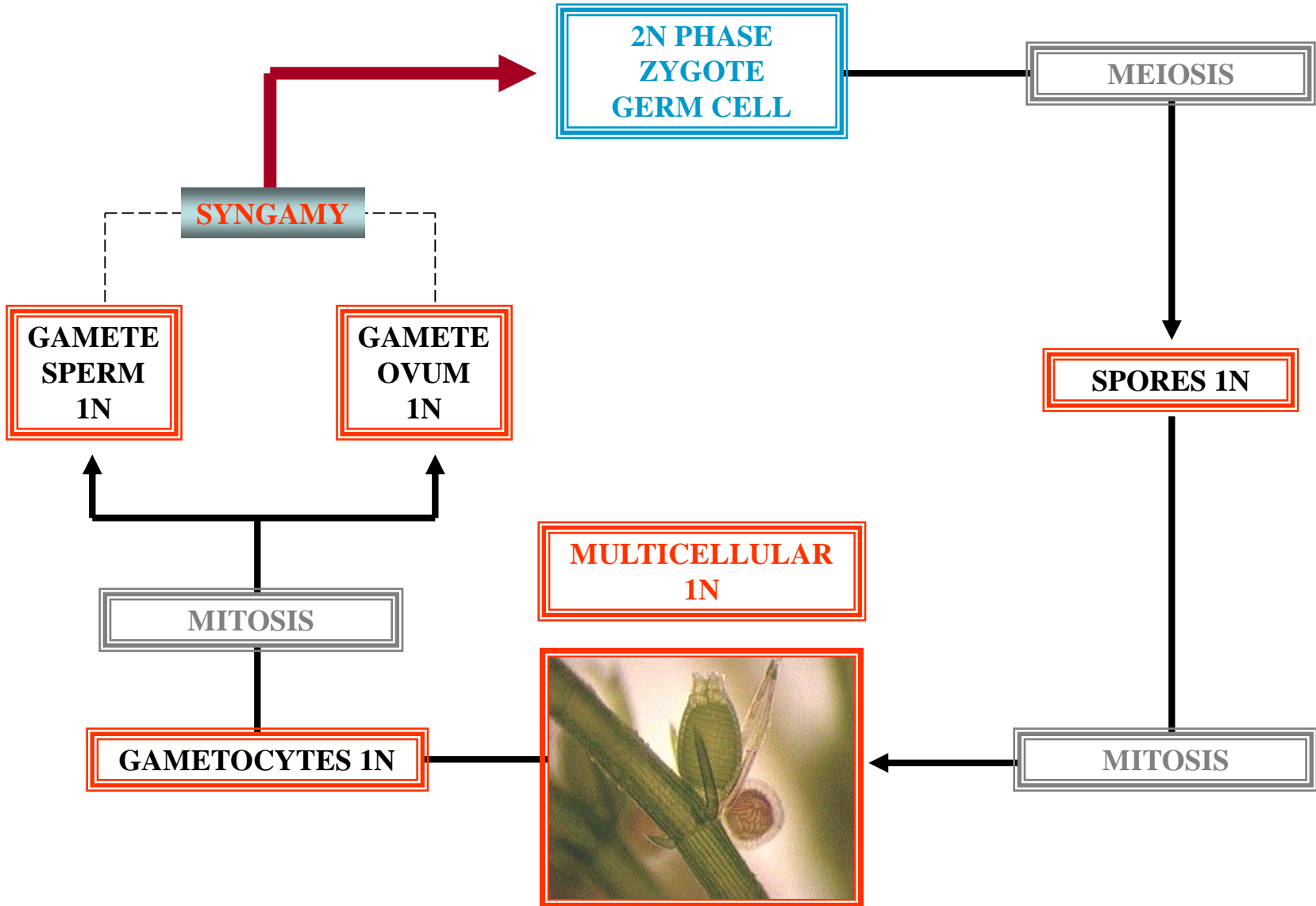


ACETABULARIA

GAMETIC LIFE CYCLE

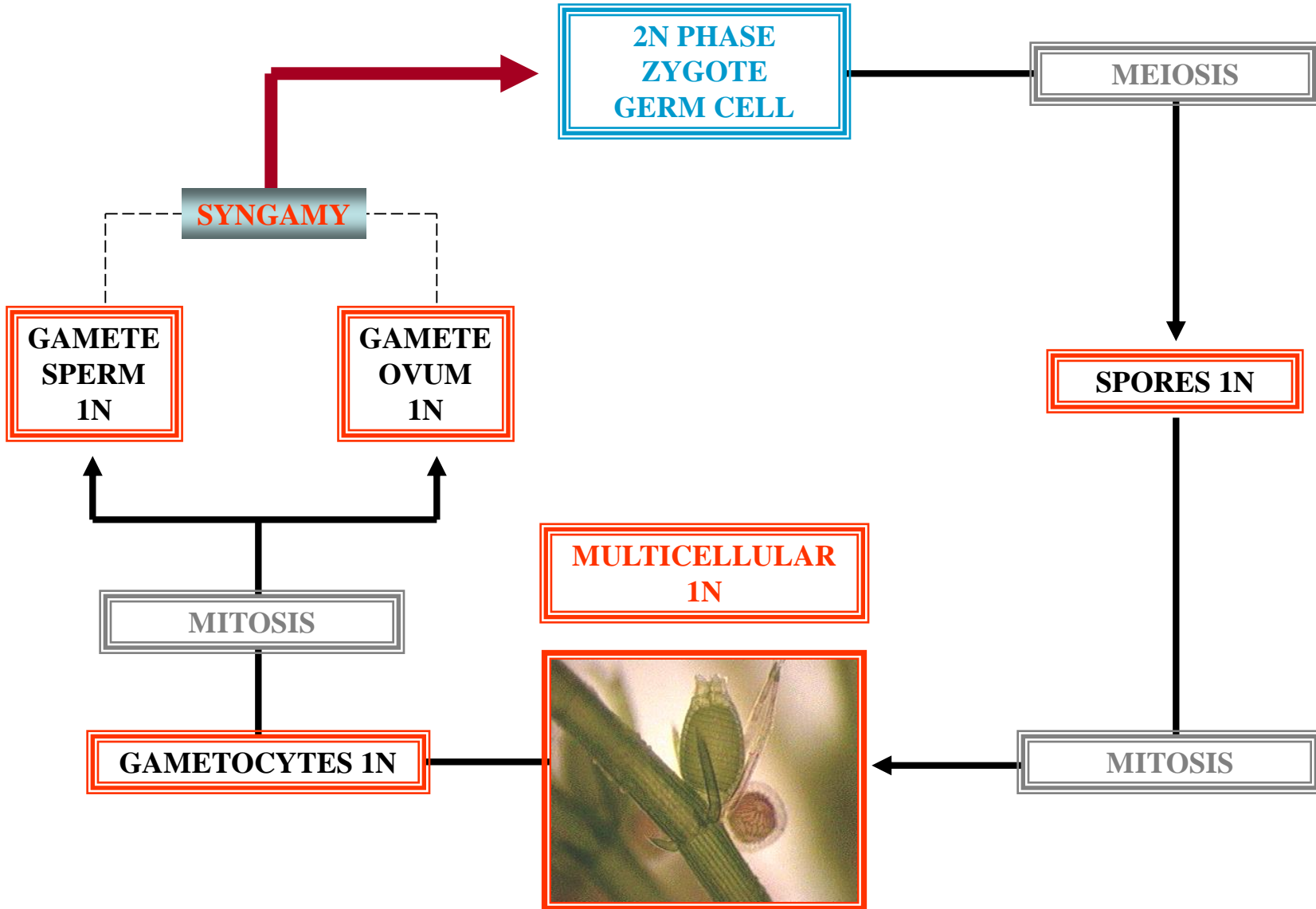


CHARA LIFE CYCLE

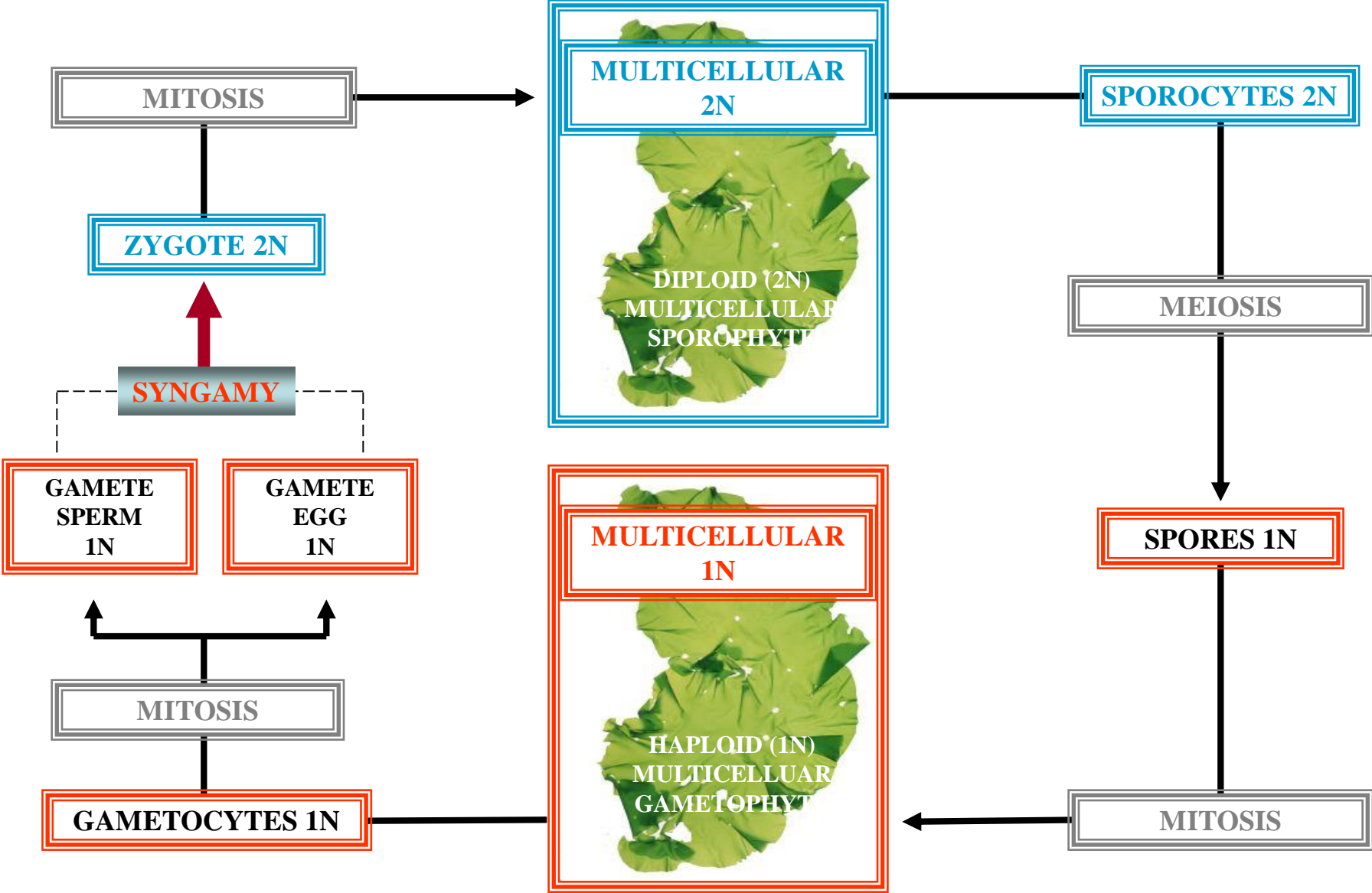


CHARA

ZYGOTIC LIFE CYCLE

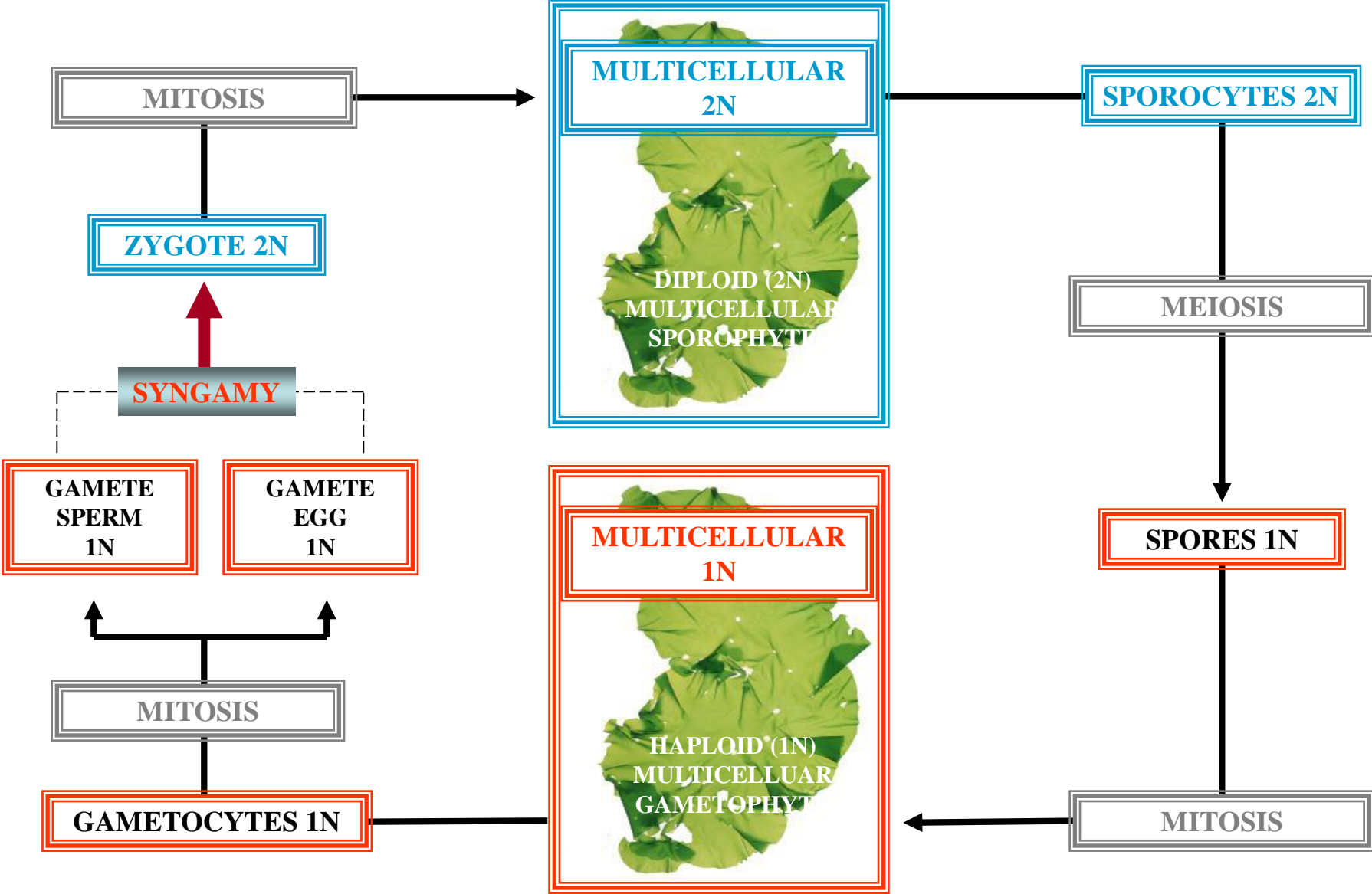


ULVA LIFE CYCLE



ULVA

SPORIC LIFE CYCLE



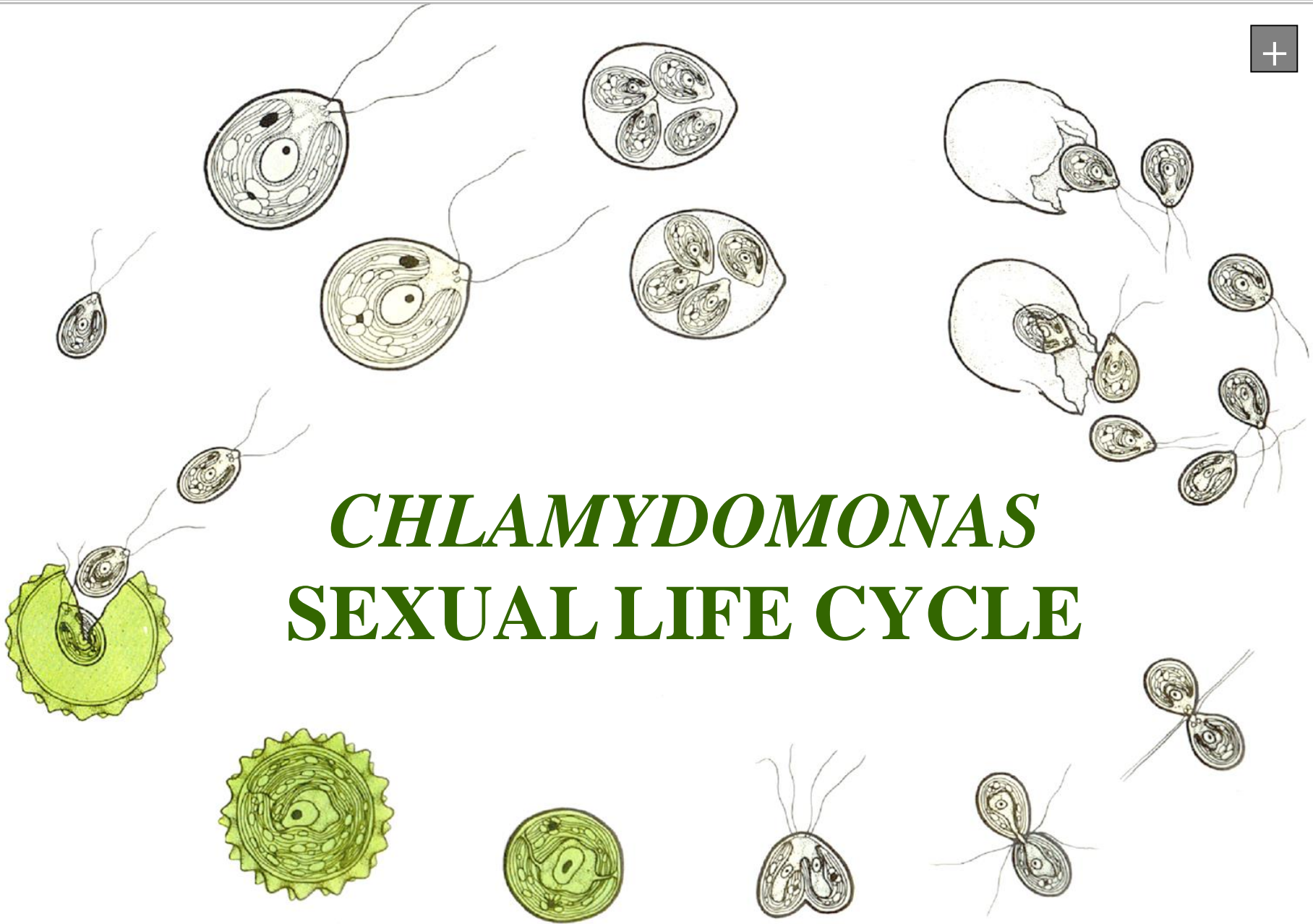


CHLAMYDOMONAS

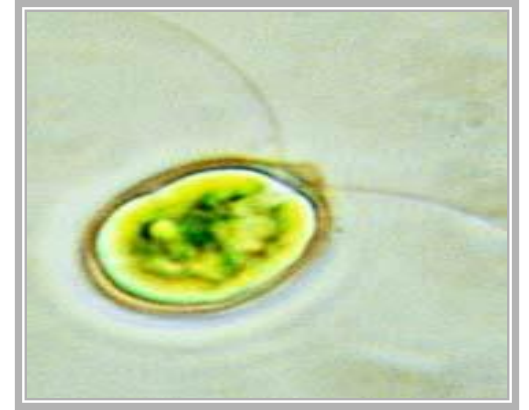
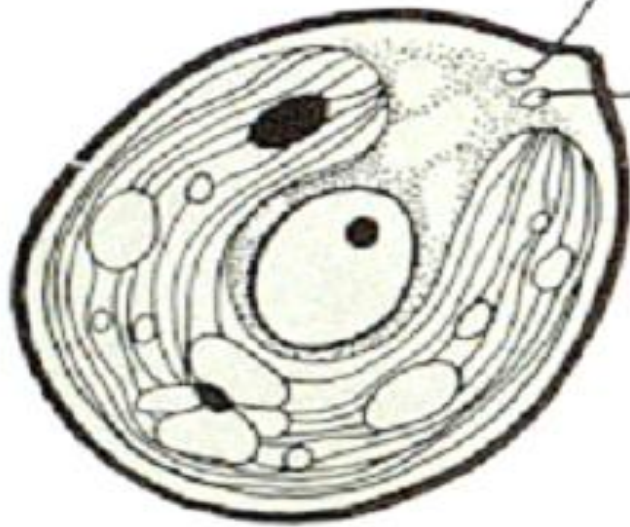
SEXUAL

LIFE CYCLE

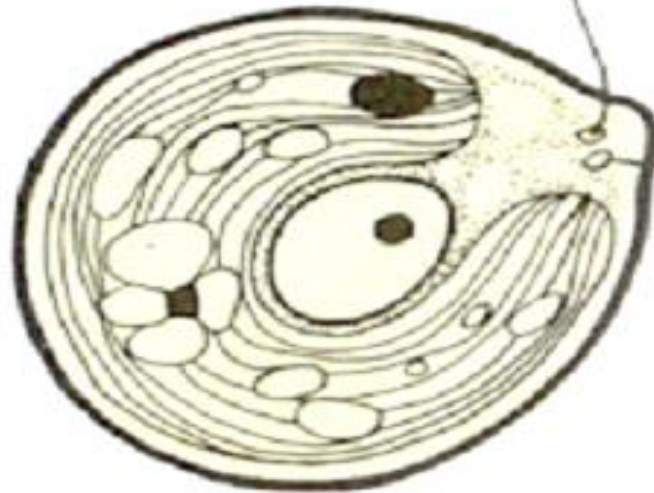
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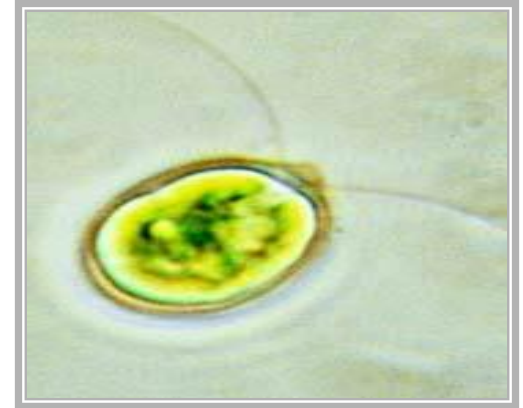
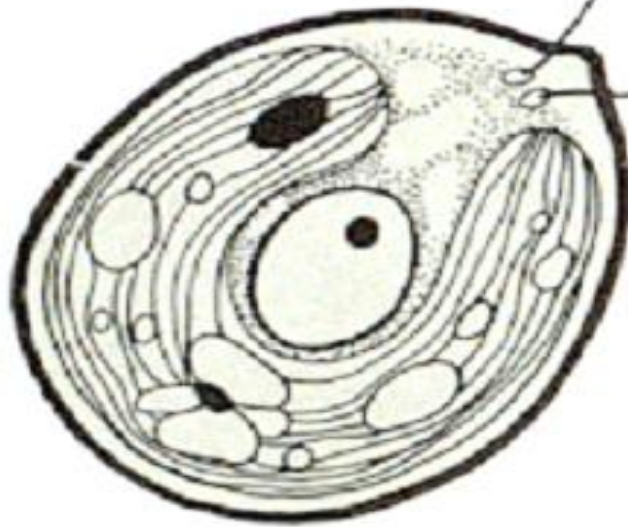


CHLAMYDOMONAS
SEXUAL LIFE CYCLE



**FREE-LIVING
CELLS**





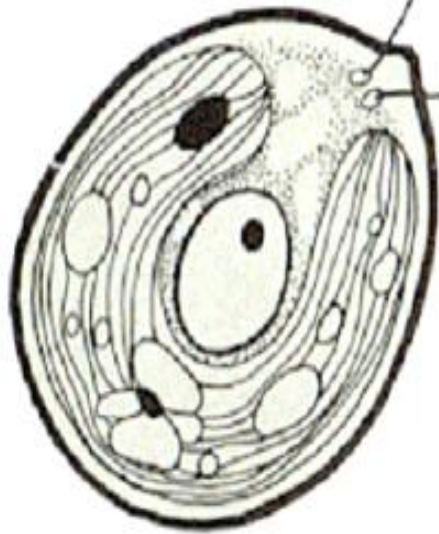
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**FREE-LIVING
CELLS
IN**



**FREE-LIVING
CELLS
IN**

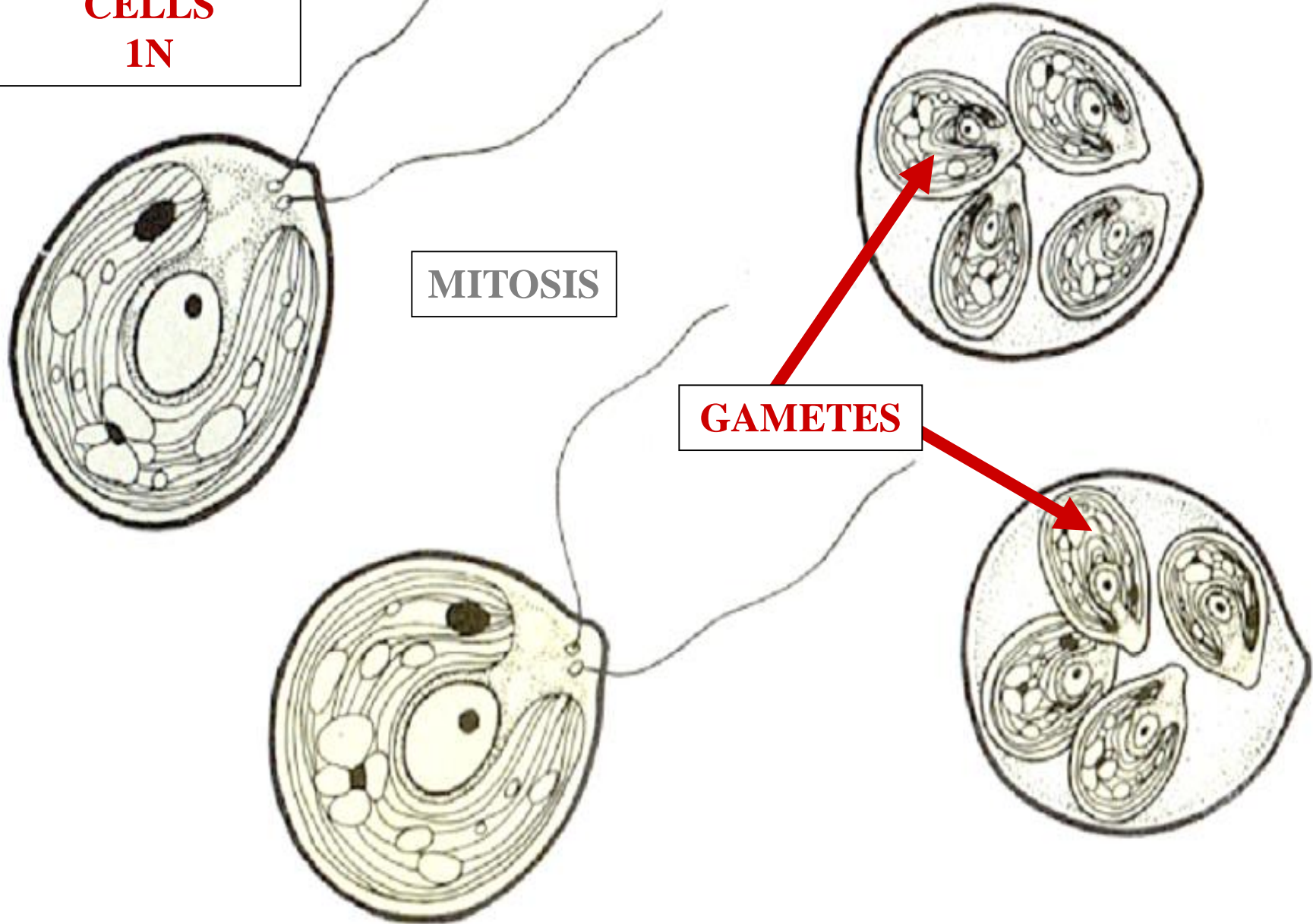
MITOSIS



**FREE-LIVING
CELLS
1N**

MITOSIS

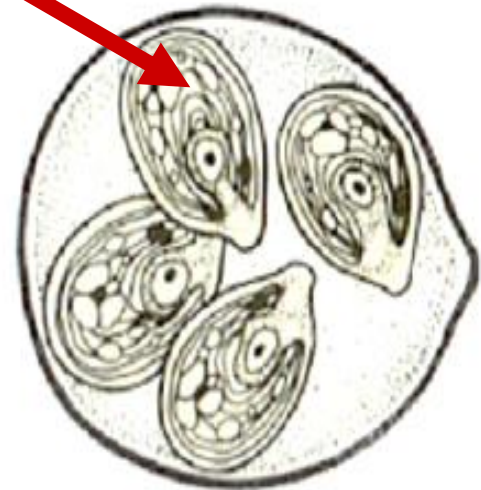
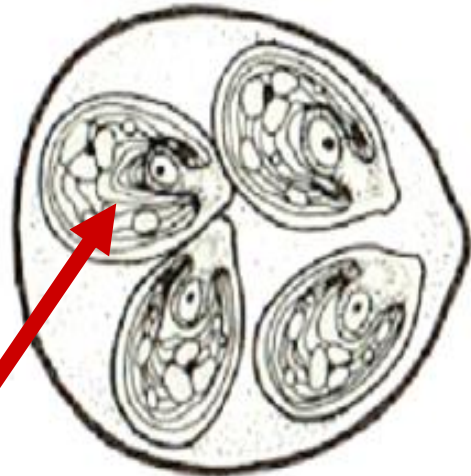
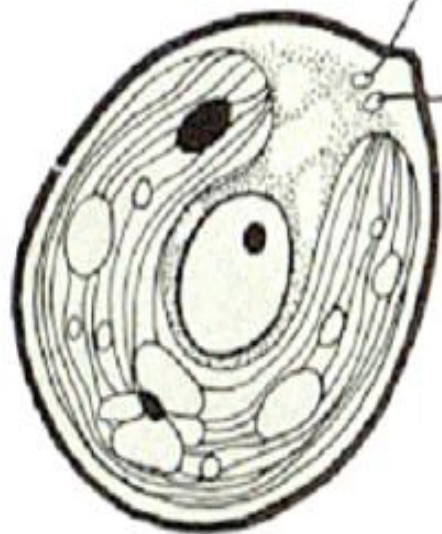
GAMETES



**FREE-LIVING
CELLS
1N**

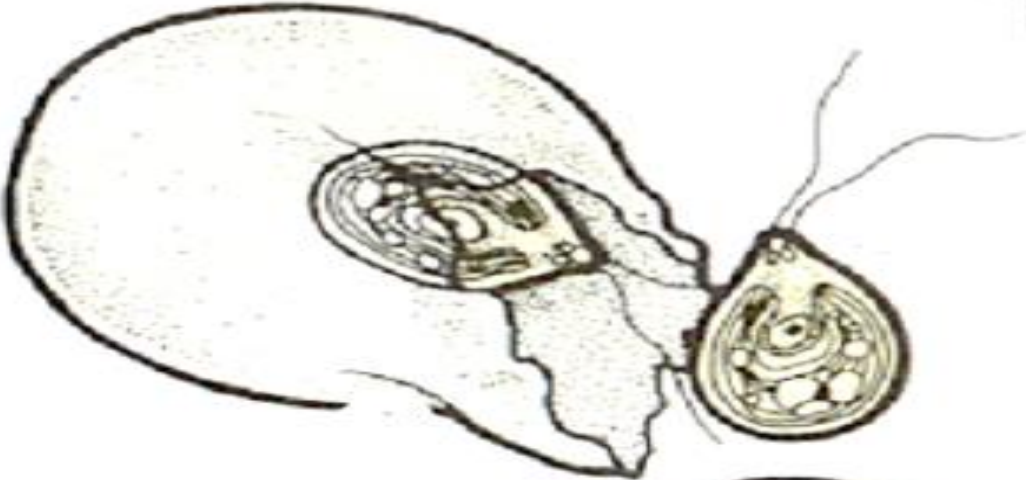
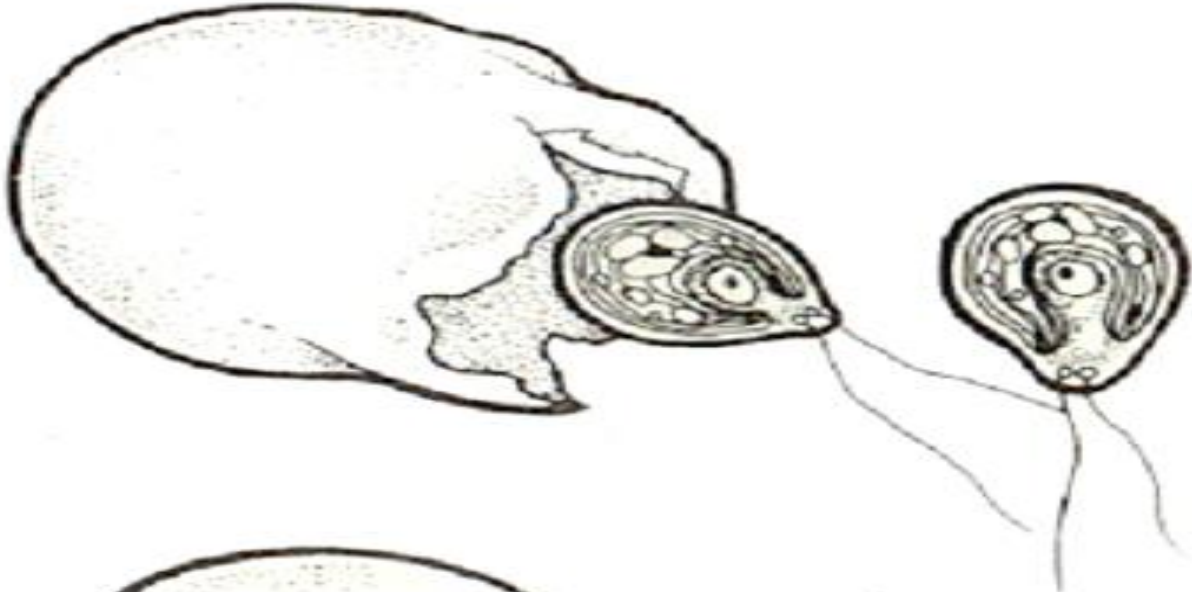
MITOSIS

1N

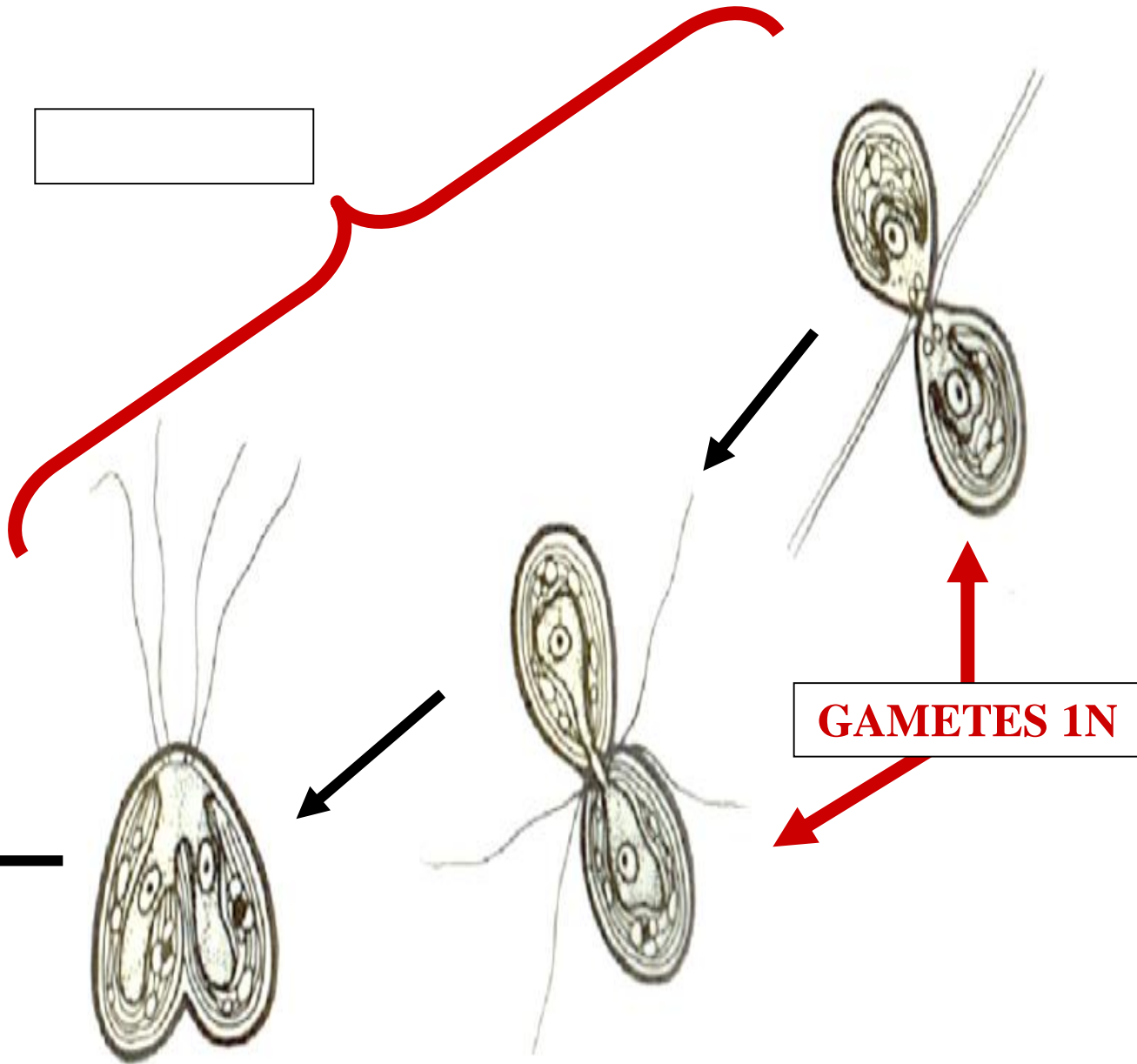
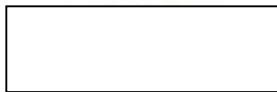




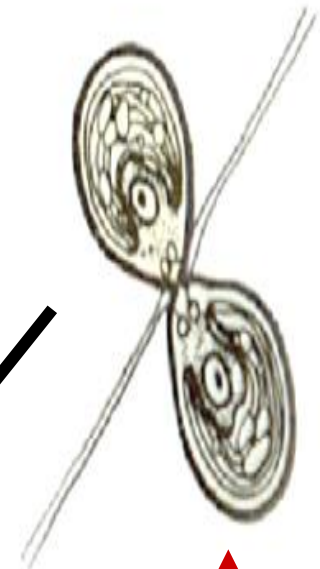
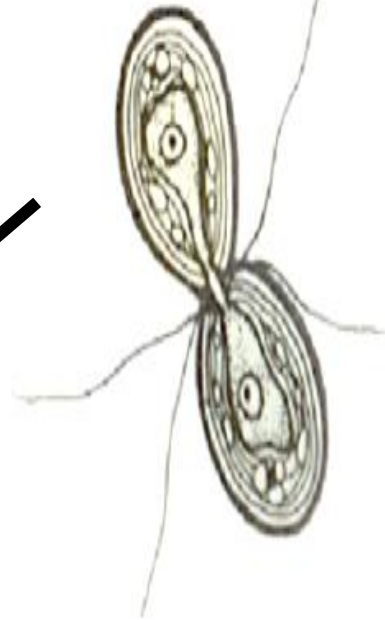
GAMETES 1N



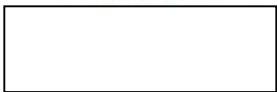
**FREE-LIVING
CELLS
1N**



SYNGAMY



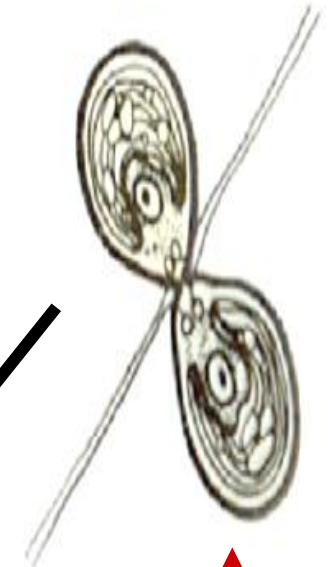
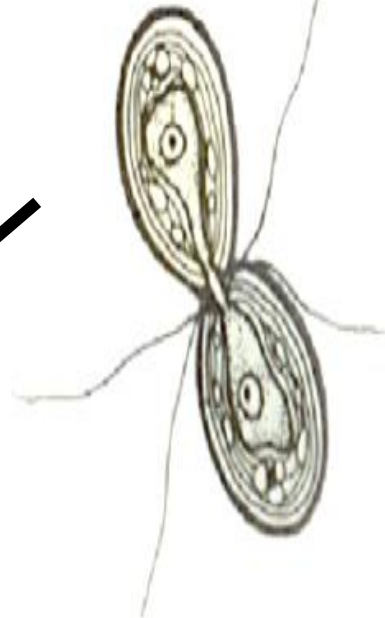
GAMETES 1N



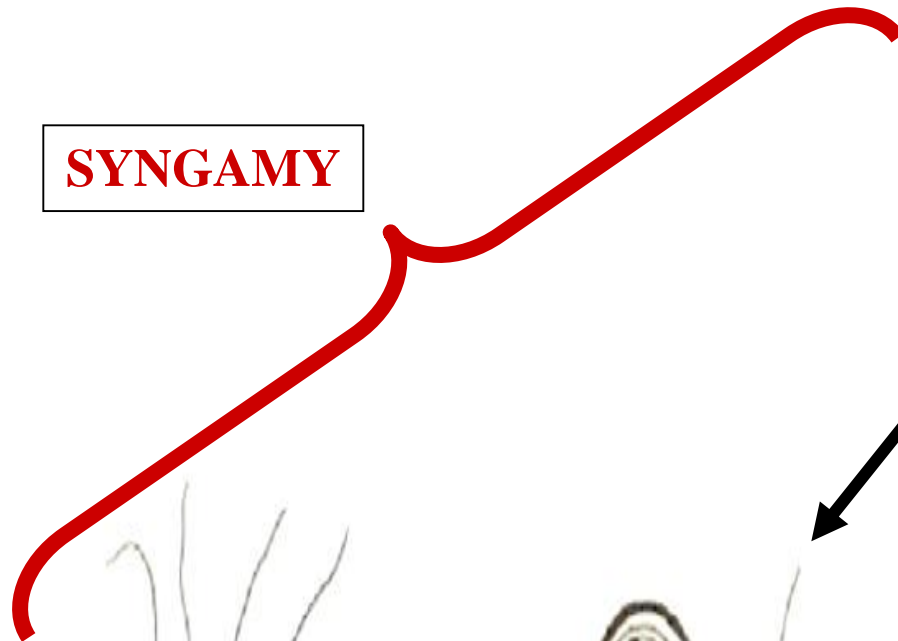
SYNGAMY



ZYGOTE



GAMETES 1N



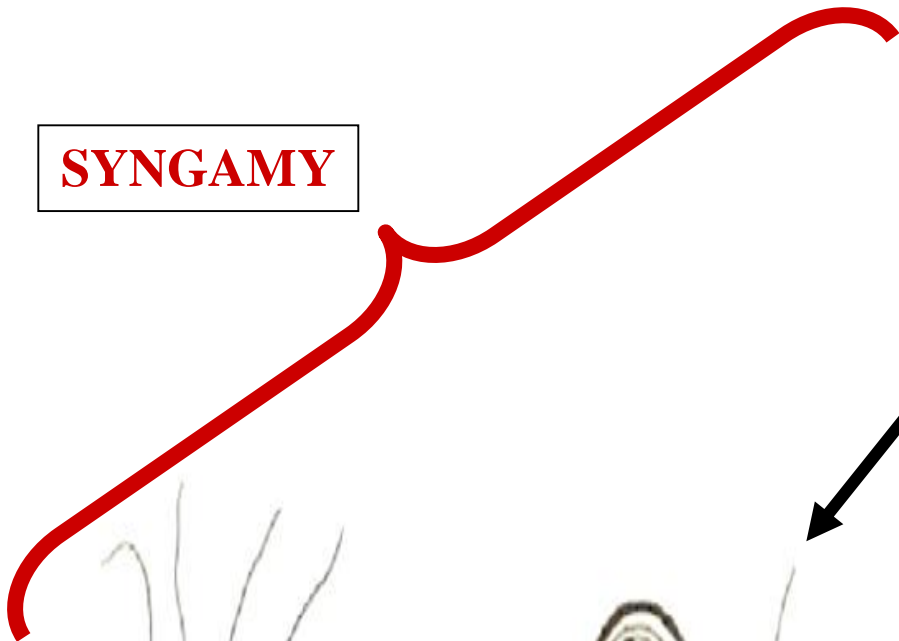
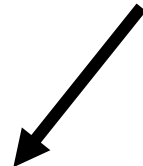
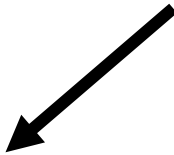
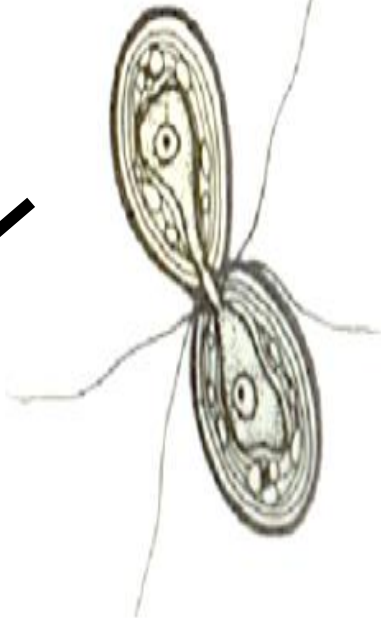


SYNGAMY

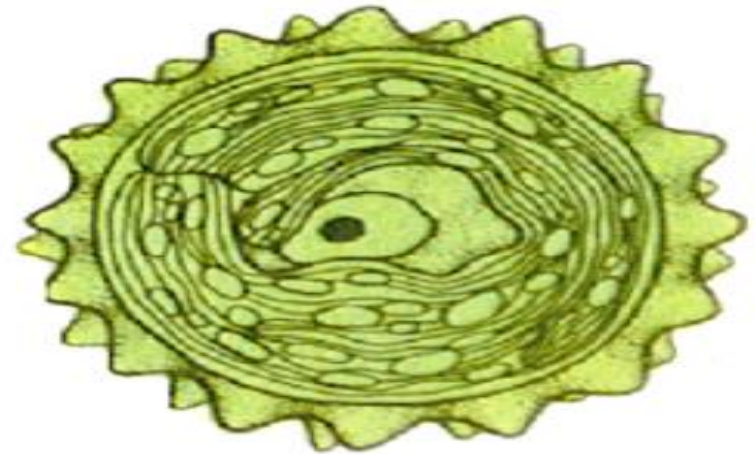
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2N

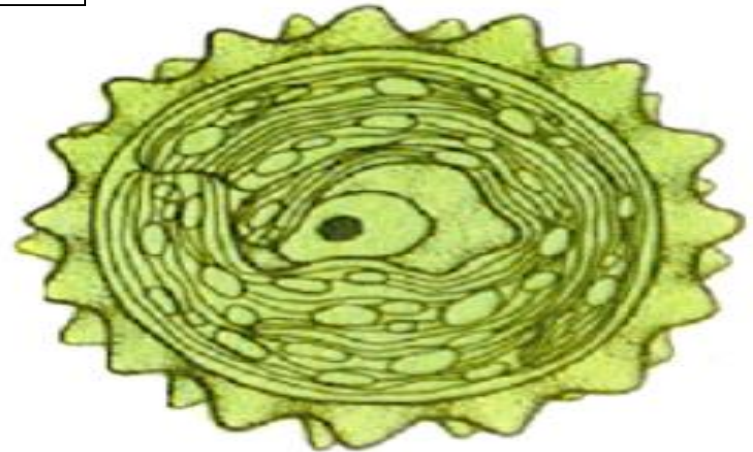


ZYGOTE = GERM CELL

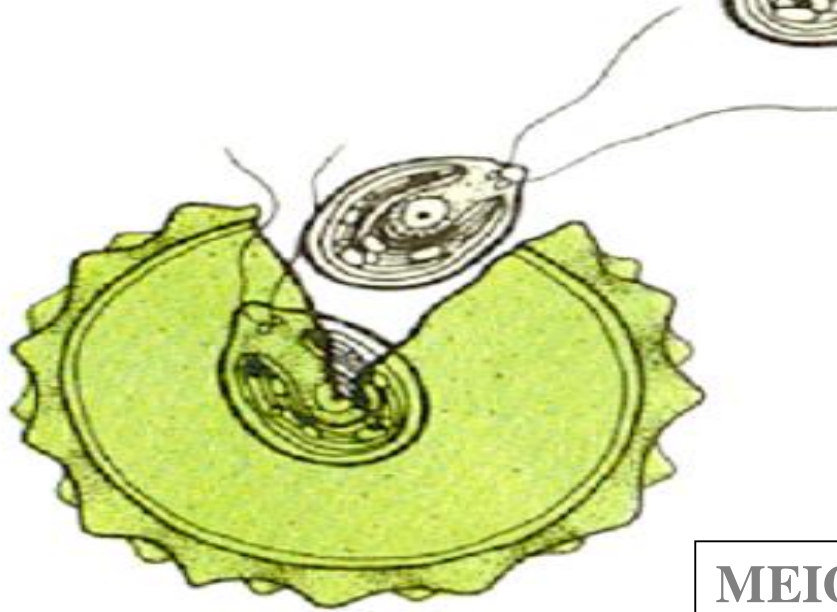
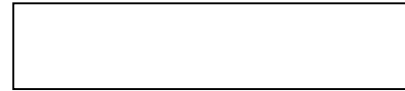


MEIOSIS

ZYGOTE = GERM CELL

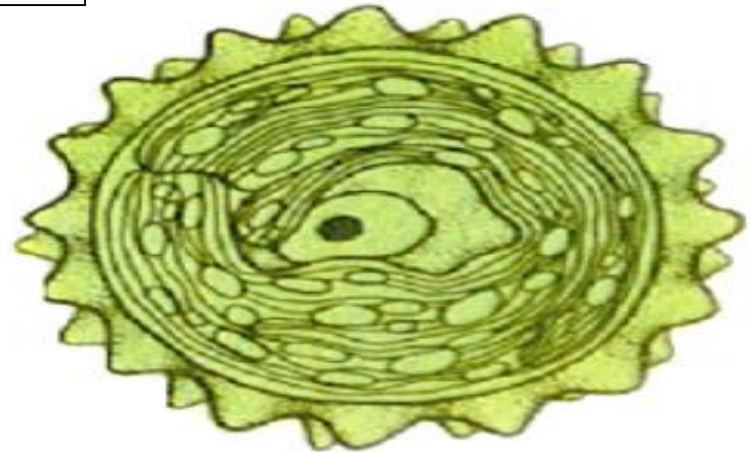


**FREE-LIVING
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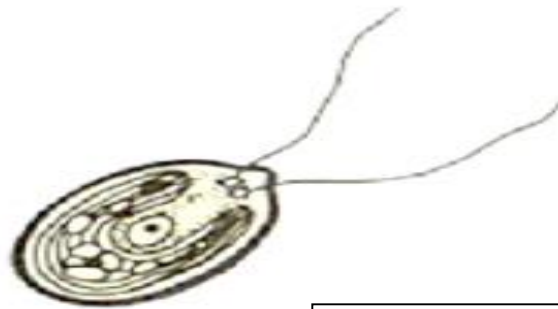
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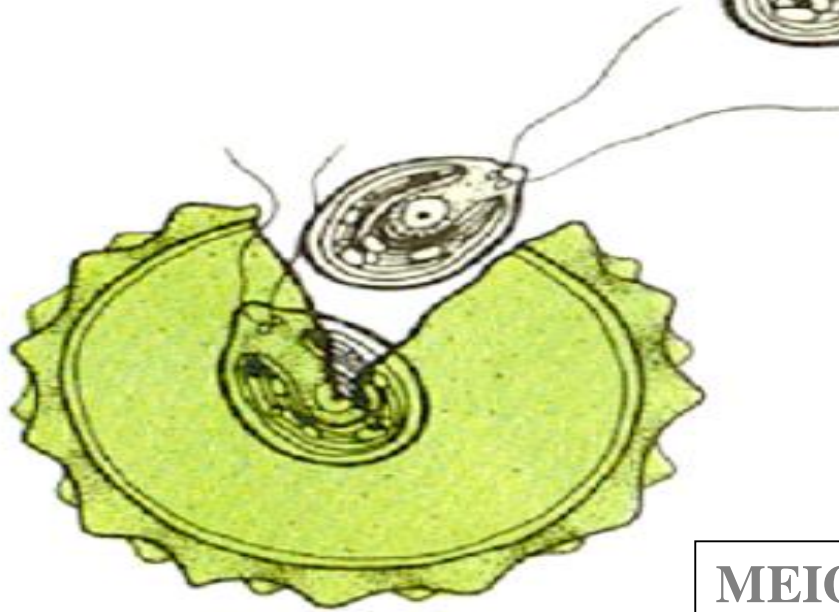




**FREE-LIVING
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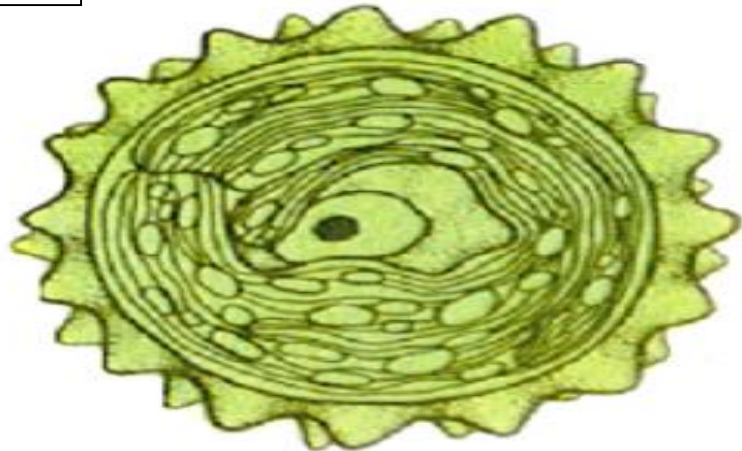


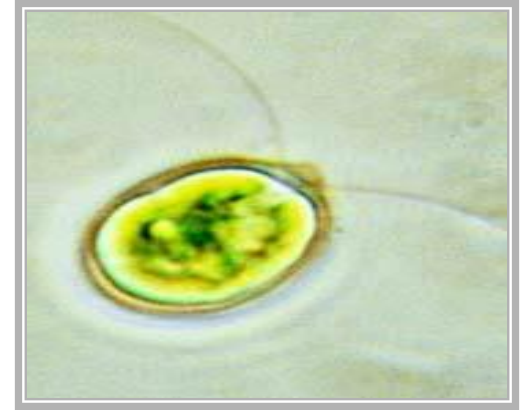
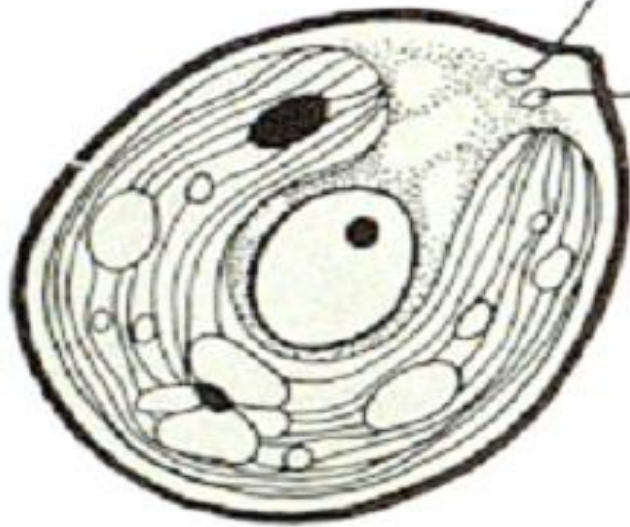
1N



MEIOSIS

ZYGOTE = GERM CELL



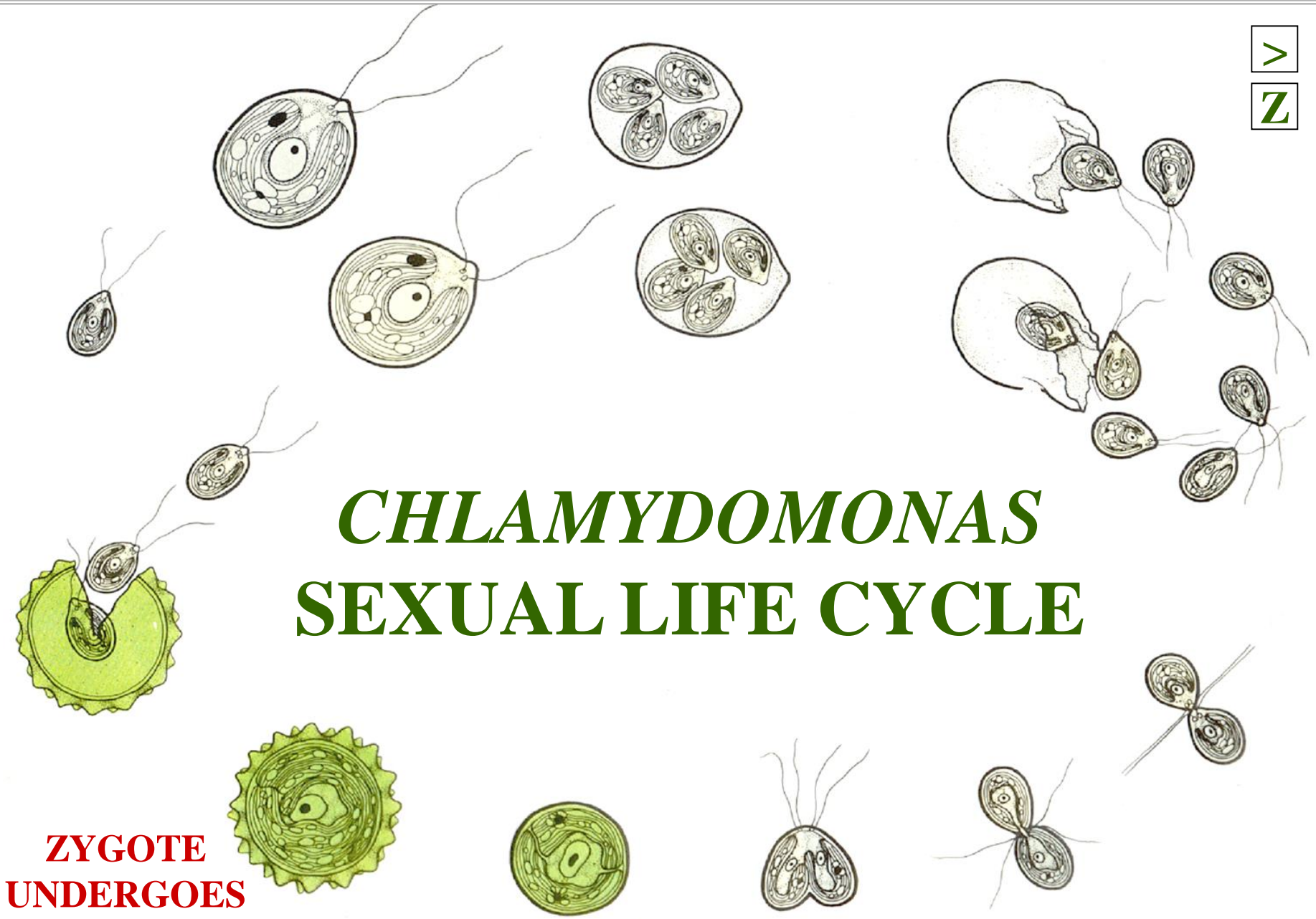


**FREE-LIVING
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IN**

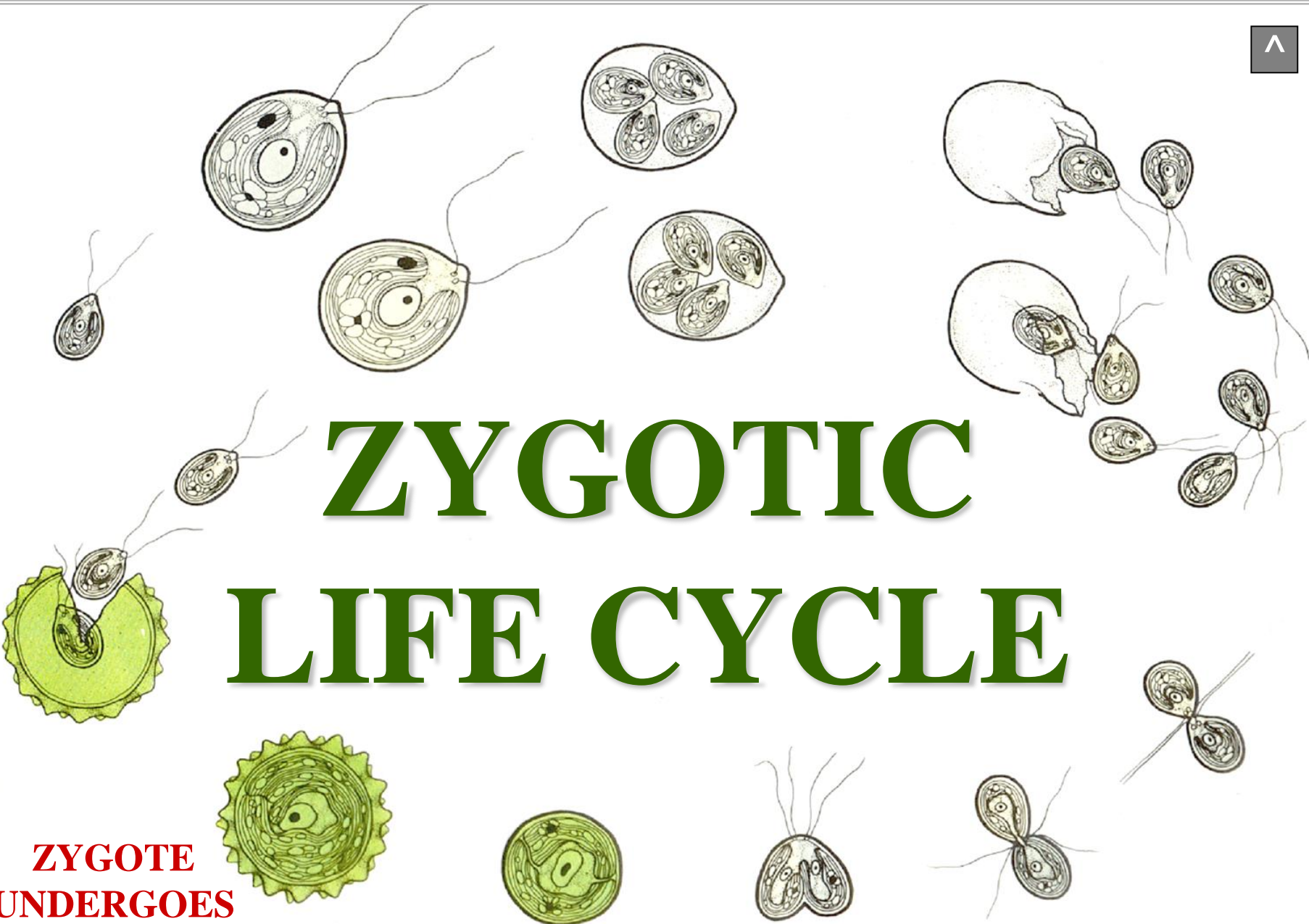




CHLAMYDOMONAS SEXUAL LIFE CYCLE



**ZYGOTE
UNDERGOES
MEIOSIS**

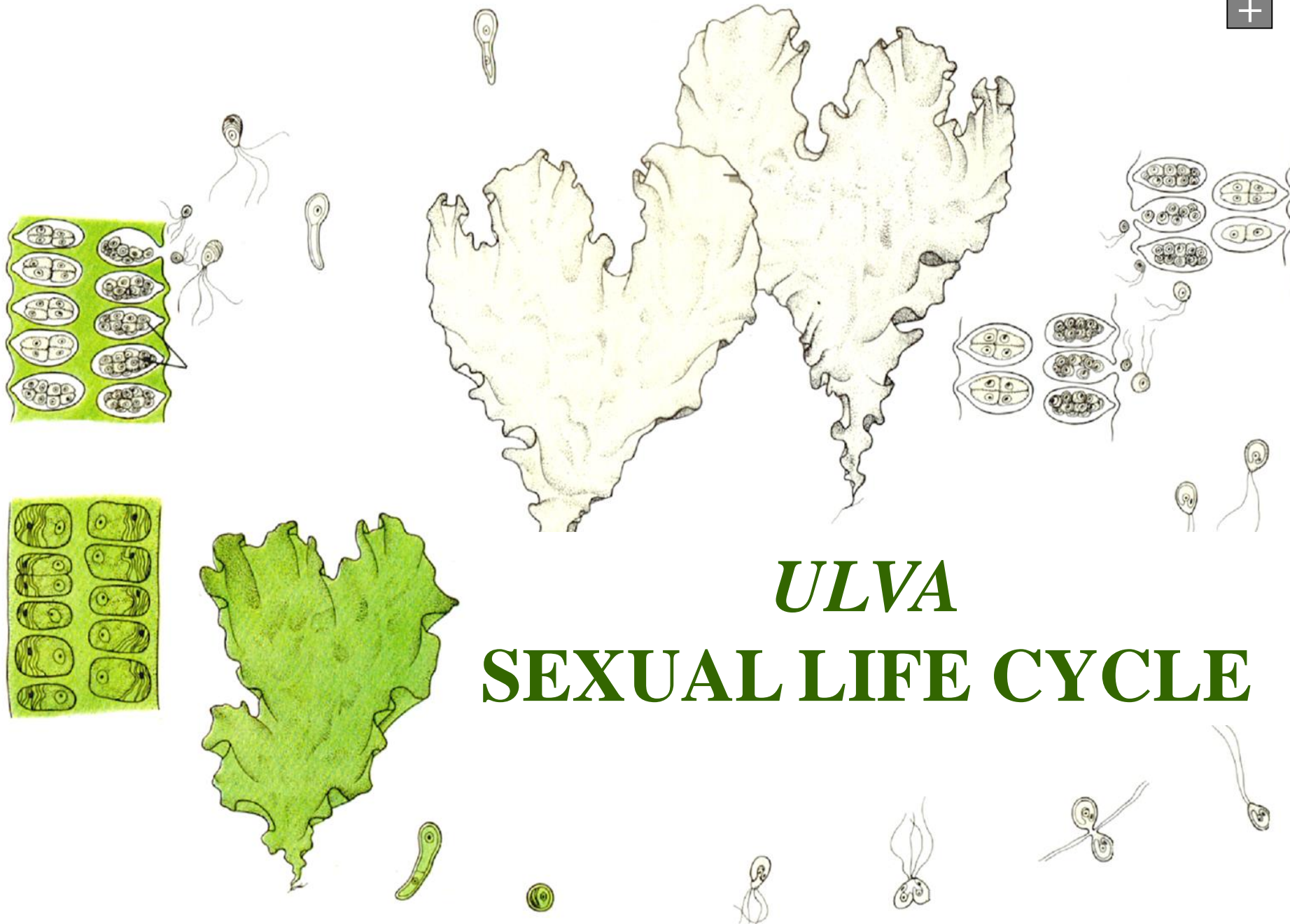


ZYGOTIC LIFE CYCLE

**ZYGOTE
UNDERGOES
MEIOSIS**

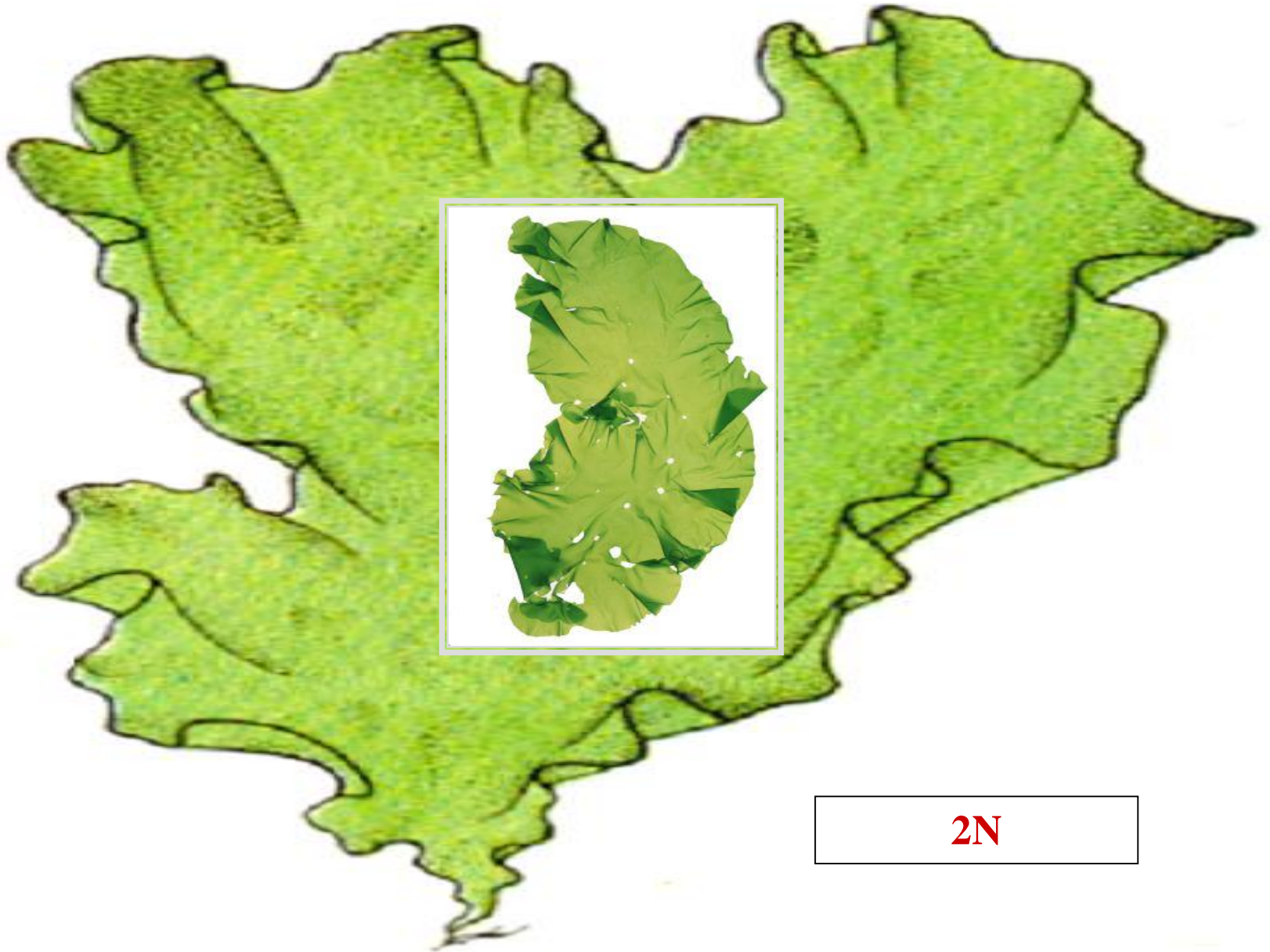


ULVA
SEXUAL
LIFE CYCLE
PAGE: 353

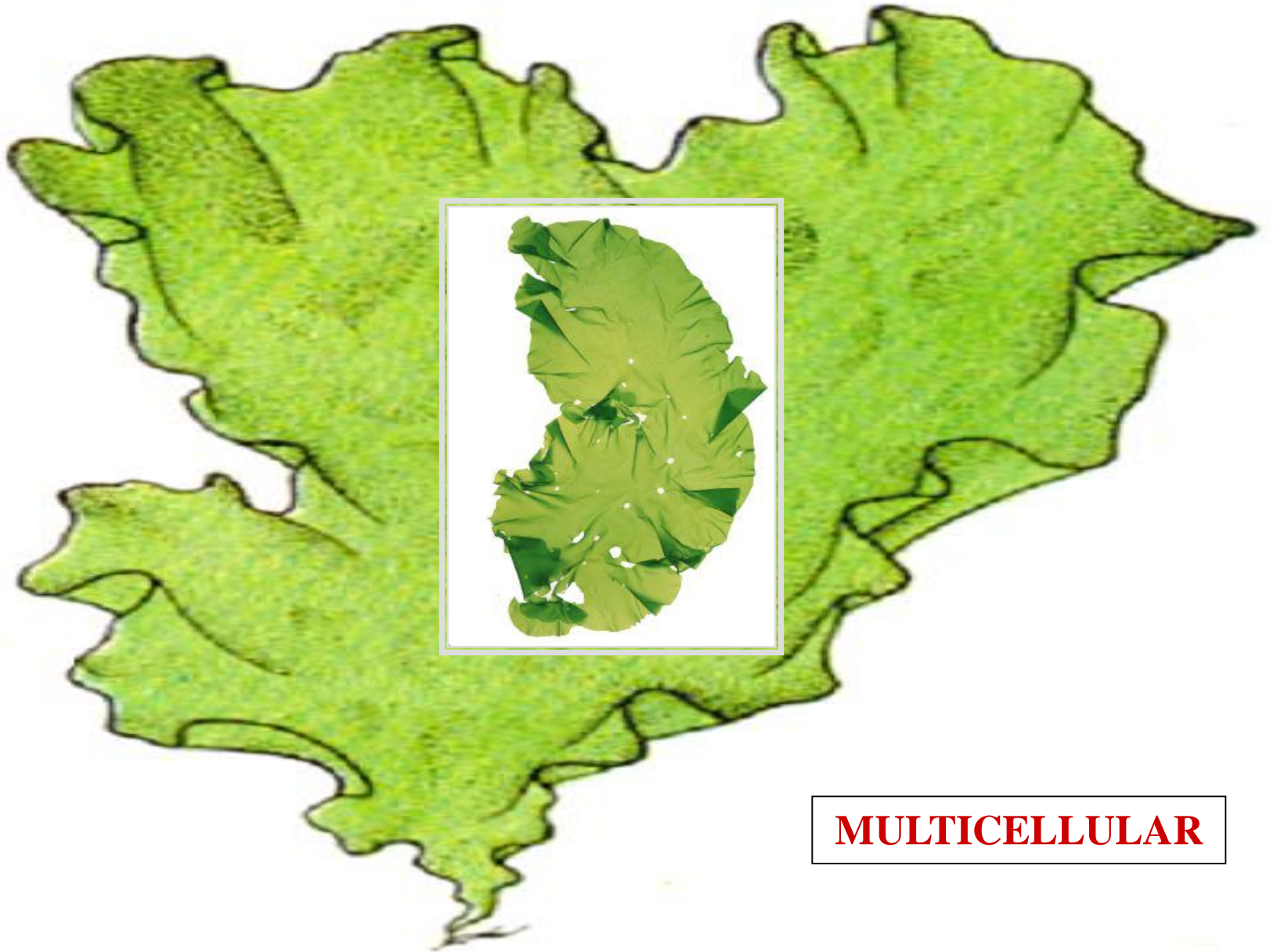




SPOROPHYTE



2N



MULTICELLULAR

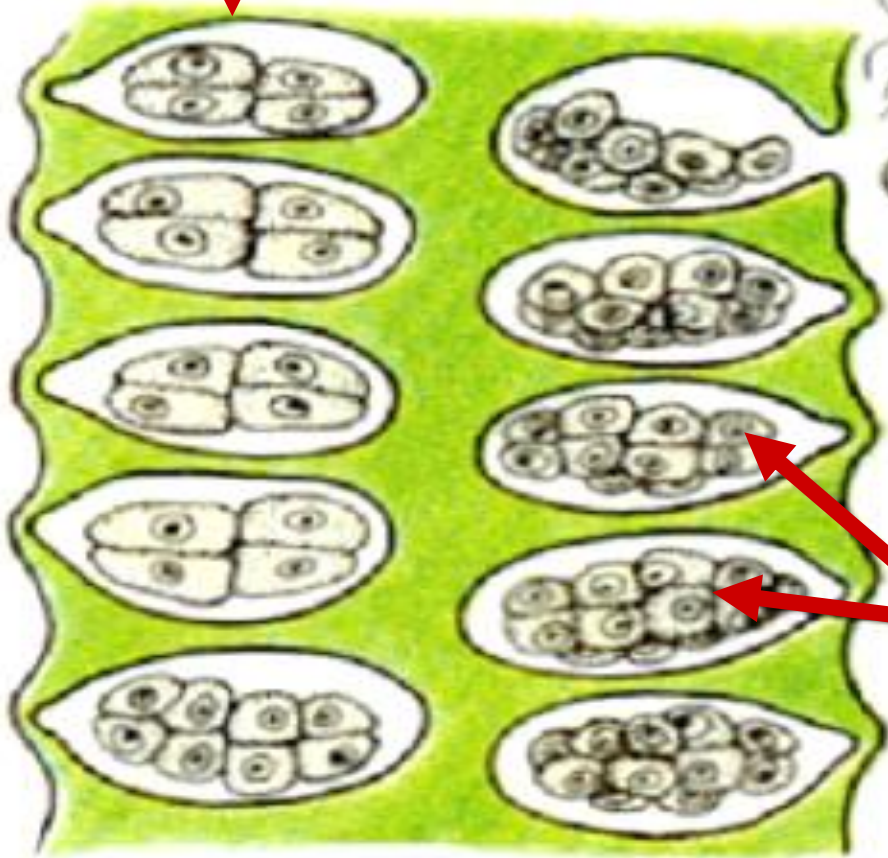


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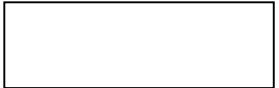
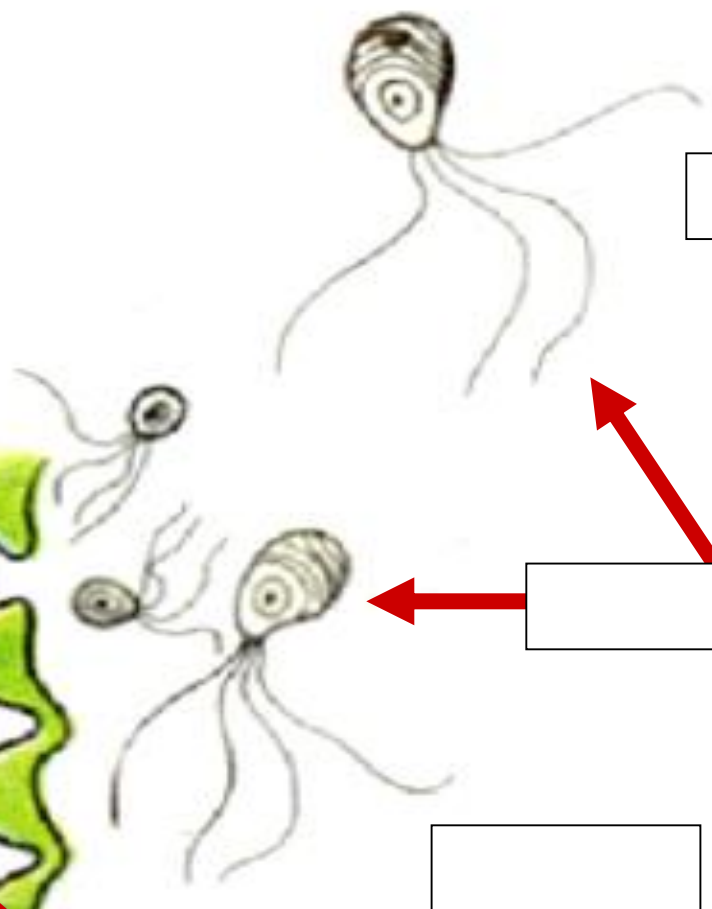


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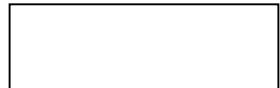
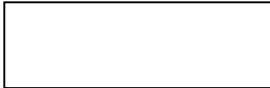
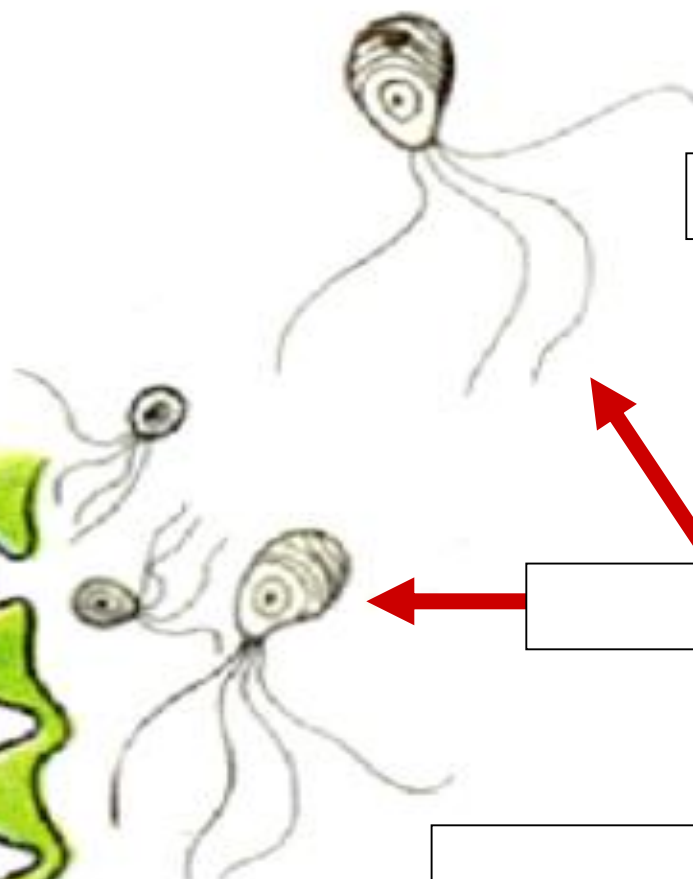
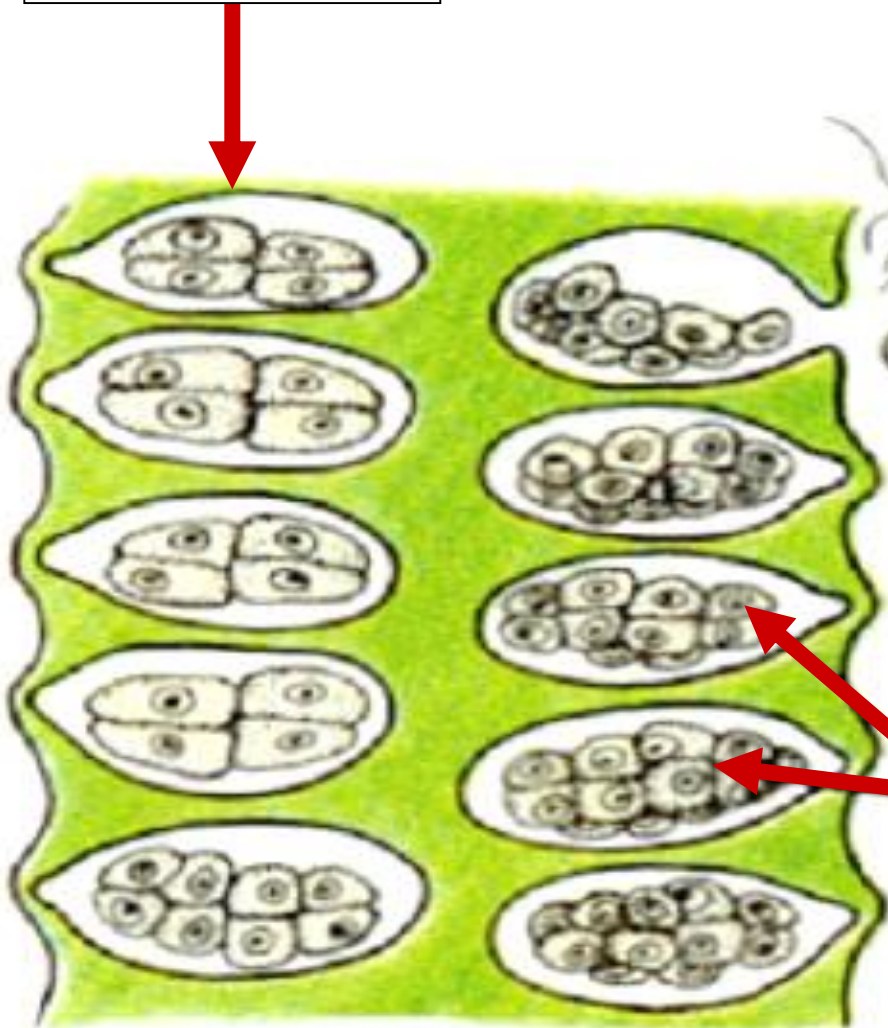
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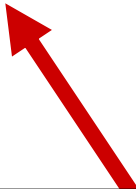
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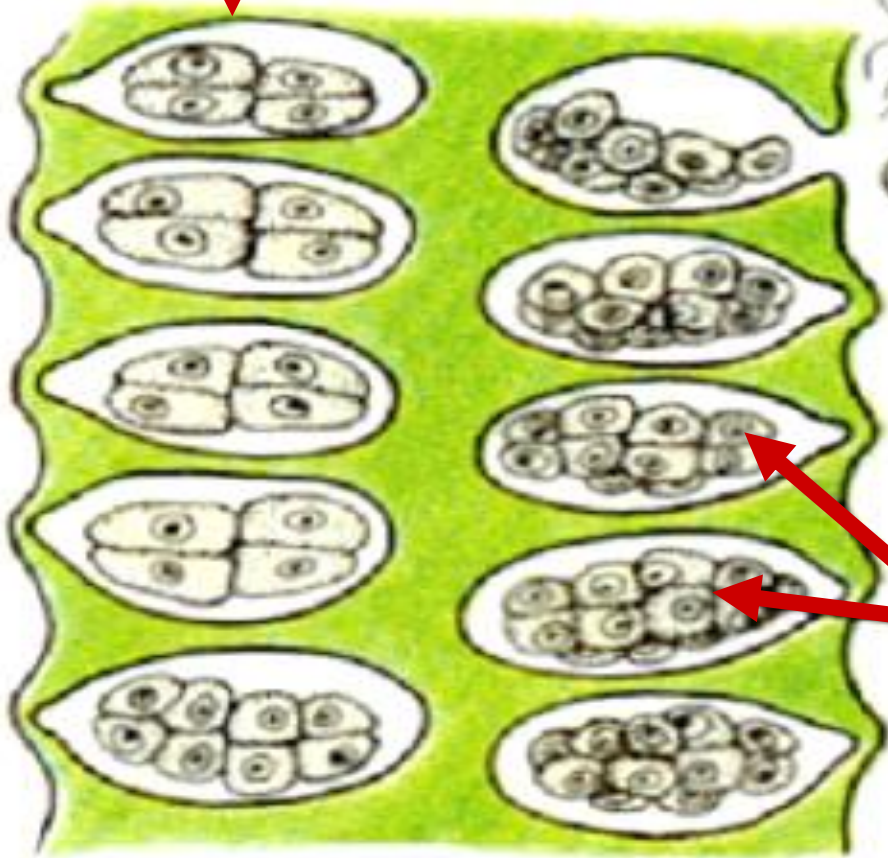
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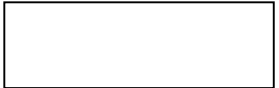
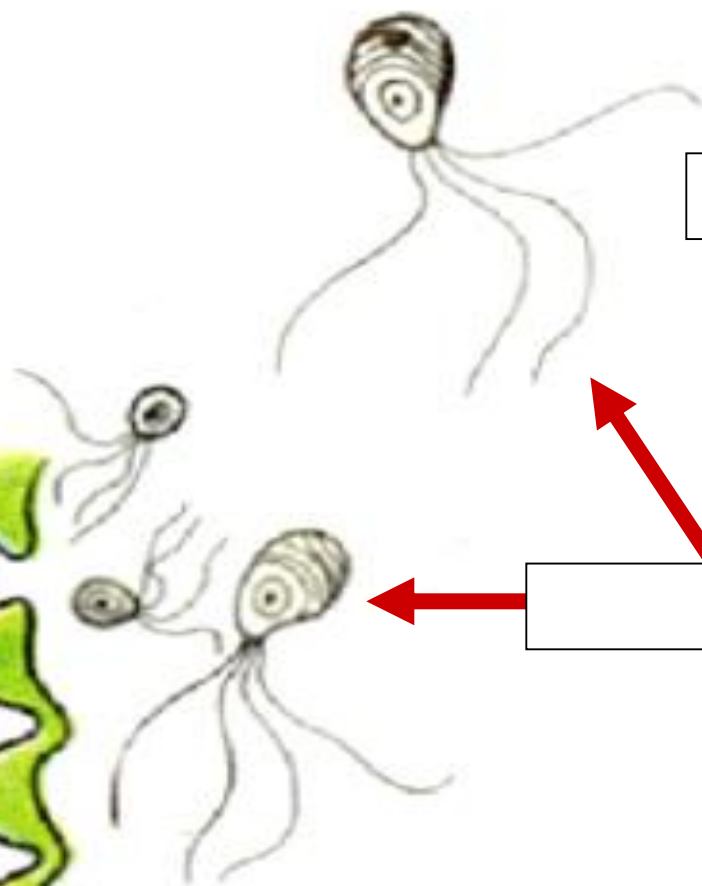
2N



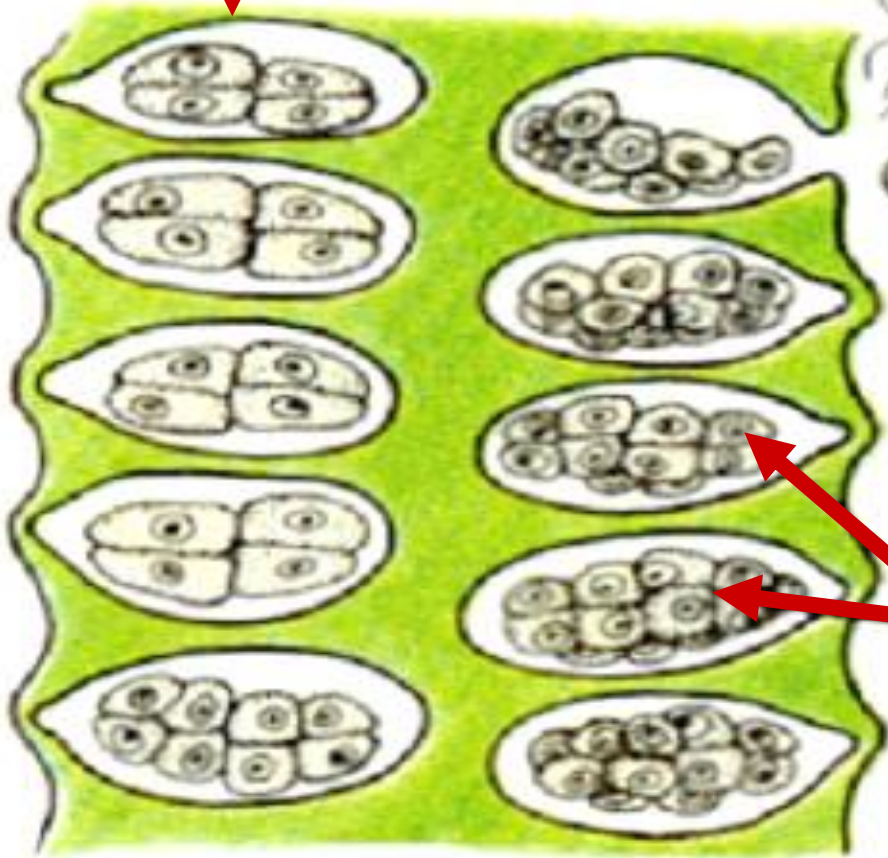
SPORANGIUM



**SPOROCTES
GERM CELLS**

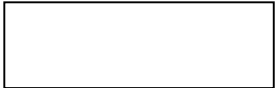
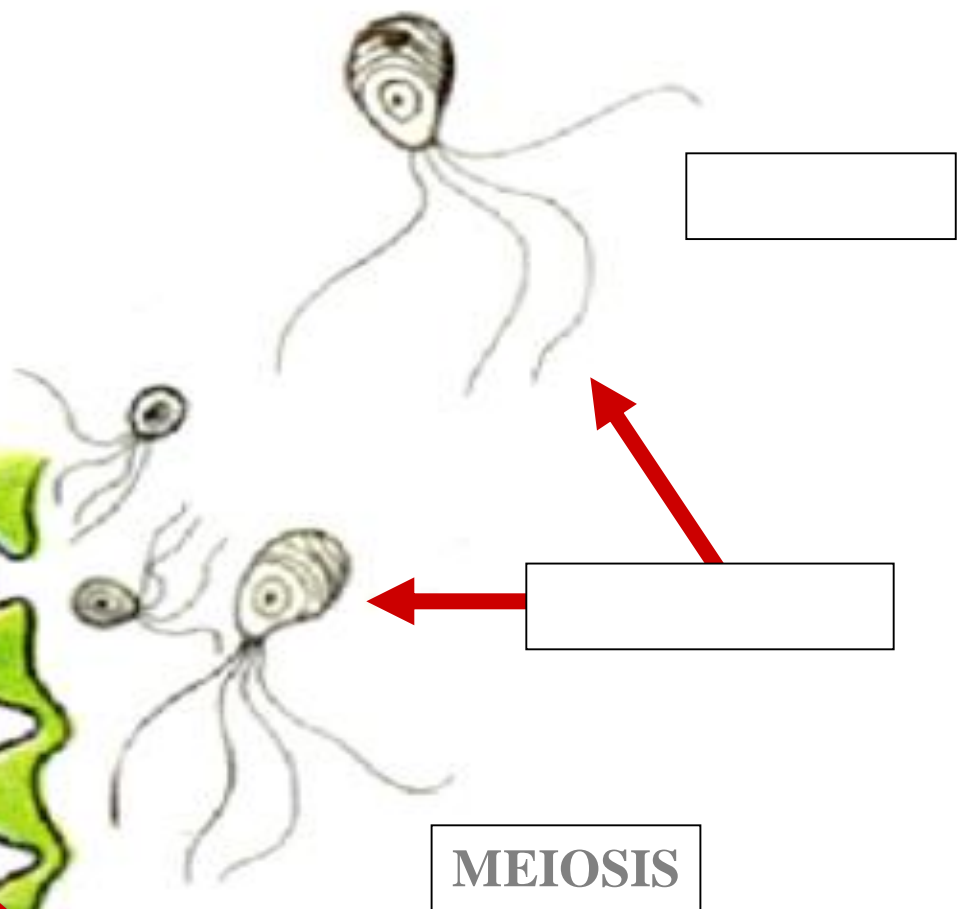


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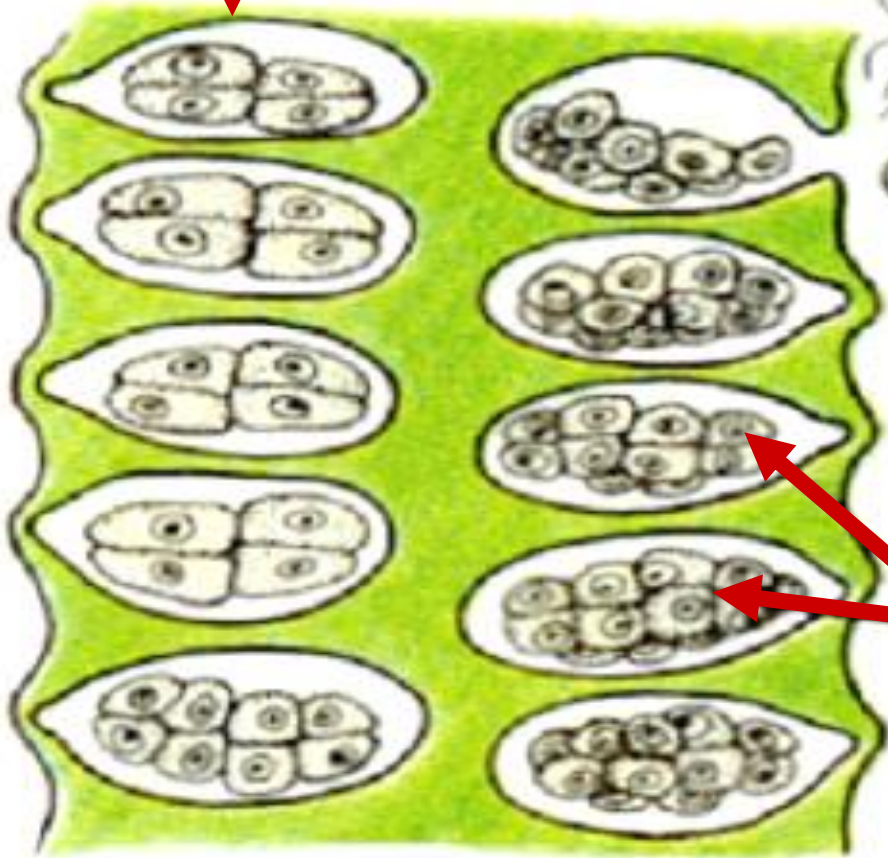


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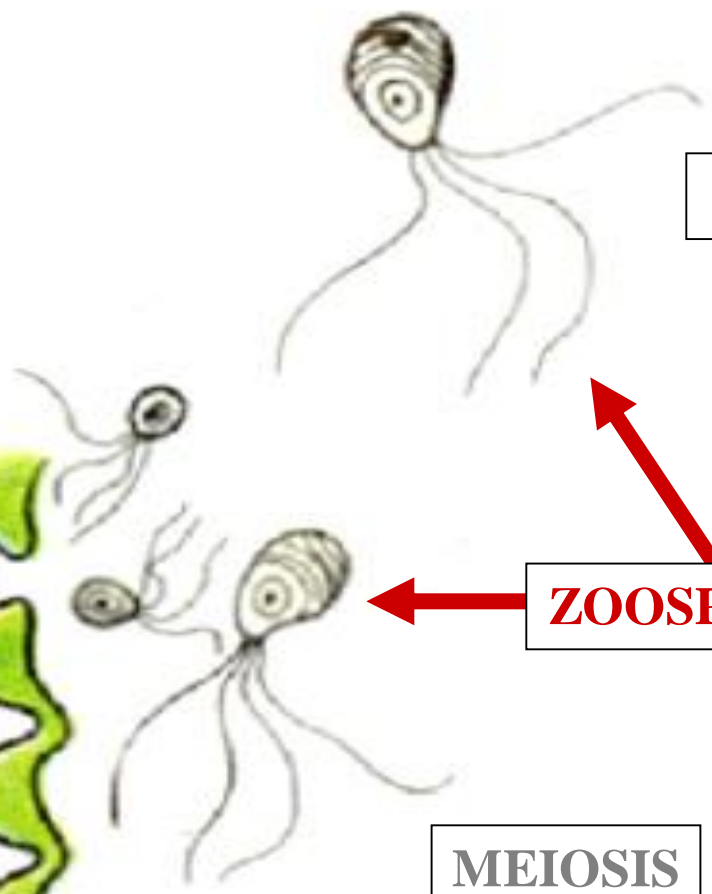
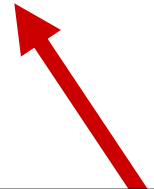
SPOROCYTES



SPORANGIUM

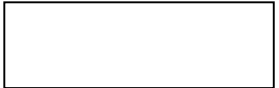


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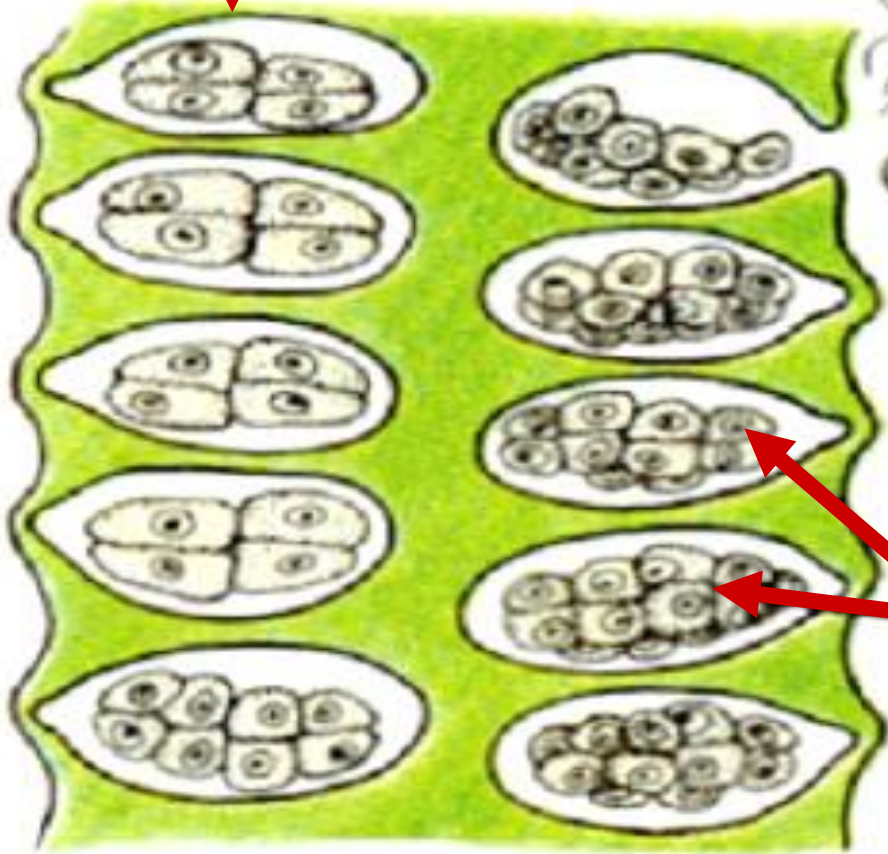


MEIOSIS

SPOROCYTES



SPORANGIUM

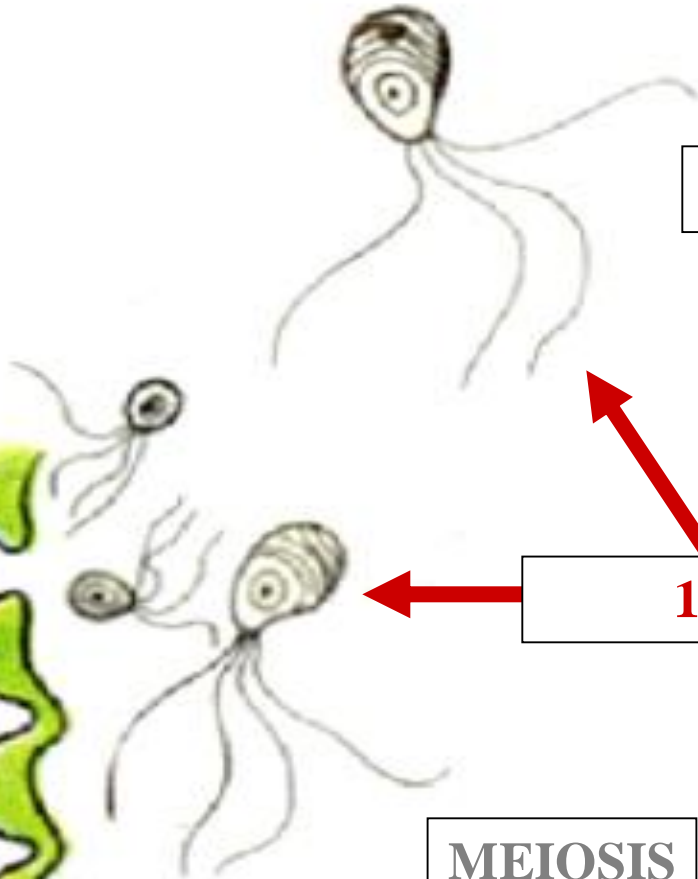


1N



MEIOSIS

SPOROCYTES



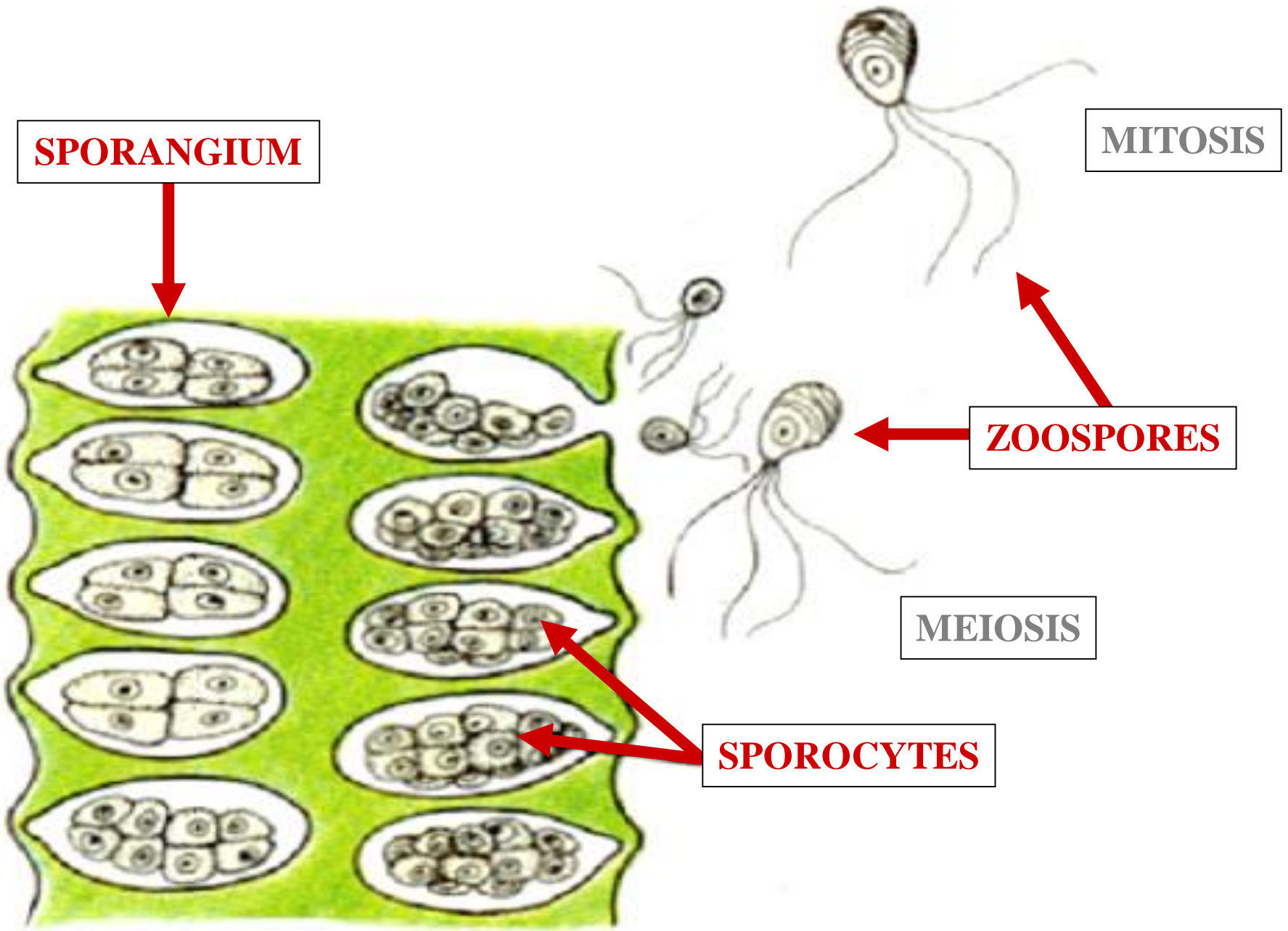
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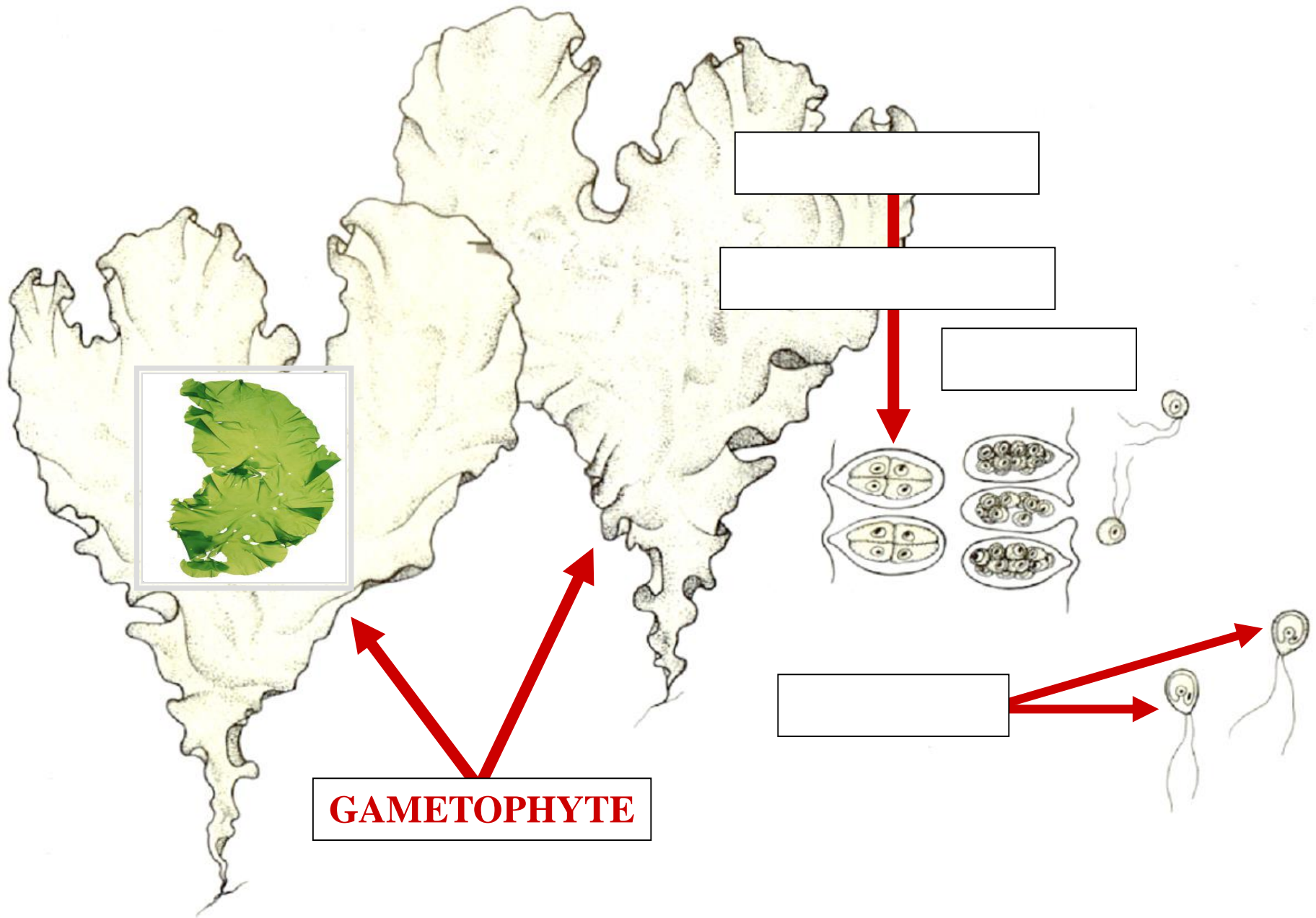
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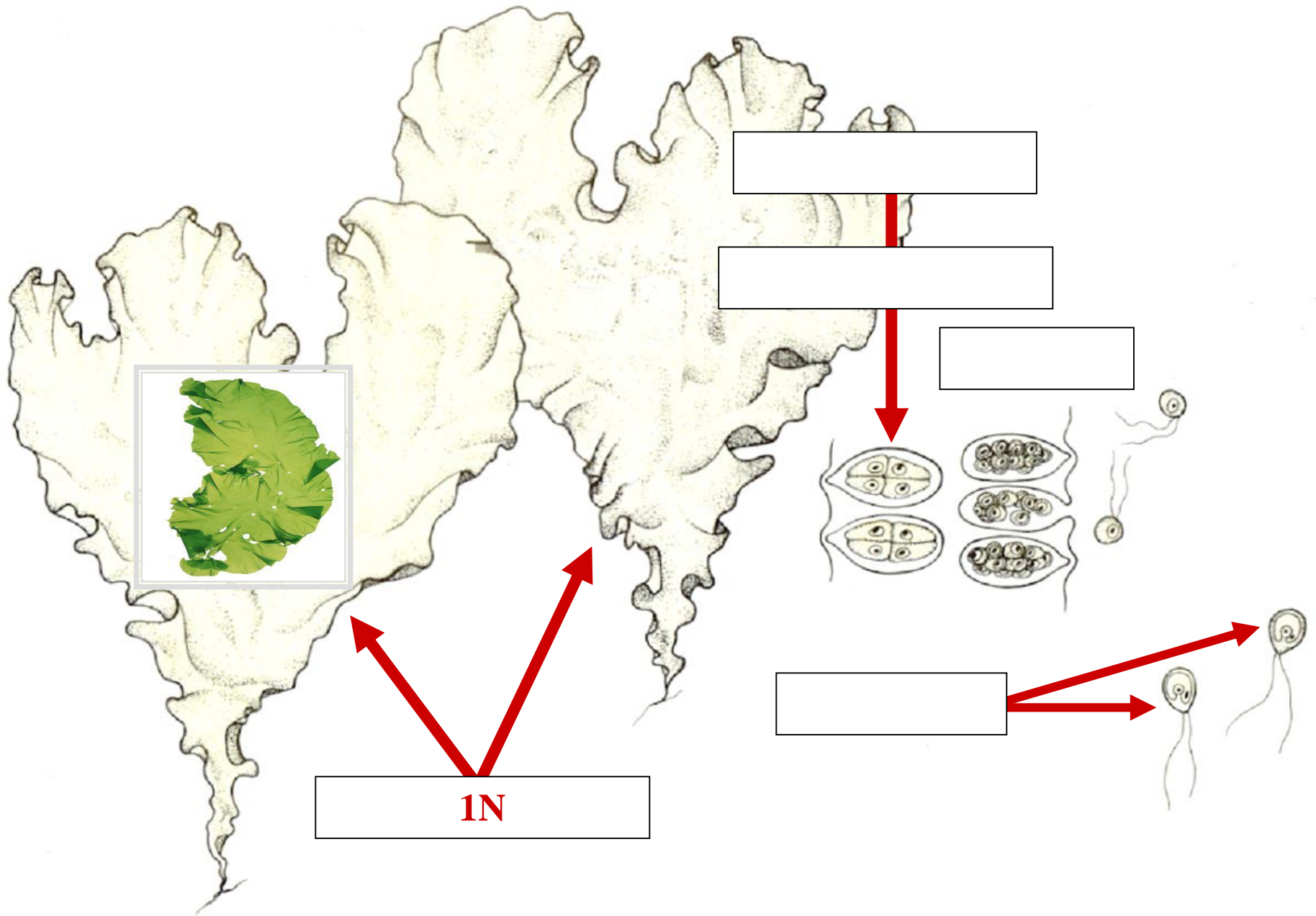
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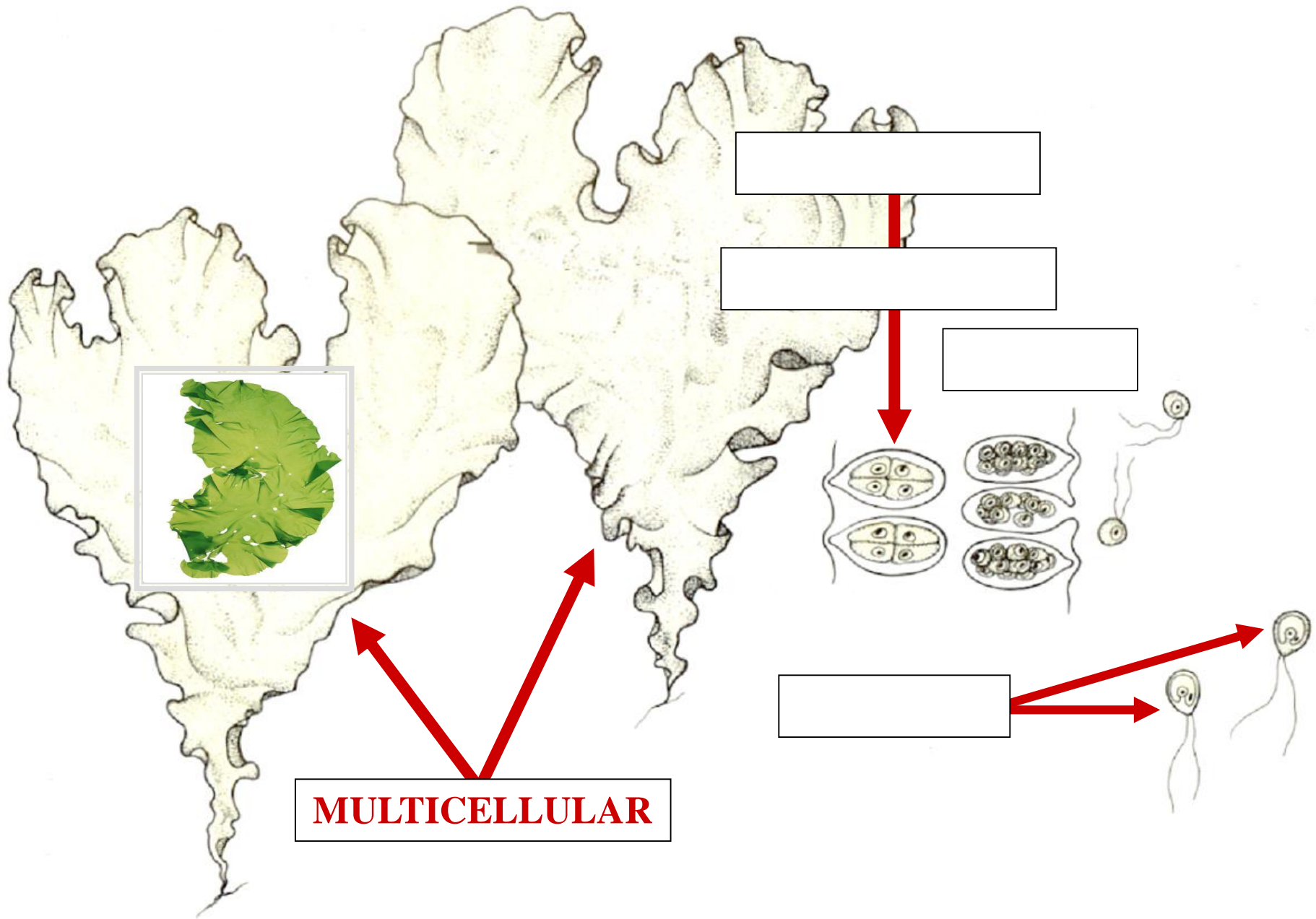
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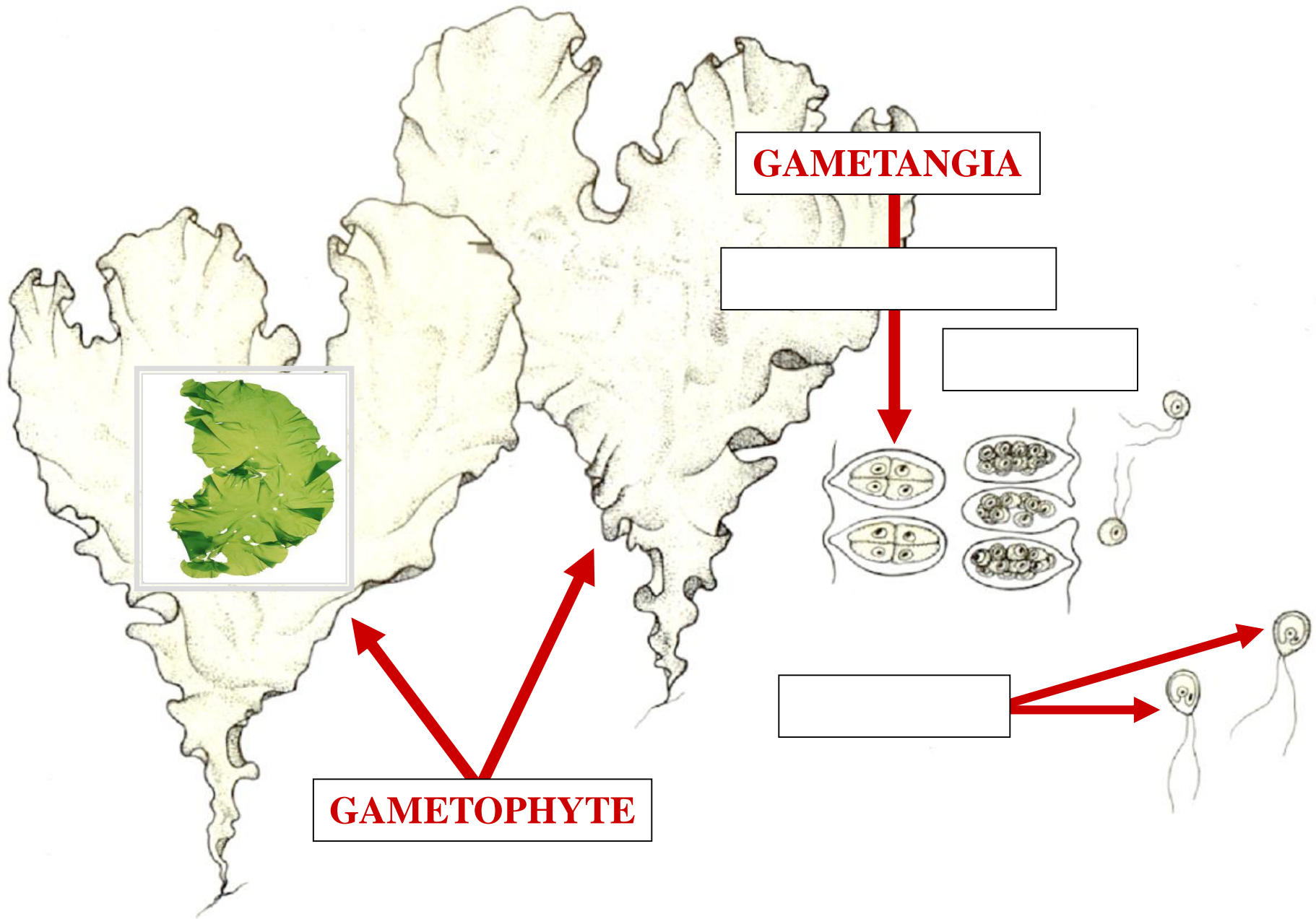


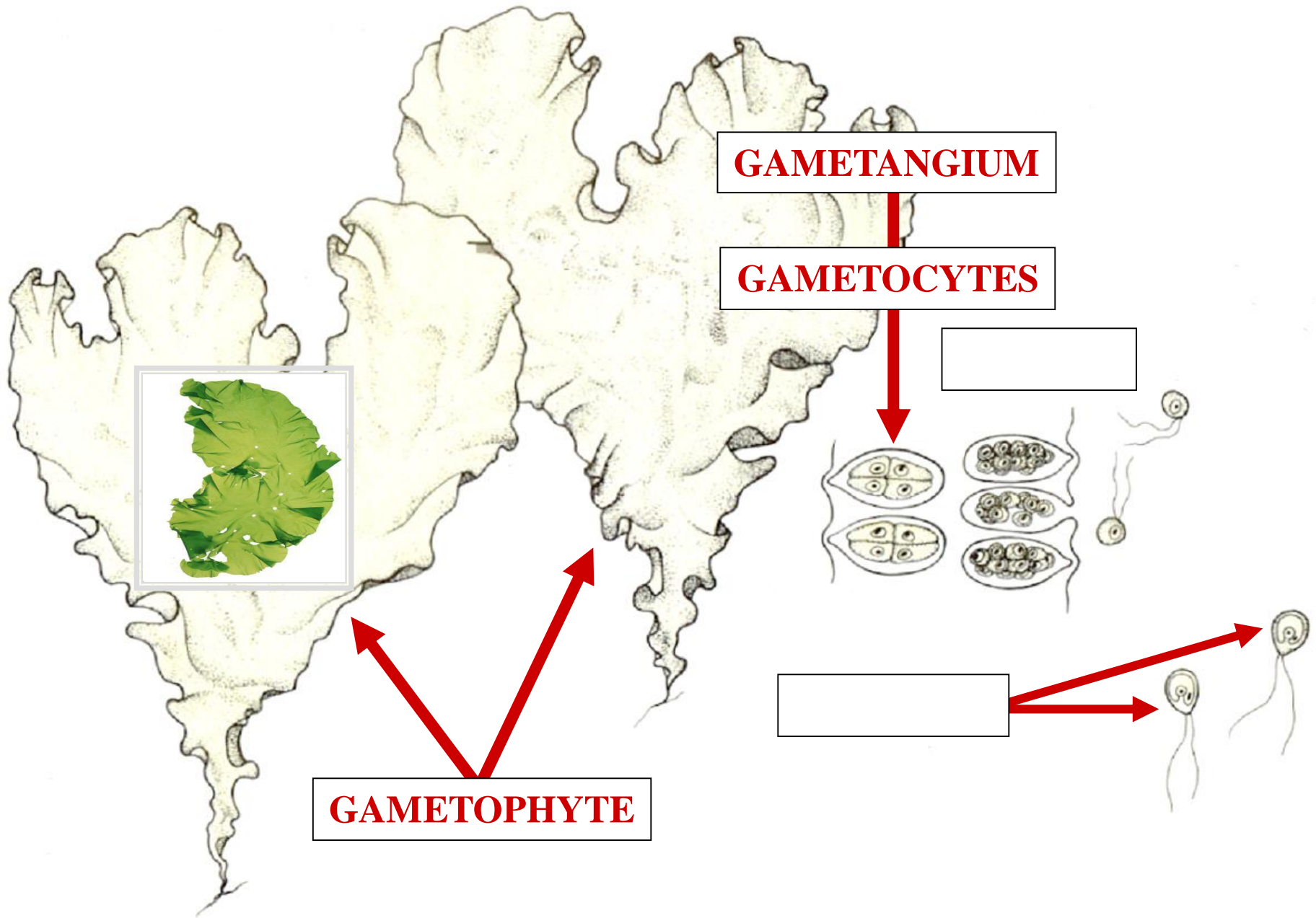






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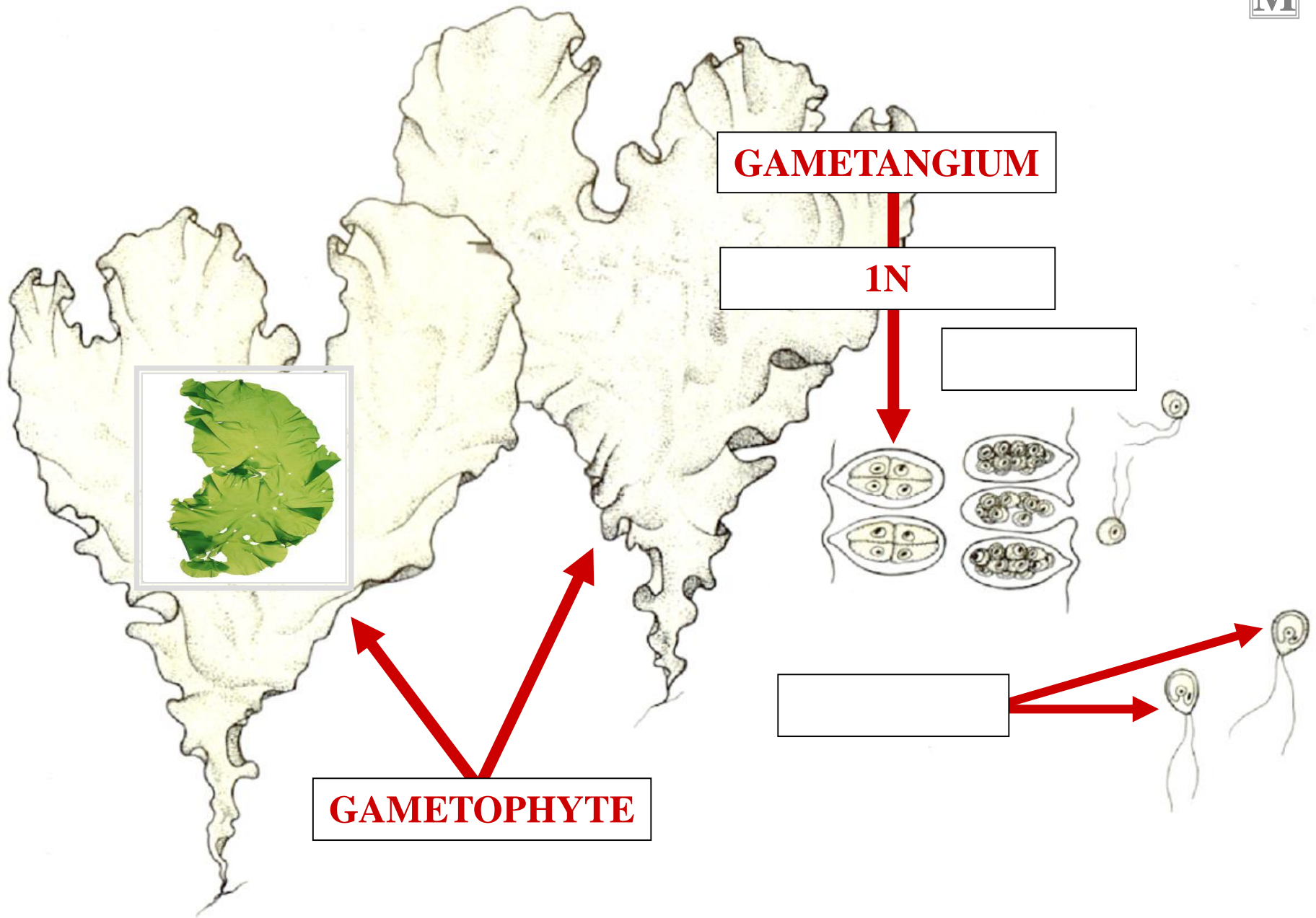


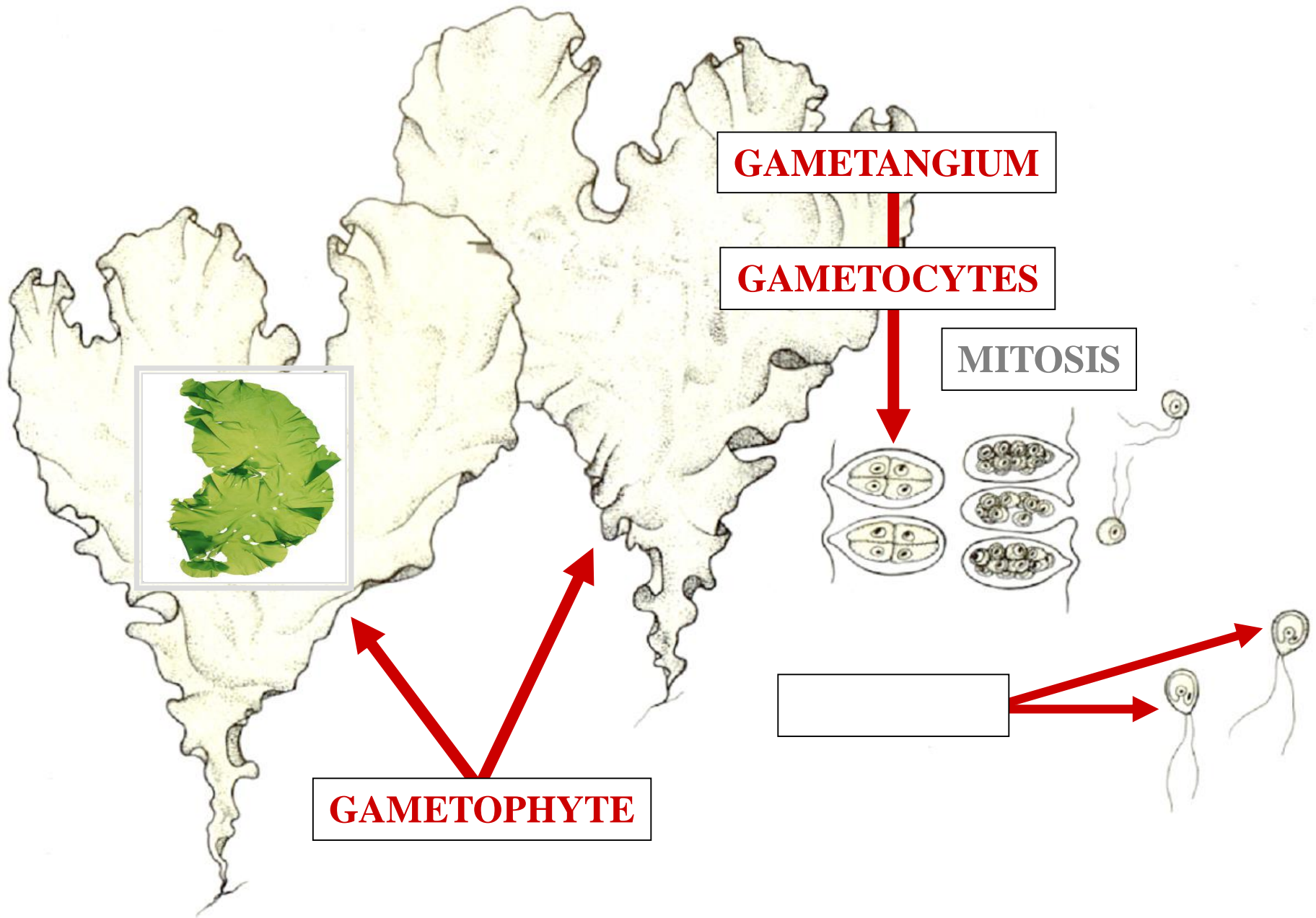


GAMETANGIUM

GAMETOCYTES

GAMETOPHYTE





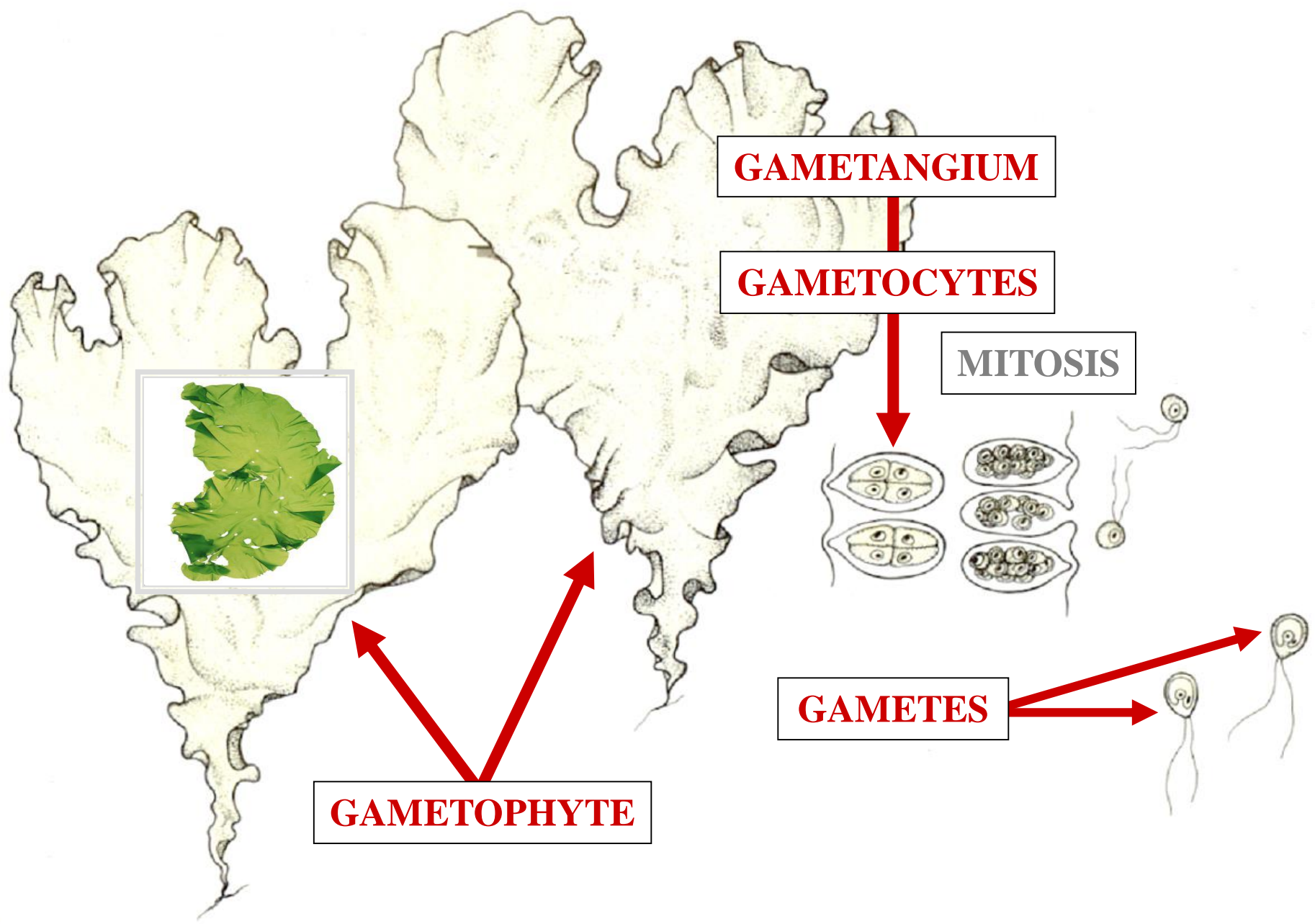
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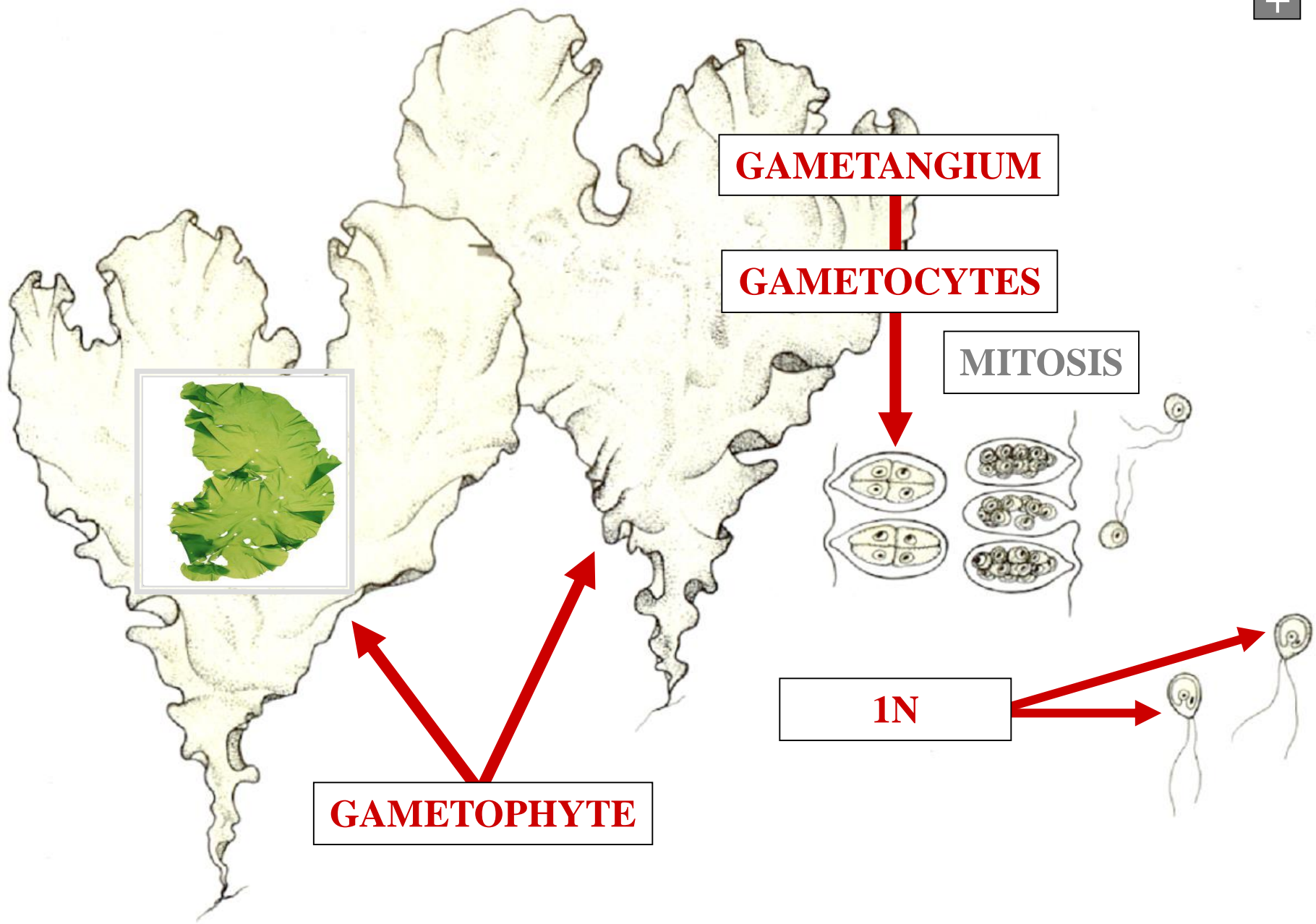
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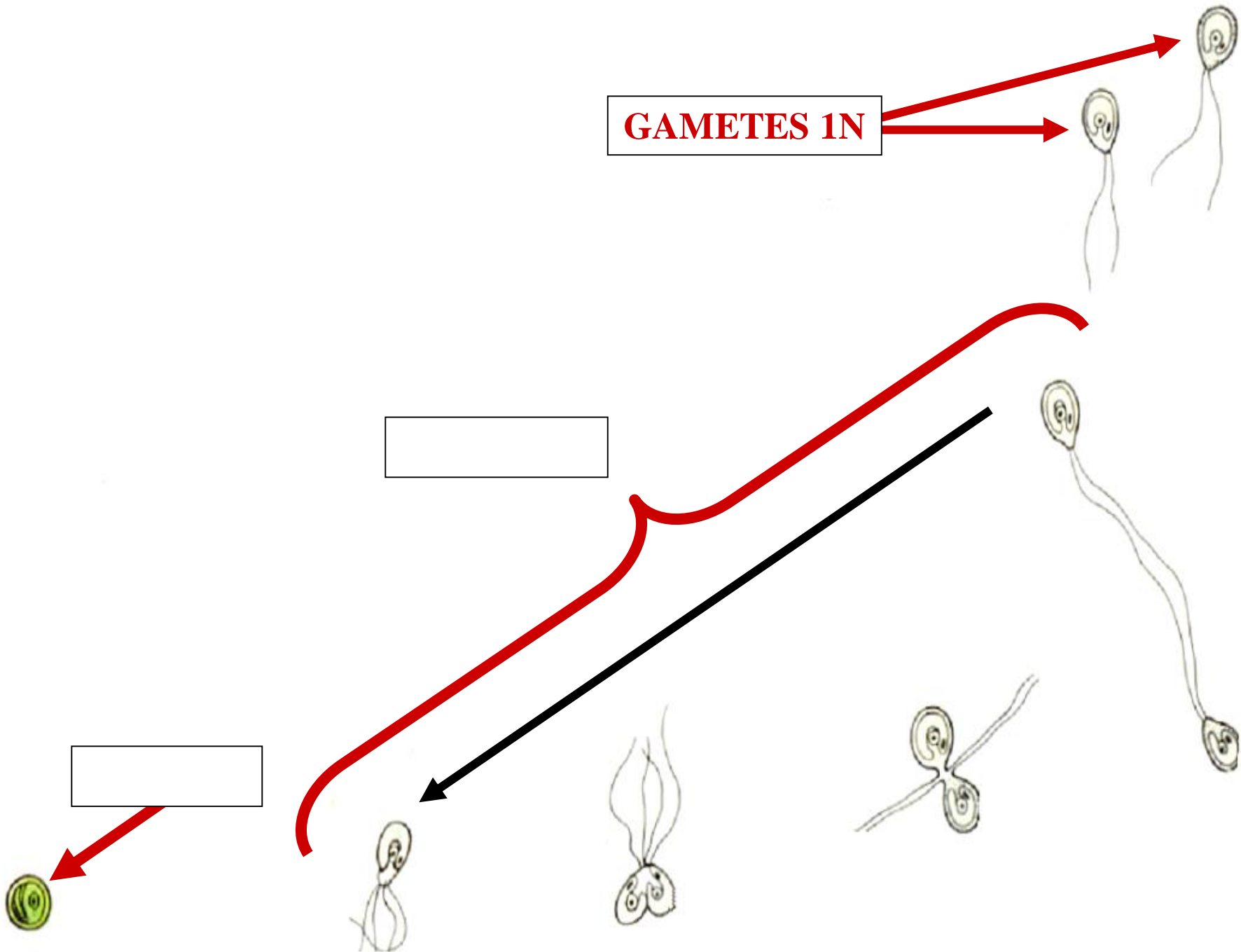
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GAMETES

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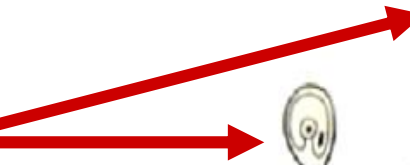
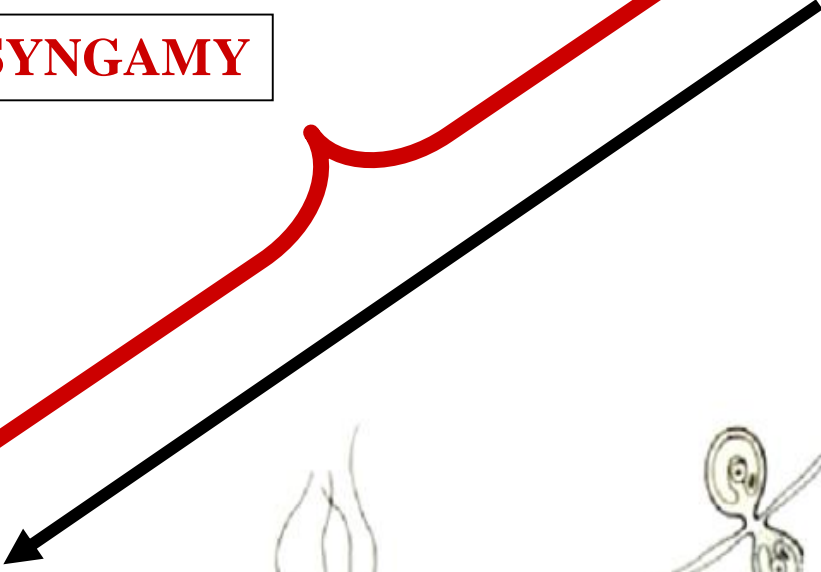
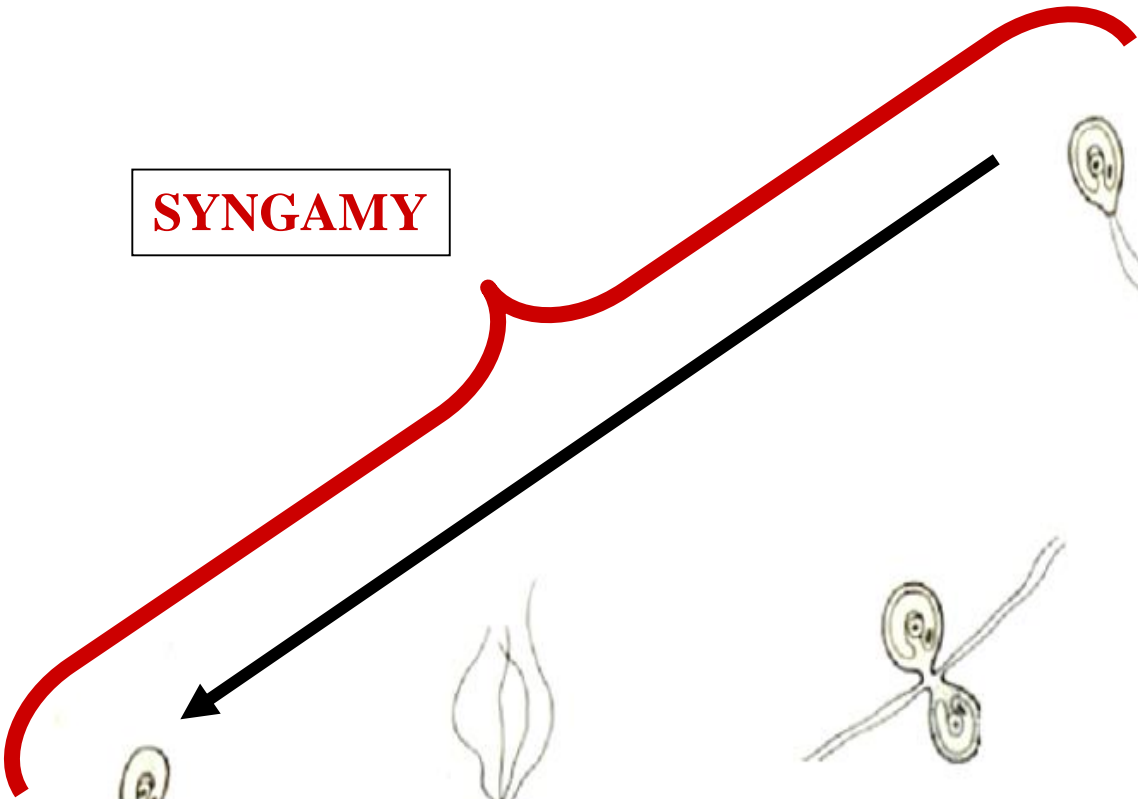
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GAMETES 1N

SYNGAMY

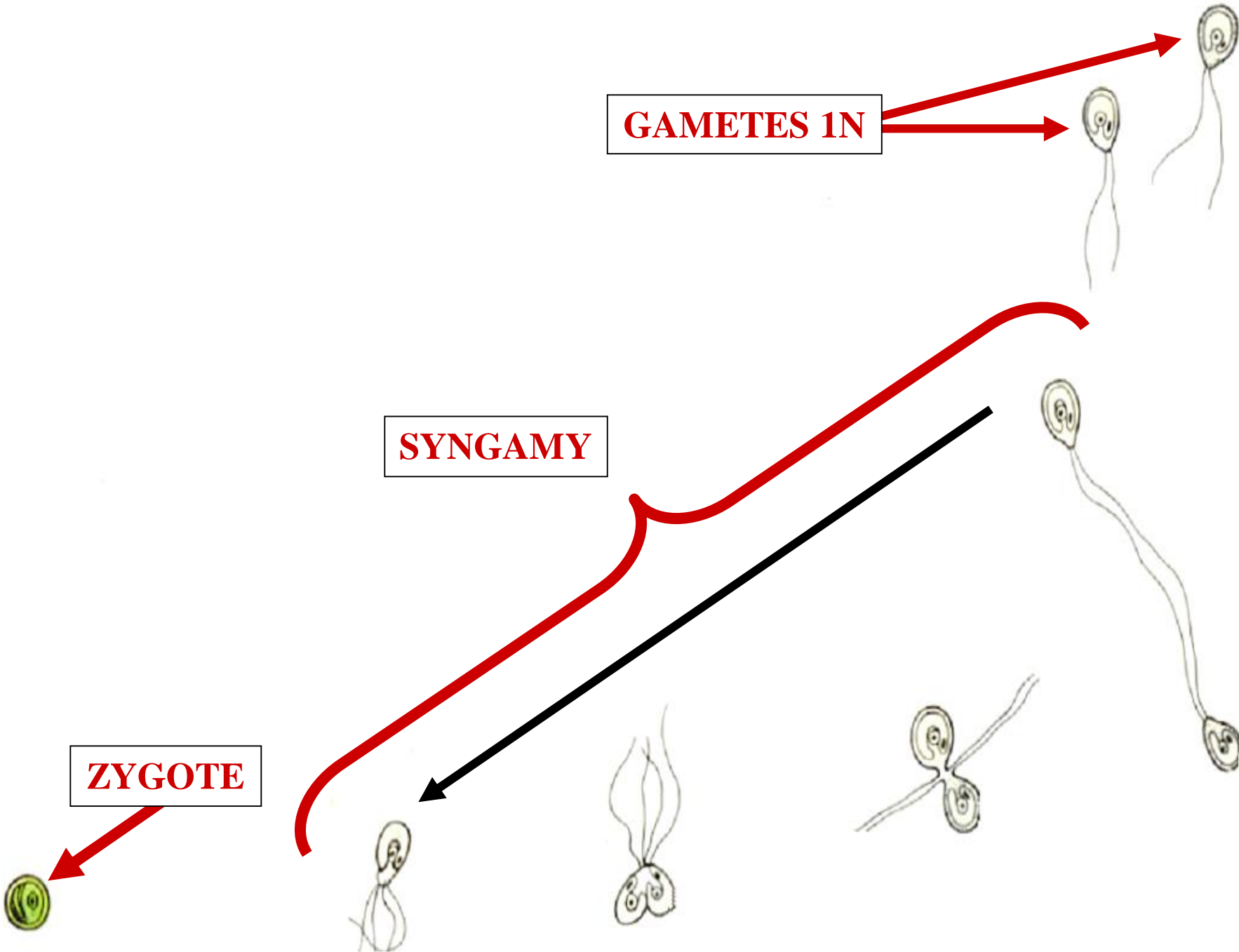
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SYNGAMY

ZYGOTE

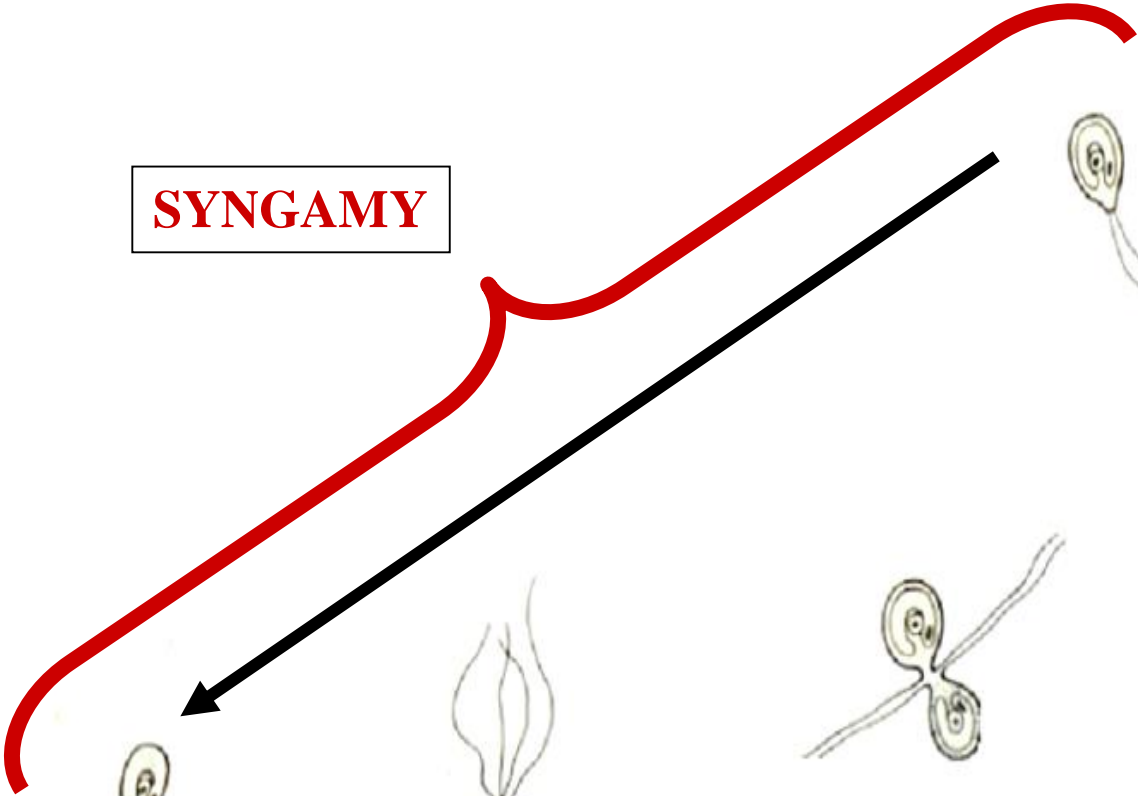
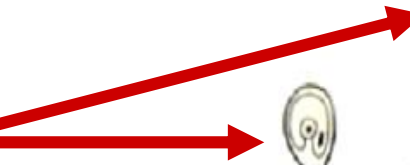


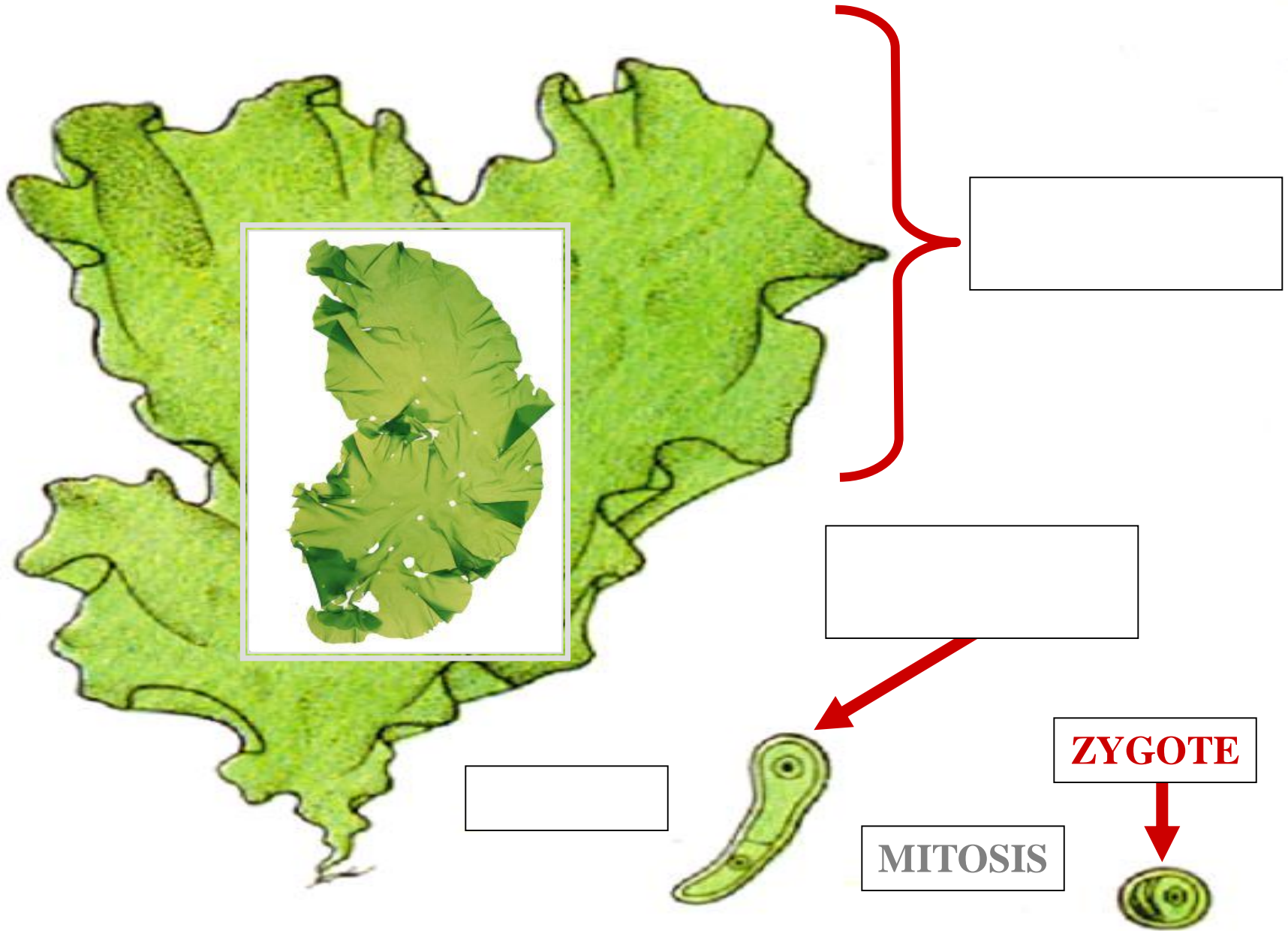
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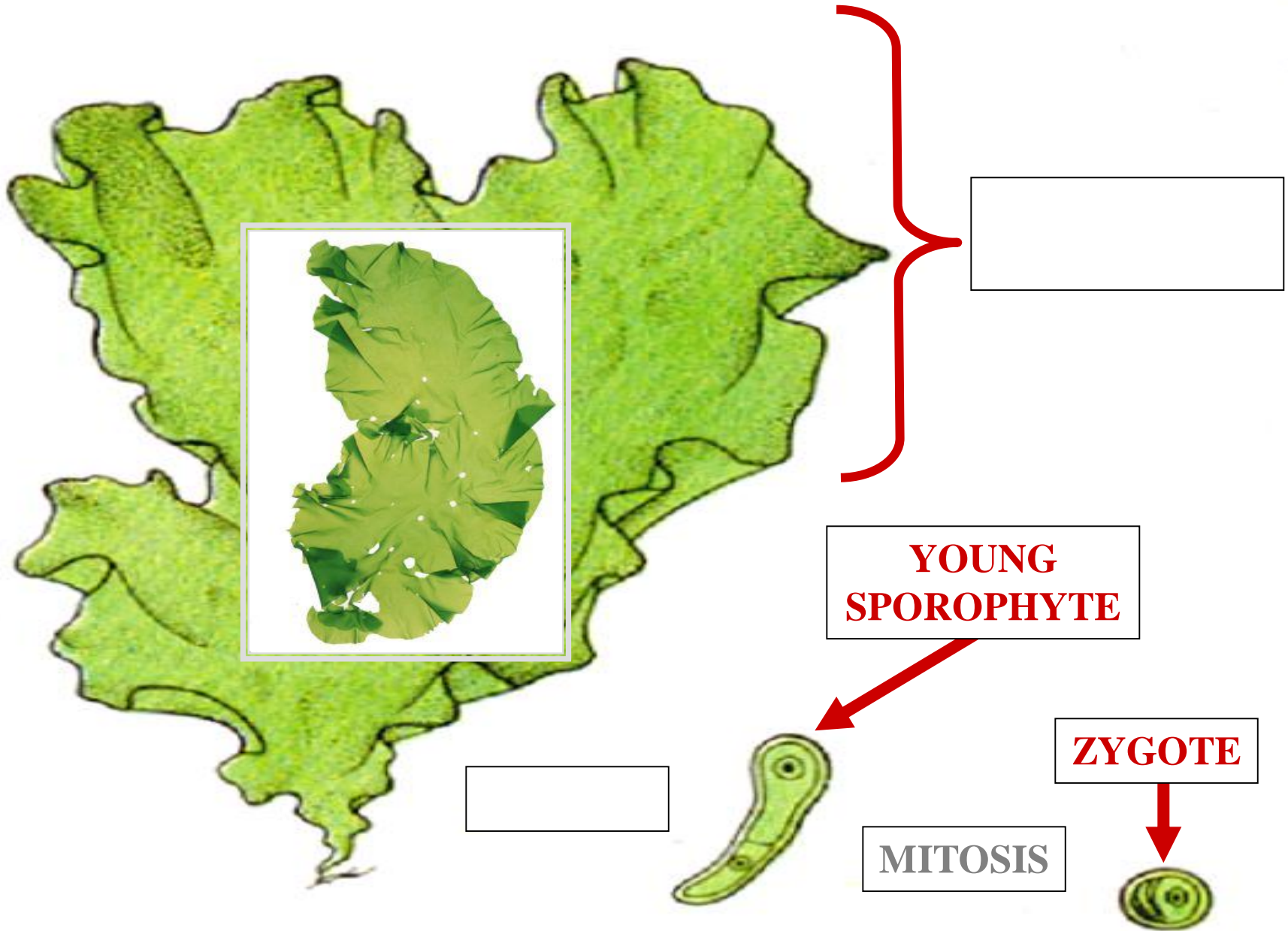
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SYNGAMY

2N







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YOUNG SPOROPHYTE

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MITOSIS

ZYGOTE



