

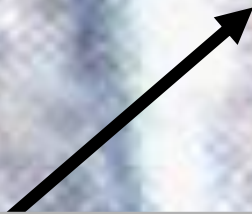
C

TELOPHASE

CELL PLATE



DAUGHTER NUCLEI

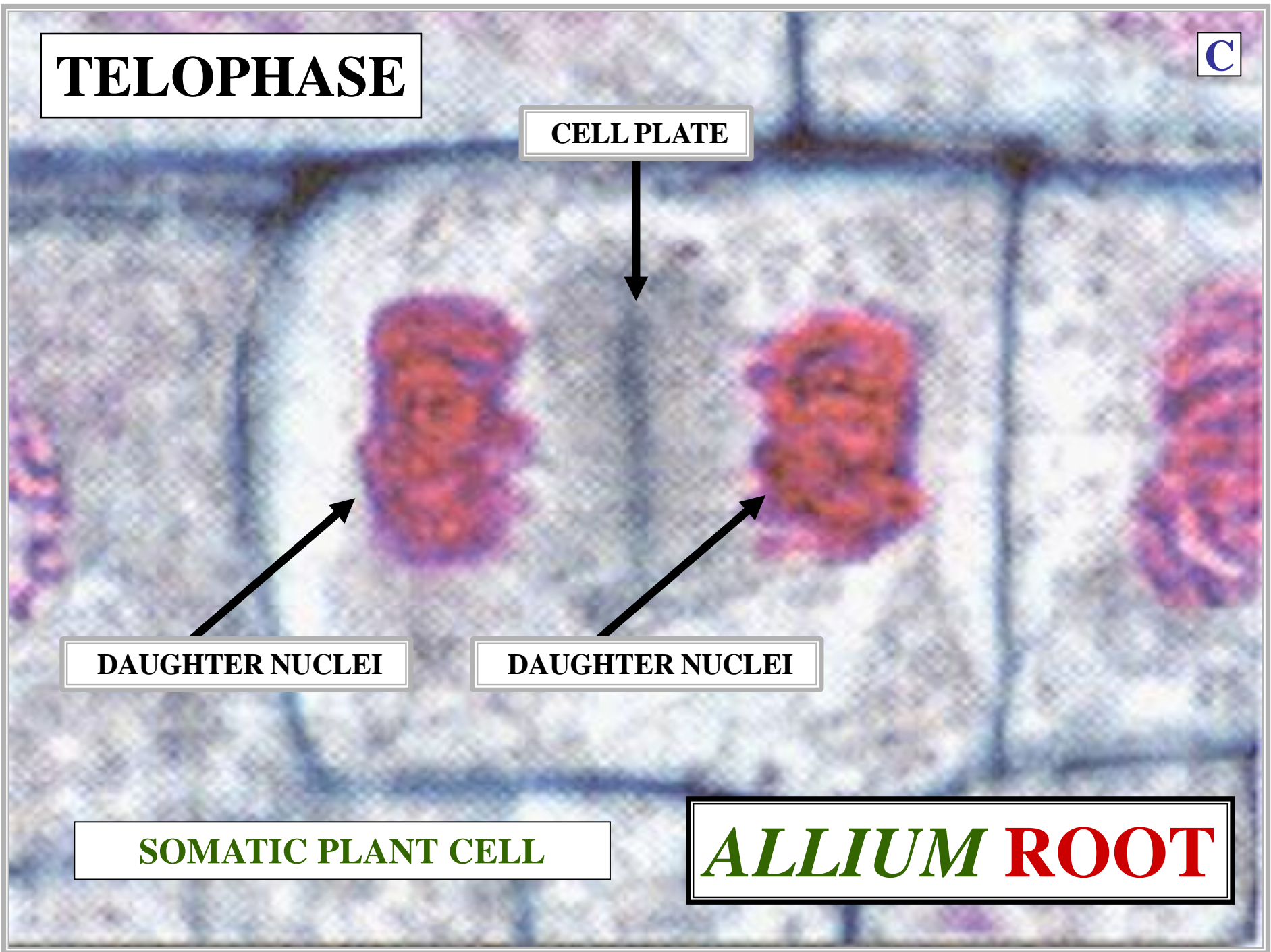


DAUGHTER NUCLEI



SOMATIC PLANT CELL

ALLIUM ROOT



CYTOKINESIS



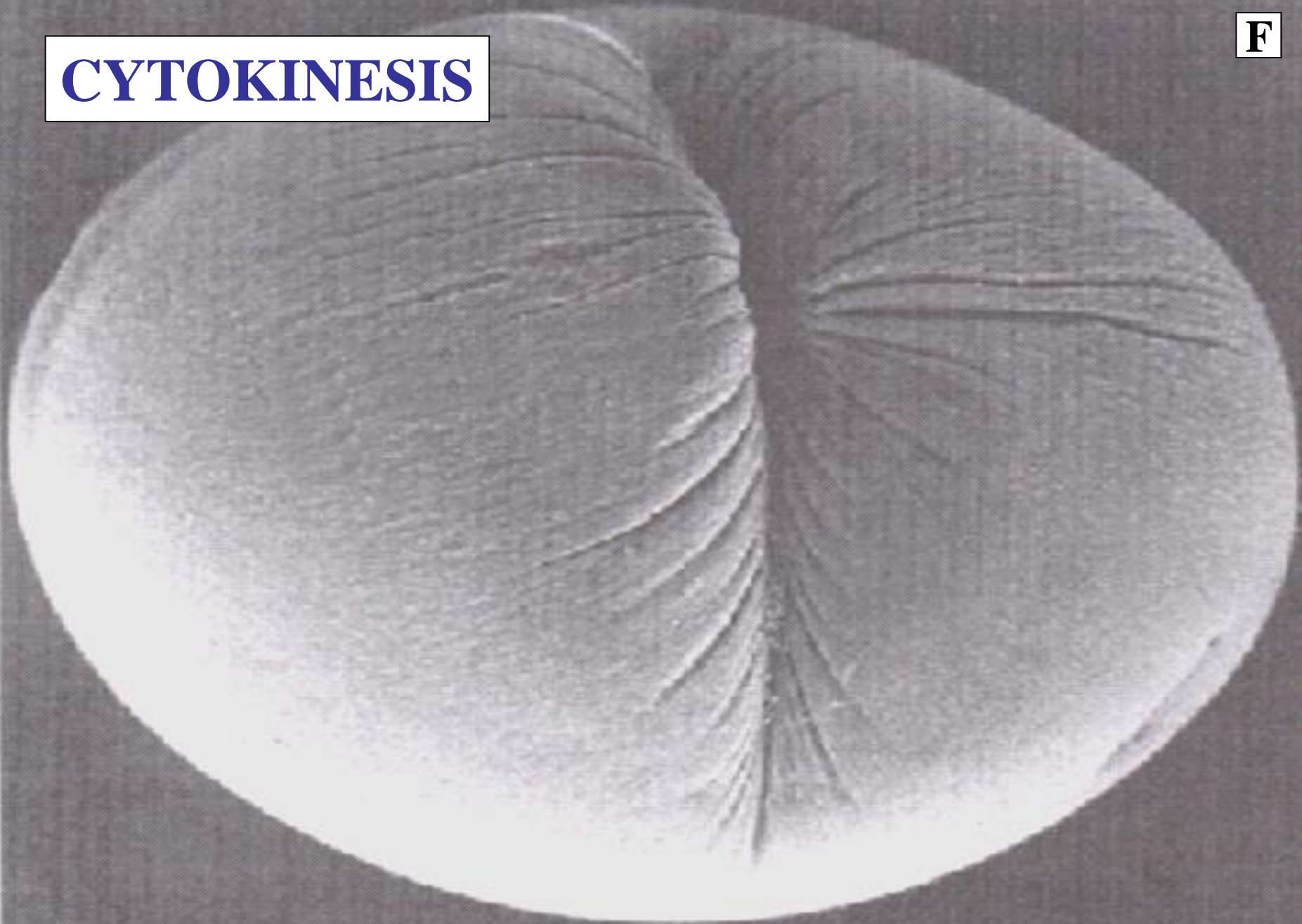
F

SOMATIC PLANT CELL

***ALLIUM* ROOT**

CYTOKINESIS

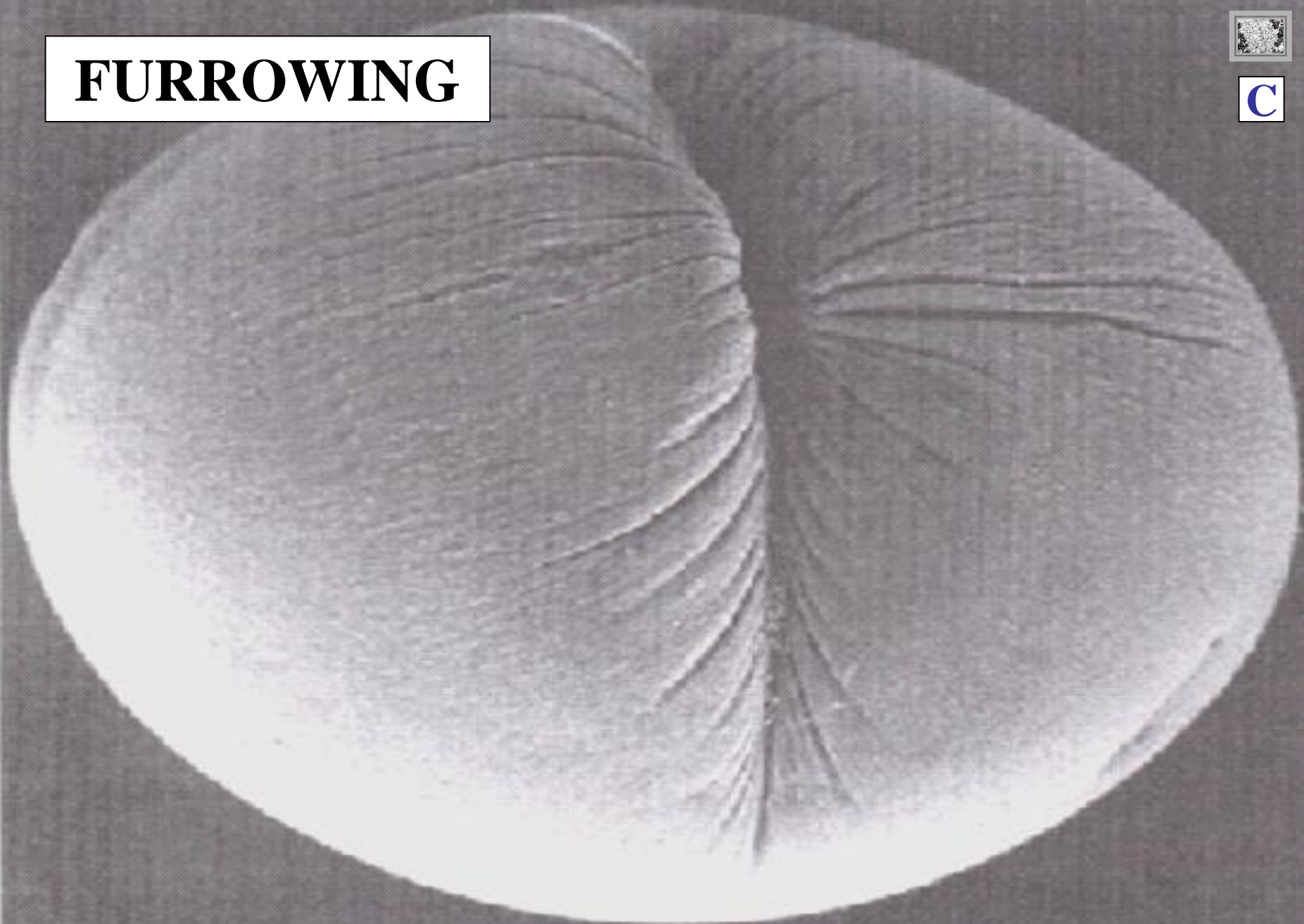
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FURROWING

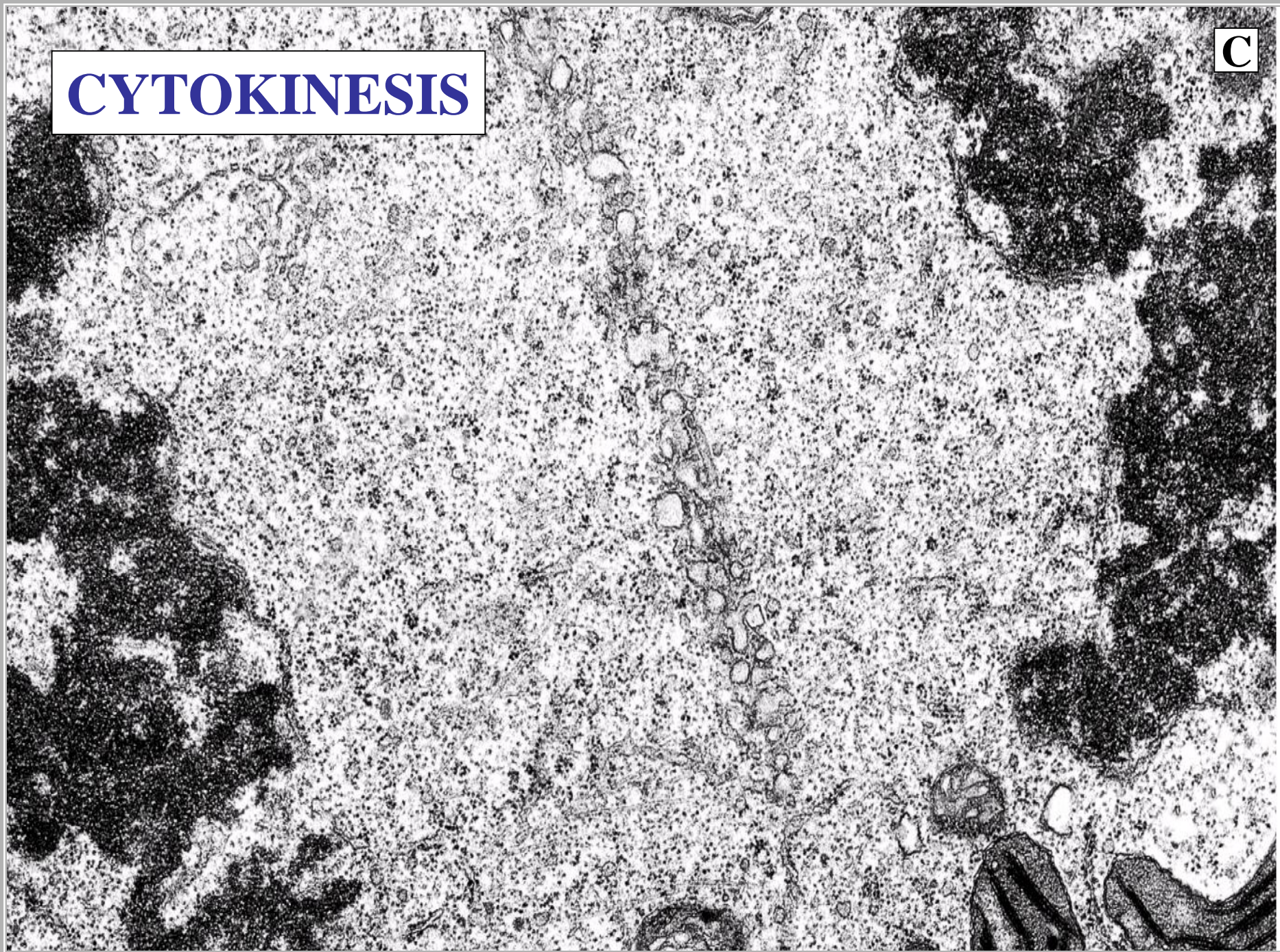


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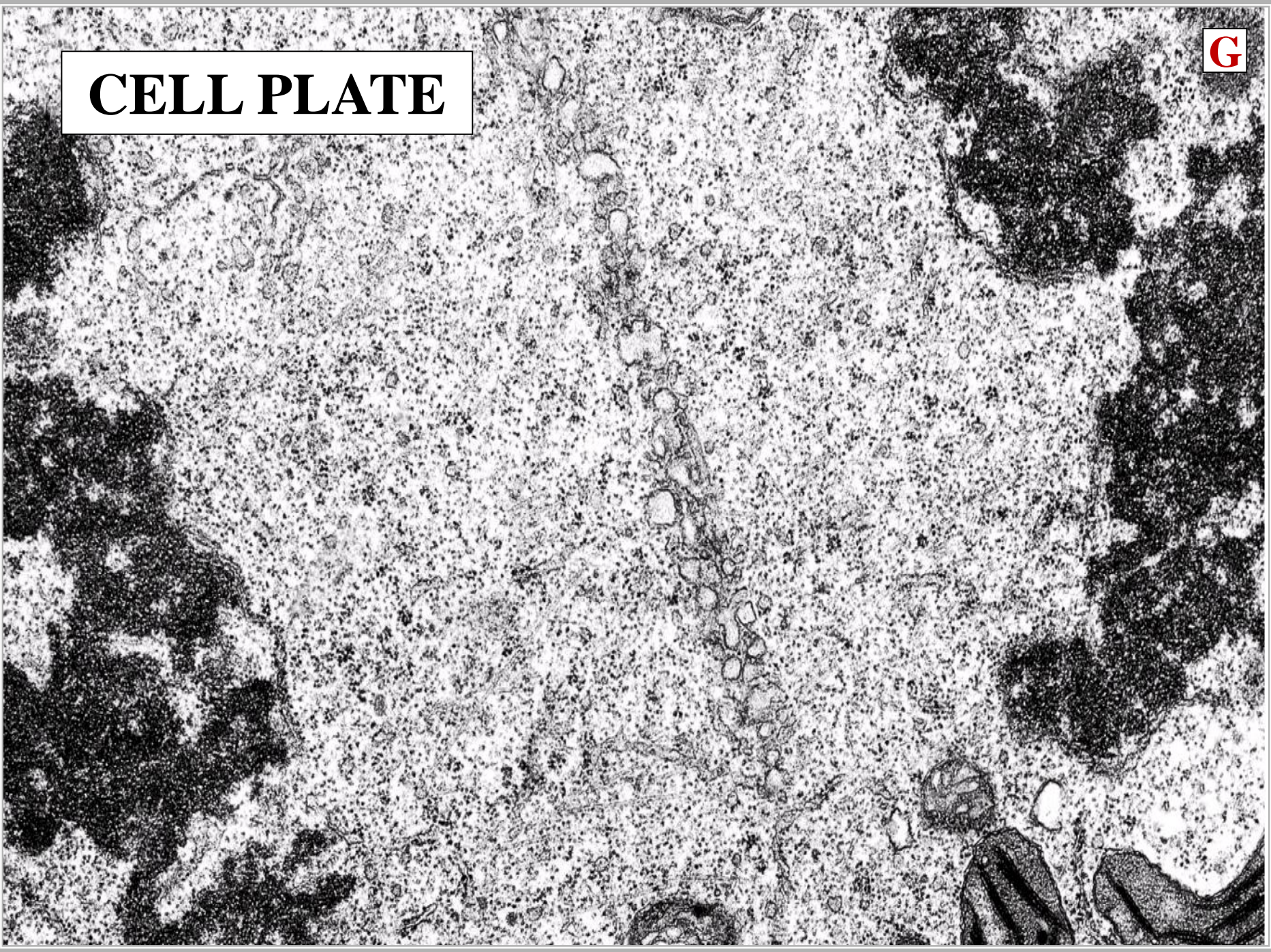


CYTOKINESIS

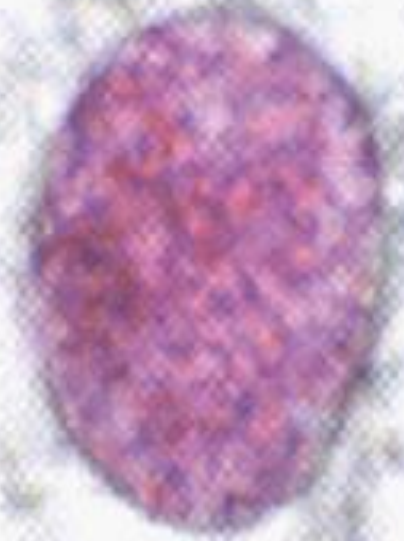
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CELL PLATE

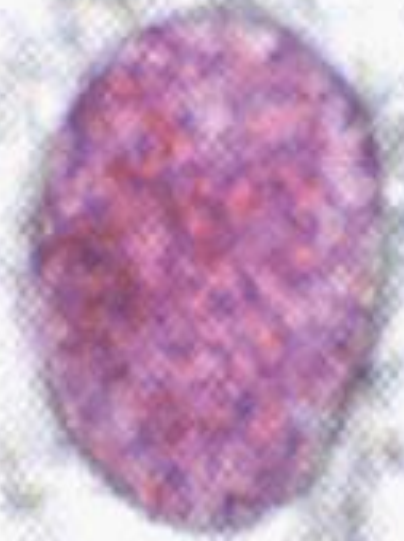


GENETICALLY IDENTICAL



ALLIUM ROOT

DAUGHTER CELLS



ALLIUM ROOT

DAUGHTER CELLS



VASCULAR PLANT EVOLUTION



~750

MILLION YEARS

T

~750 MILLION YEARS AGO

PLANT THALLUS EVOLVES



THALLUS

THALLUS



MULTICELLULAR PLANT BODY

THALLUS

PLANT THALLUS



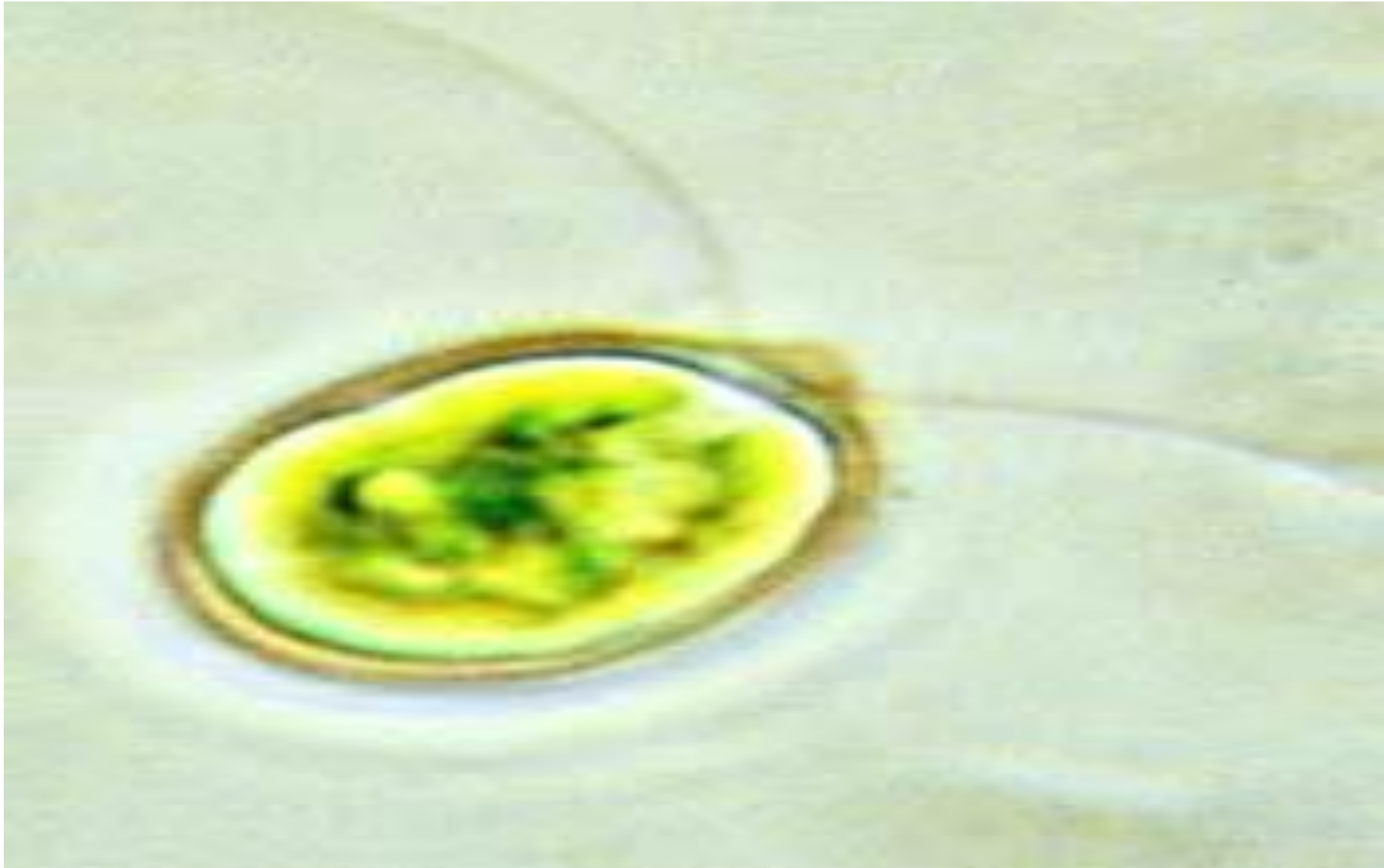
MULTICELLULAR PLANT BODY



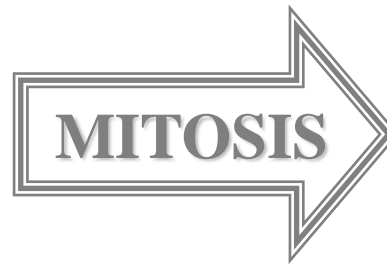
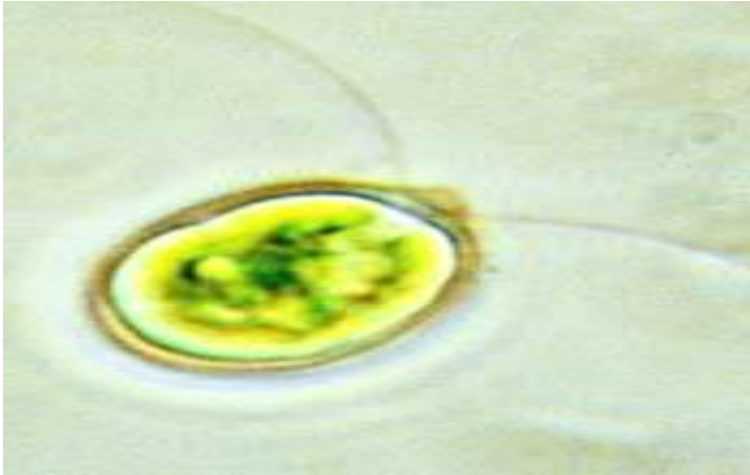


SCENARIO PLANT THALLUS EVOLUTION

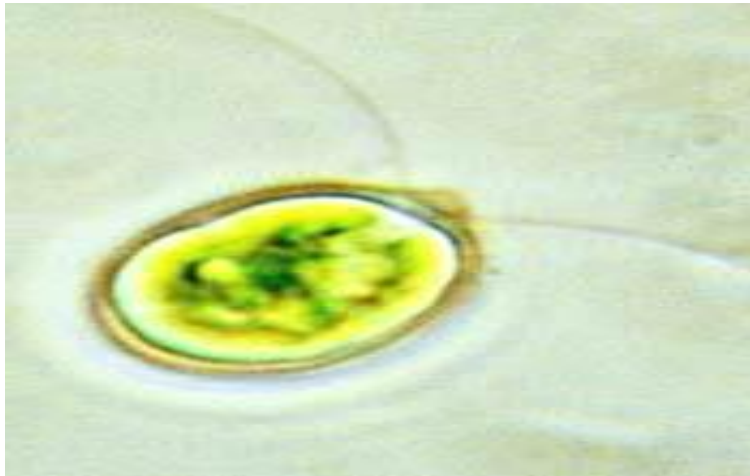
UNICELLULAR PLANT



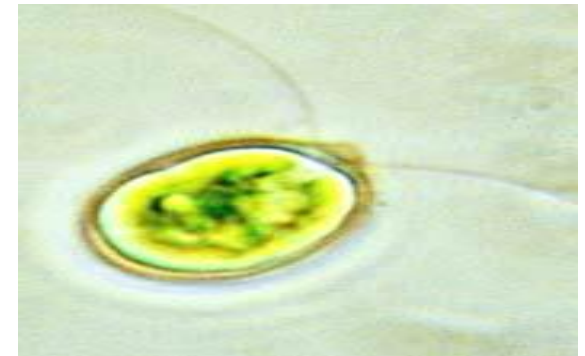
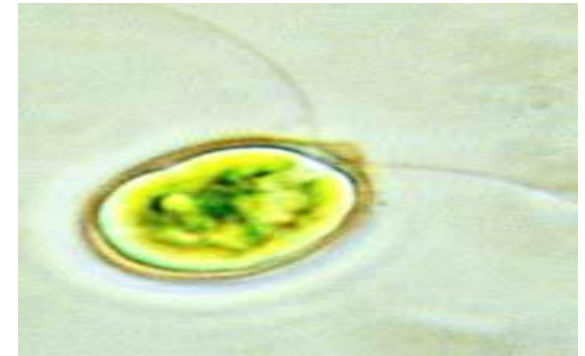
UNICELLULAR PLANT



UNICELLULAR PLANT

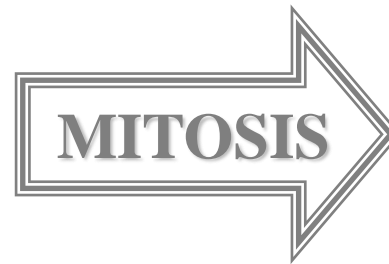
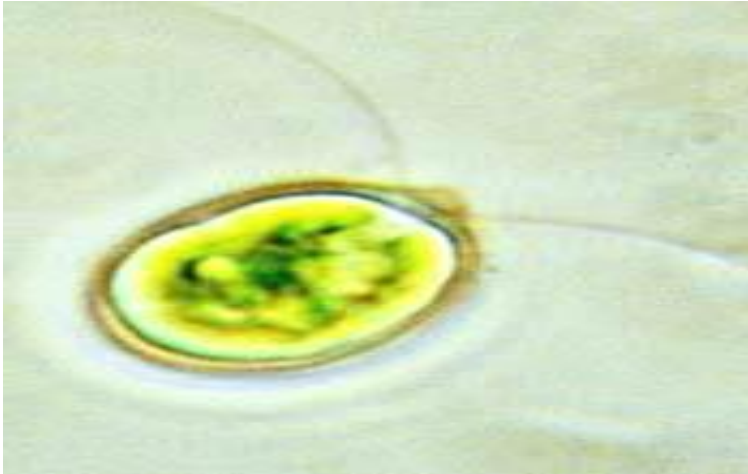


MITOSIS

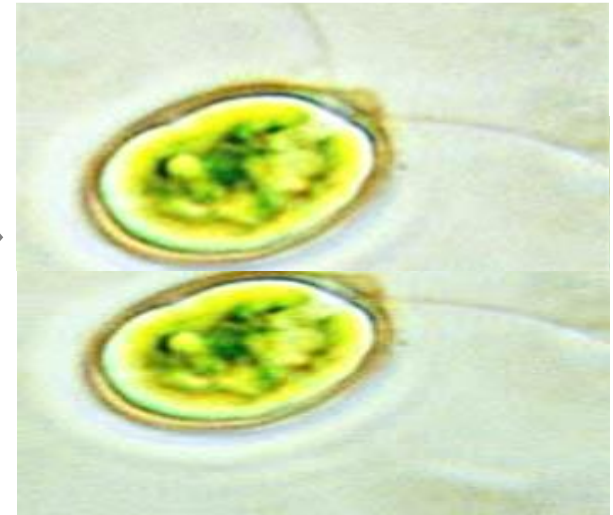
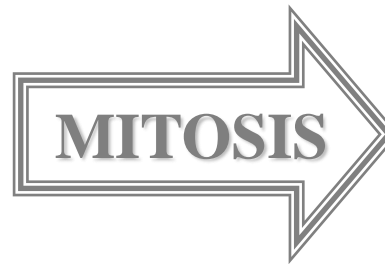
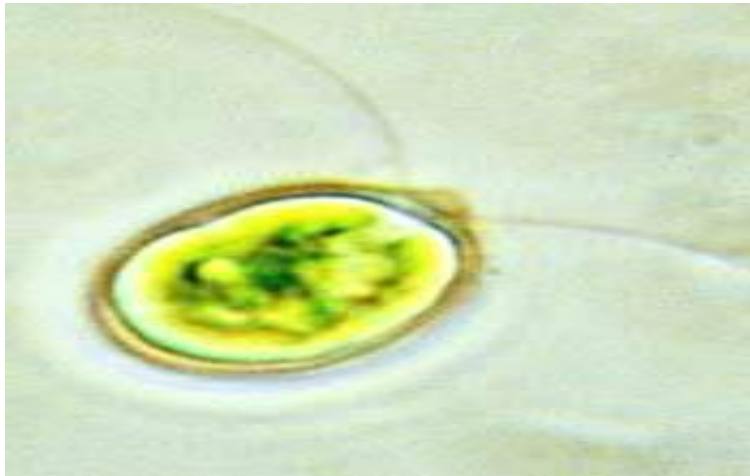


MITOSIS DISSOCIATION

UNICELLULAR PLANT



UNICELLULAR PLANT



MITOSIS NON-DISSOCIATION



MITOSIS NON-DISSOCIATION

MITOSIS



MITOSIS

MITOSIS NON-DISSOCIATION

COLONIAL PLANT



CELL #1

P
AB

**PRIMARY
CELL WALL**

**CELL
MEMBRANE**

**ENDOPLASMIC
RETICULUM**

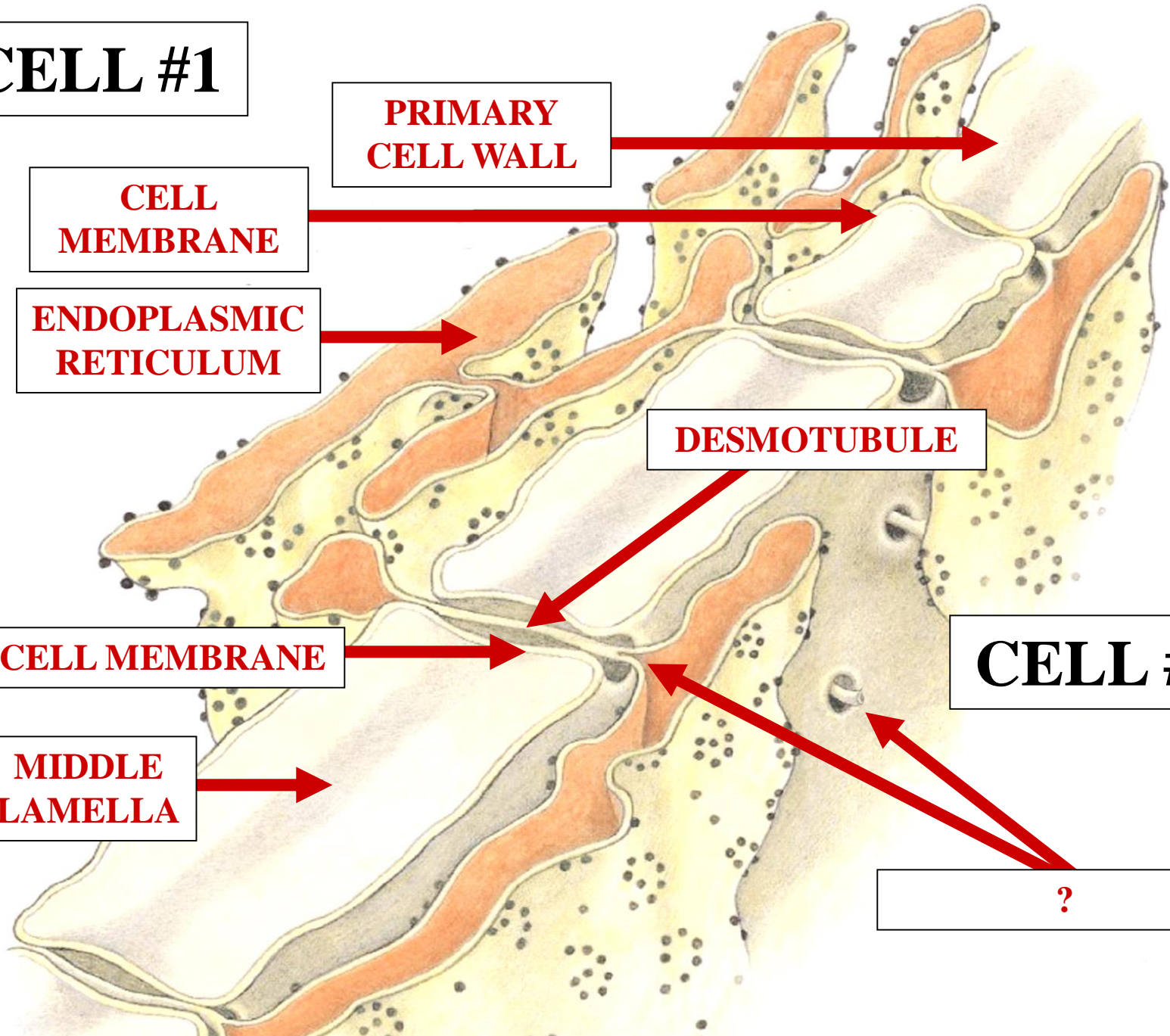
DESMOTUBULE

CELL MEMBRANE

CELL #2

**MIDDLE
LAMELLA**

?



CELL #1

P
PR

**PRIMARY
CELL WALL**

**CELL
MEMBRANE**

**ENDOPLASMIC
RETICULUM**

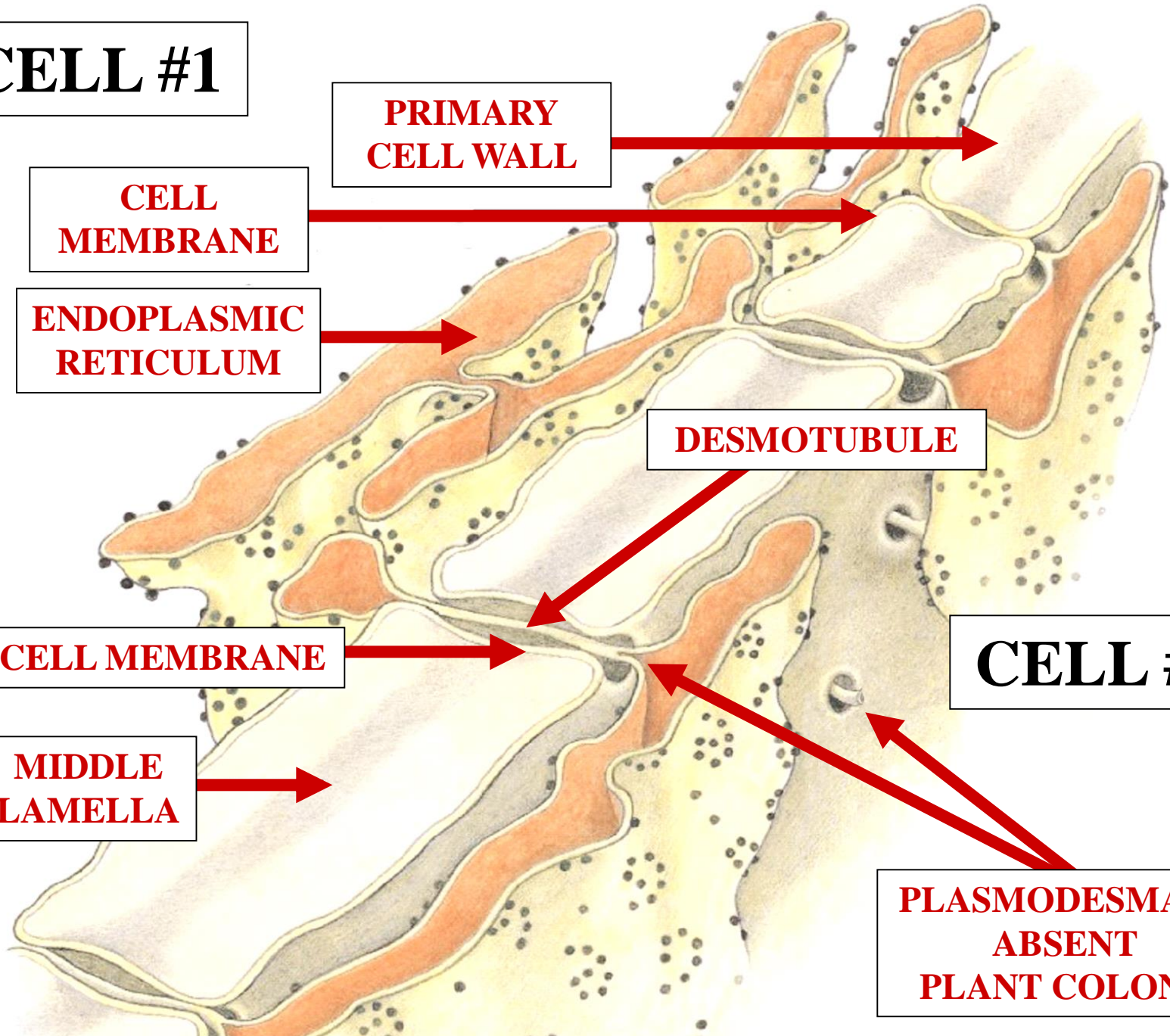
DESMOTUBULE

CELL MEMBRANE

CELL #2

**MIDDLE
LAMELLA**

**PLASMODESMATA
ABSENT
PLANT COLONY**



CELL #1



**PRIMARY
CELL WALL**

**CELL
MEMBRANE**

**ENDOPLASMIC
RETICULUM**

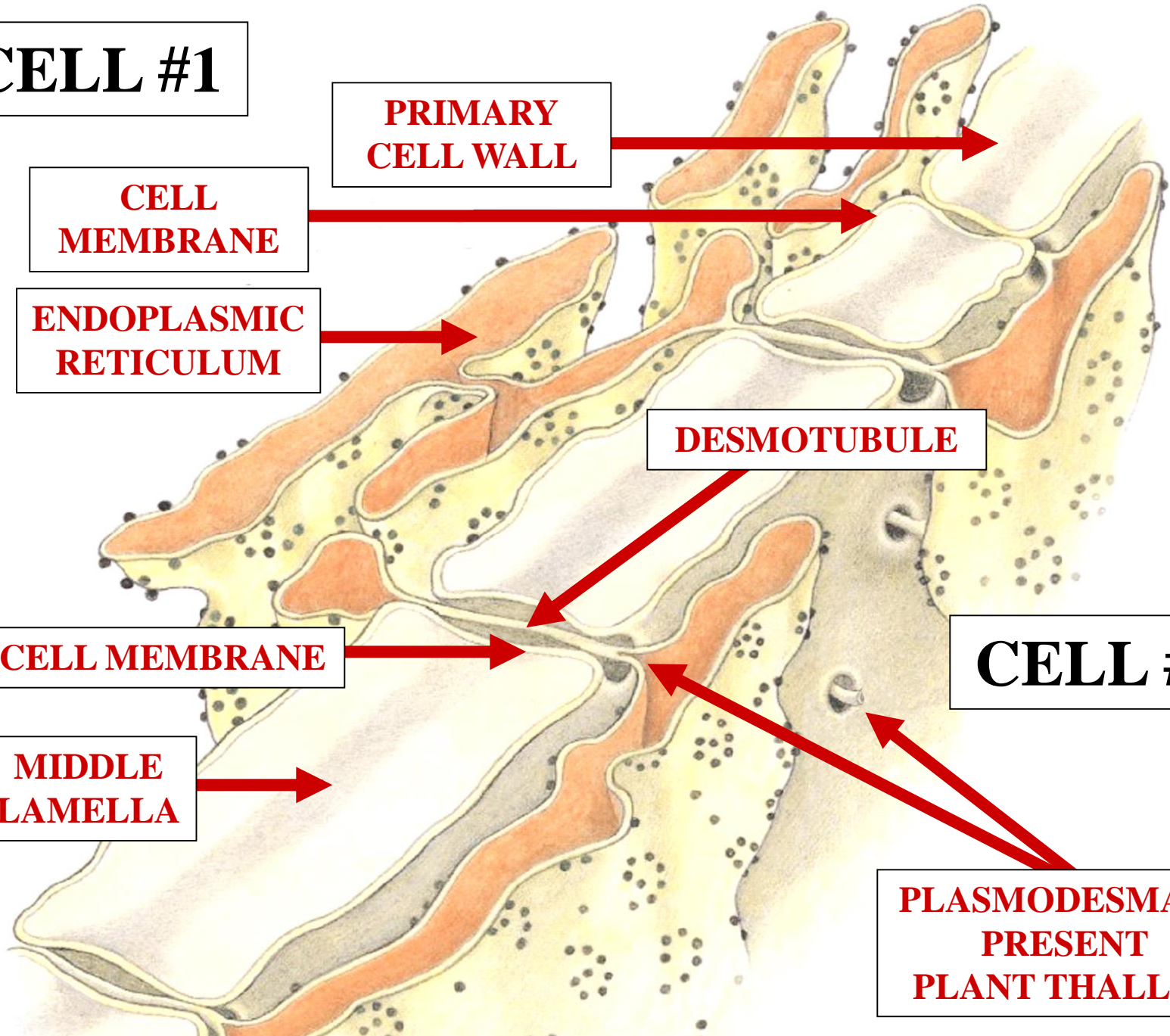
DESMOTUBULE

CELL MEMBRANE

CELL #2

**MIDDLE
LAMELLA**

**PLASMODESMATA
PRESENT
PLANT THALLUS**



PLANT THALLUS



**PLASMODESMATA
PRESENT**

MULTICELLULAR PLANT THALLUS

PLANT THALLUS



**MULTICELLULAR PLANT THALLUS
DIFFERENTIATES**

PLANT THALLUS



GAMETANGIA
OR
SPORANGIA

**MULTICELLULAR PLANT THALLUS
DIFFERENTIATES**



VASCULAR PLANT EVOLUTION



~570

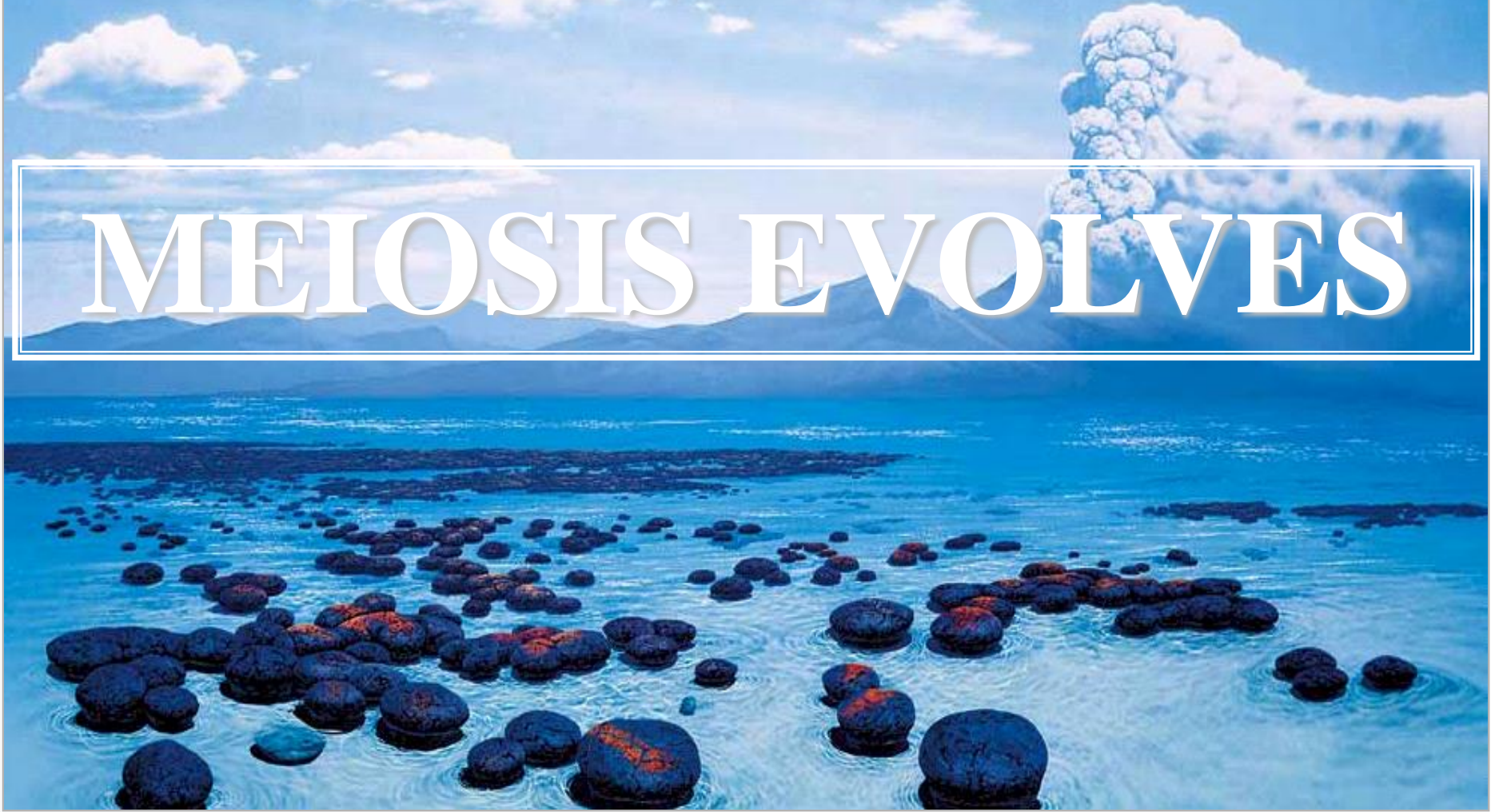
MILLION YEARS

~570 MILLION YEARS AGO



G

MEIOSIS EVOLVES



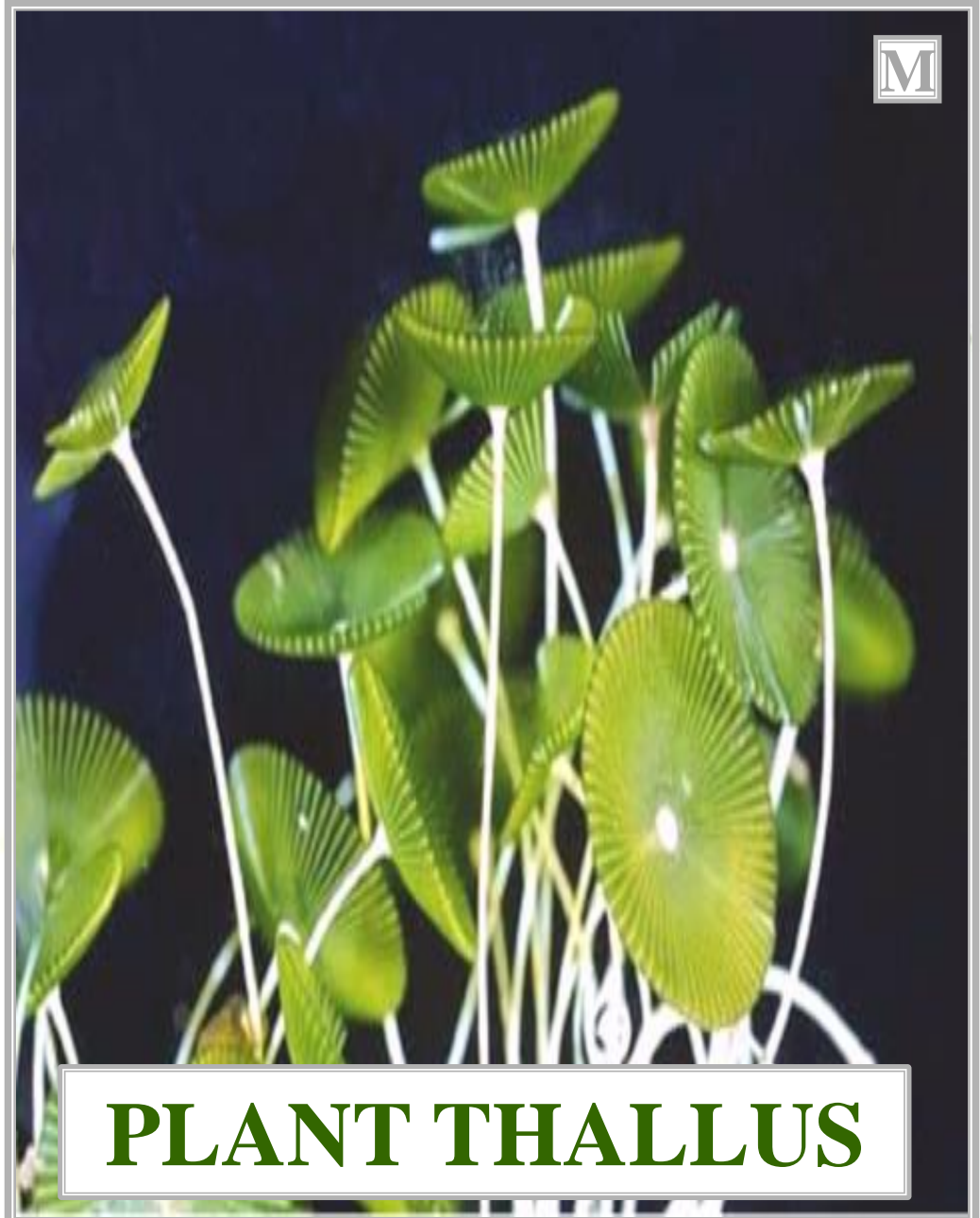
PLANT THALLUS

A photograph of several green fern fronds with white petioles, set against a dark background. The fronds are fan-shaped and have a distinct ribbed texture.

**GAMETANGIA
UNDERGO
MEIOSIS**



GAMETANGIA

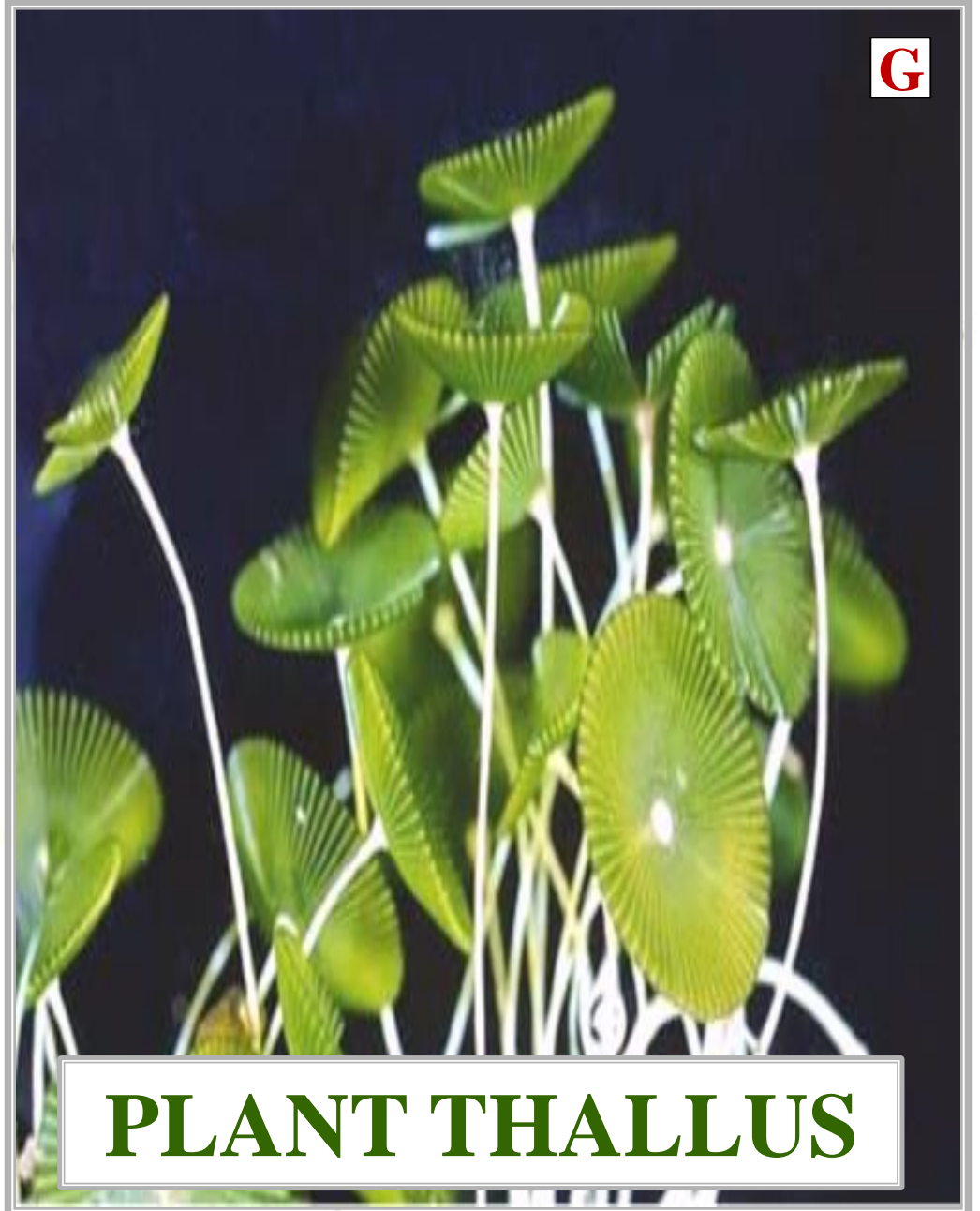


PLANT THALLUS



GAMETANGIA

MEIOSIS



G

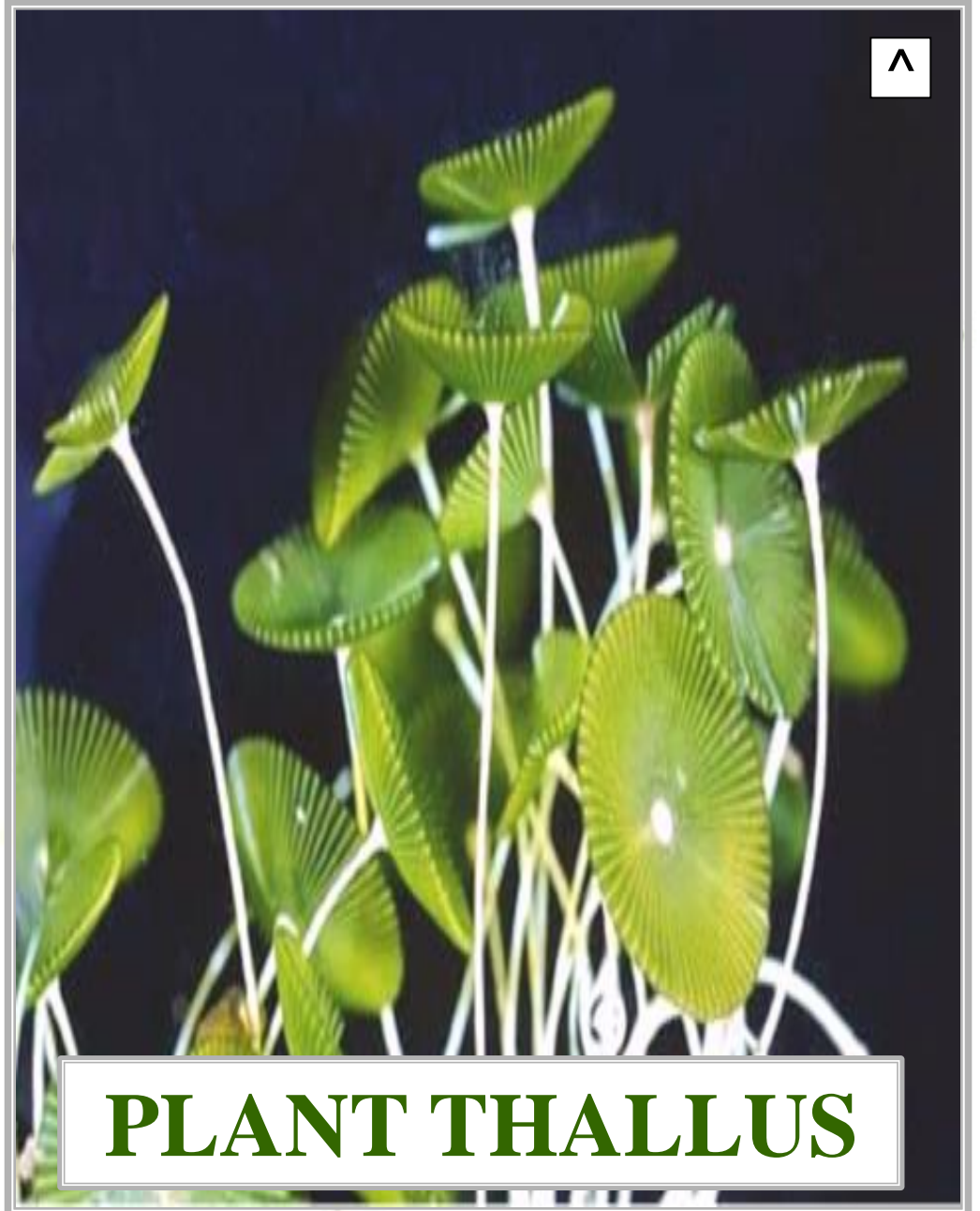
PLANT THALLUS



GAMETANGIA

MEIOSIS

GAMETES



PLANT THALLUS

PLANT THALLUS



**SPORANGIA
UNDERGO
MEIOSIS**



SPORANGIA

PLANT THALLUS

M



SPORANGIA

MEIOSIS

PLANT THALLUS

S





SPORANGIA

MEIOSIS

SPORES

PLANT THALLUS

?



QUESTION

WHAT IS THE CELL
THAT UNDERGOES
MEIOSIS?

QUESTION



ANSWER

GERM CELL

ANSWER

**TRUE PLANT
GERM
CELL CYCLE**

**TRUE PLANT
GERM CELL**

**TRUE PLANT
GERM CELL**



**UNDERGOES
MITOSIS & MEIOSIS**

**TRUE PLANT
GERM CELL**

**TRUE PLANT
GERM CELL
UNDERGOES
MITOSIS & MEIOSIS**

**DERIVES
GAMETES OR SPORES**

**TRUE PLANT
GERM CELL**



TRUE PLANT GERM CELL



NUCLEUS
20
CHROMOSOMES

GERM CELL

TRUE PLANT GERM CELL



NUCLEUS
20
CHROMOSOMES

MEIOSIS

GERM CELL

PLANT THALLUS



**GAMETANGIA
UNDERGO
MEIOSIS**

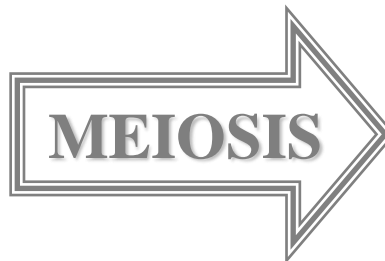
TRUE PLANT GERM CELL



NUCLEUS
20
CHROMOSOMES

GAMETANGIA

GERM CELL



NUCLEUS
10
CHROMOSOMES

GAMETE

NUCLEUS
10
CHROMOSOMES

GAMETE



NUCLEUS
10
CHROMOSOMES

GAMETE

NUCLEUS
10
CHROMOSOMES

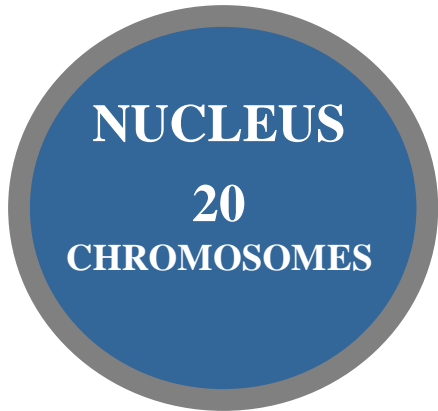
GAMETE

PLANT THALLUS



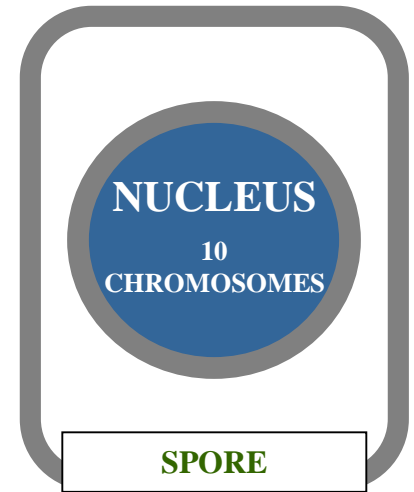
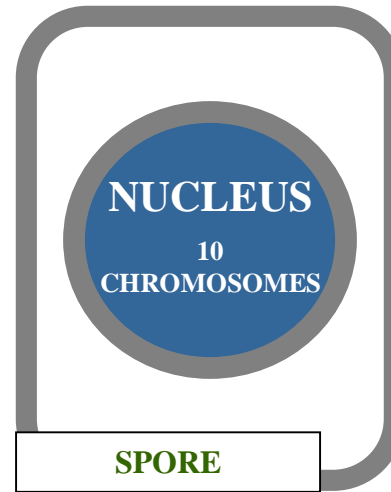
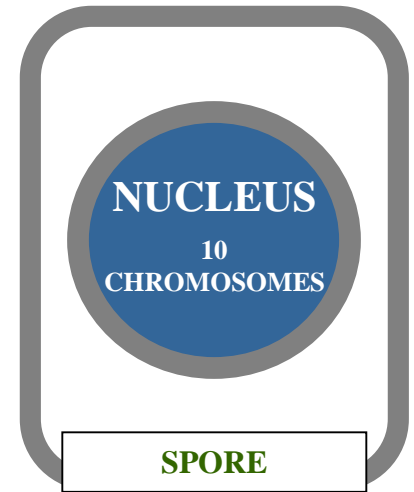
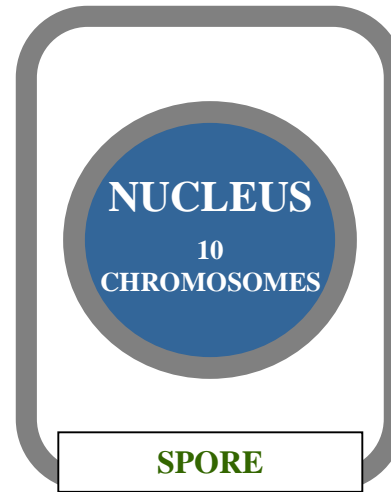
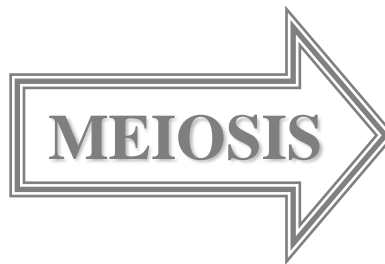
**SPORANGIA
UNDERGO
MEIOSIS**

TRUE PLANT GERM CELL



SPORANGIA

GERM CELL



PLOIDY LEVEL

PLOIDY LEVEL



PLOIDY LEVEL

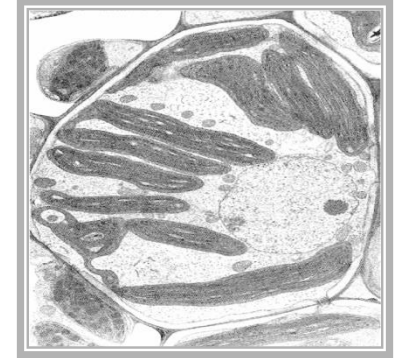
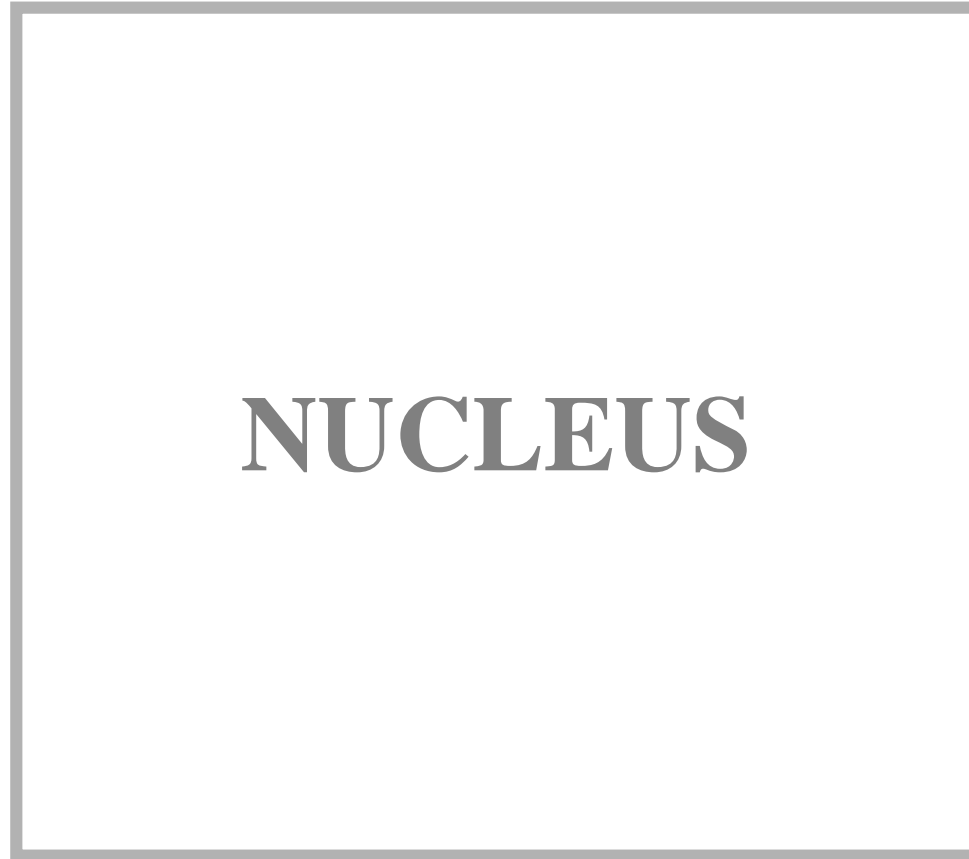
NUMBER

**HOMOLOGOUS CHROMOSOME
SETS/CELL**

PLOIDY LEVEL



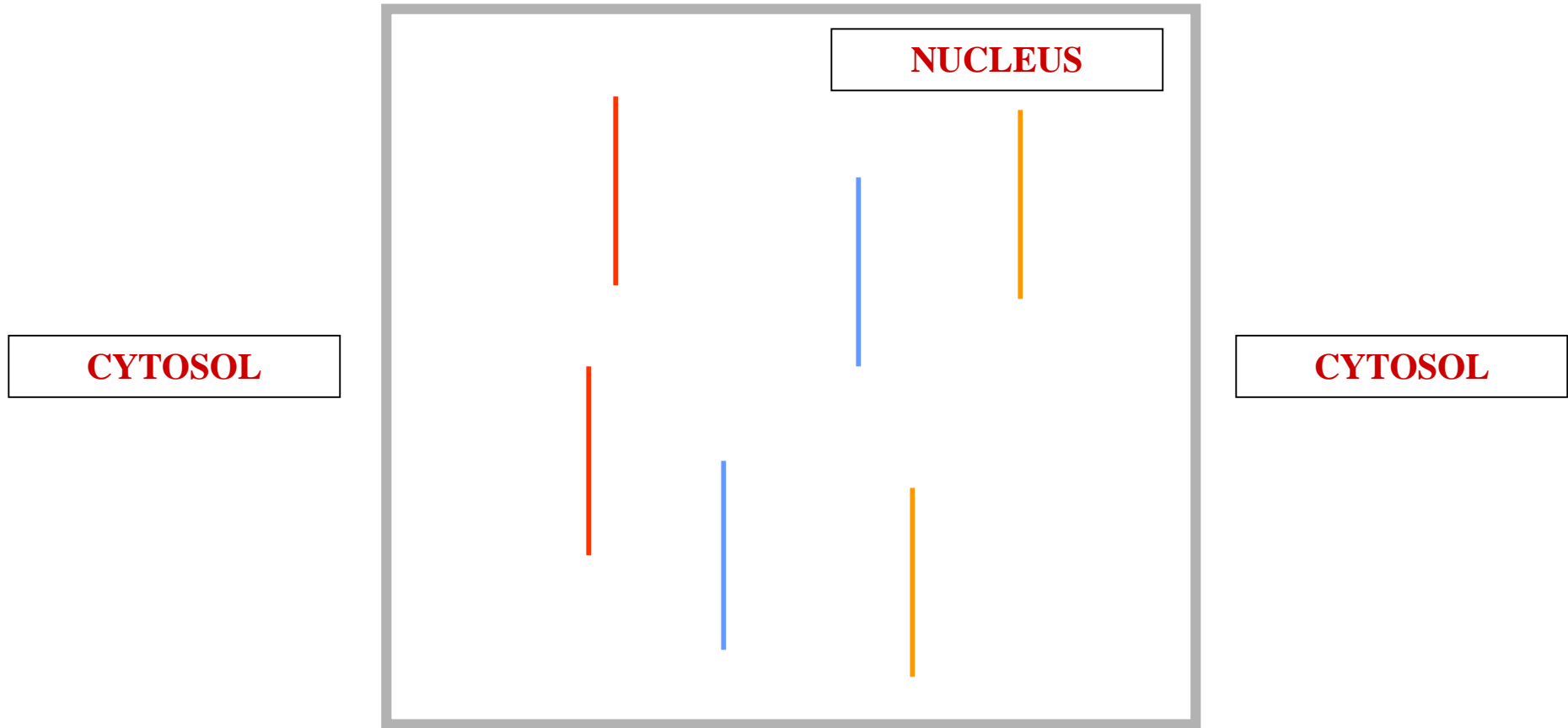
TRUE PLANT GERM CELL



NUCLEUS

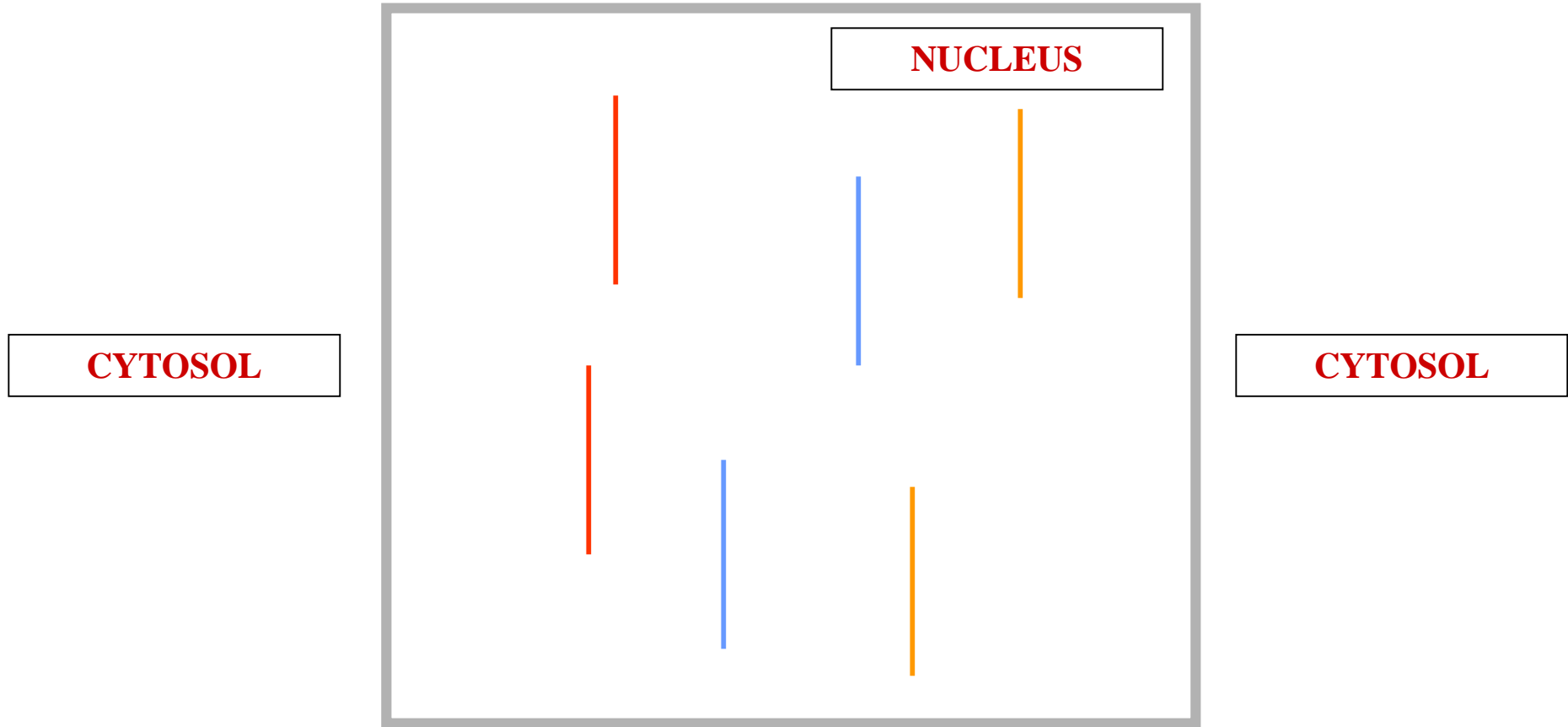
CYTOSOL

TRUE PLANT GERM CELL



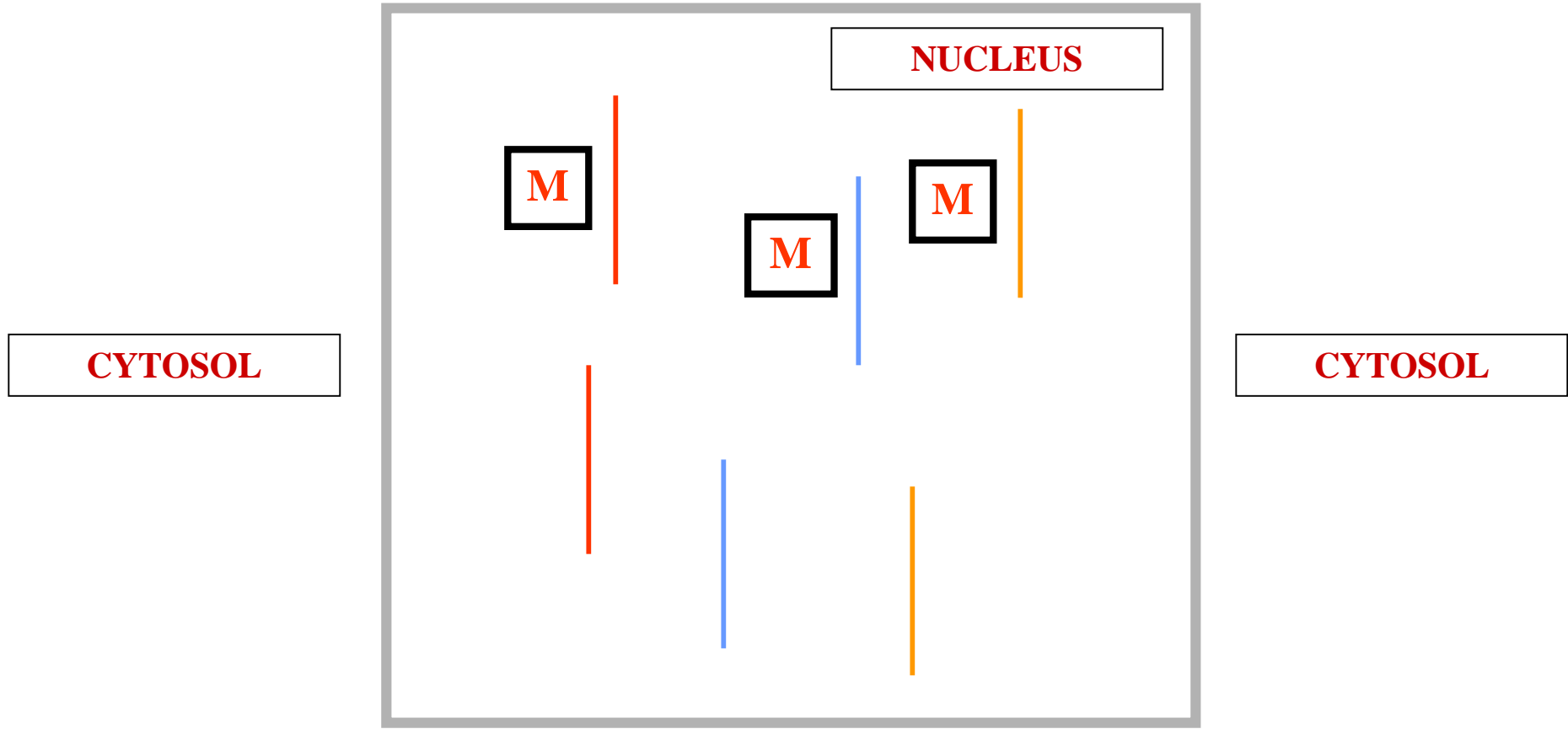
6 CHROMOSOMES

TRUE PLANT GERM CELL



HOMOLOGOUS CHROMOSOMES

TRUE PLANT GERM CELL

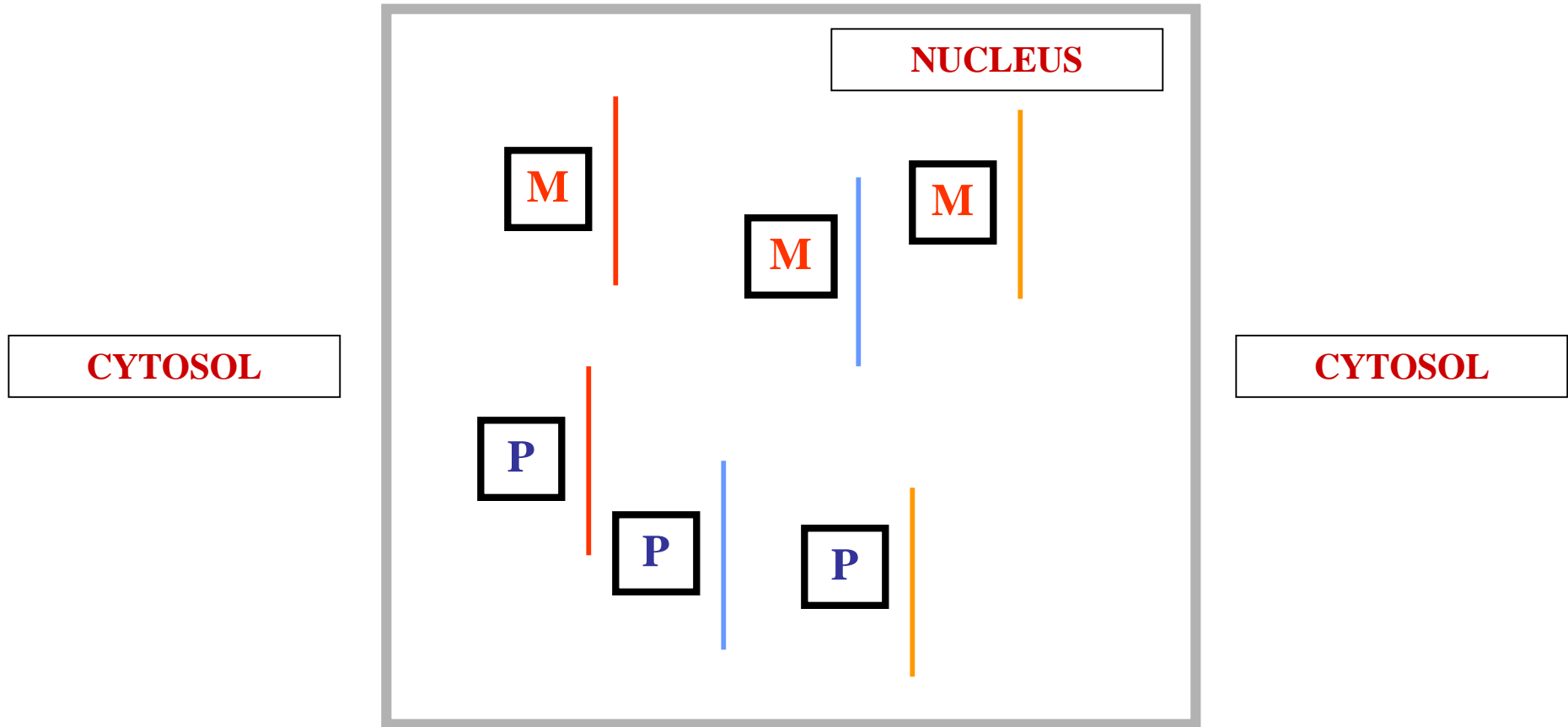


M = MATERNAL CHROMOSOME

HOMOLOGOUS CHROMOSOMES



TRUE PLANT GERM CELL



M = MATERNAL CHROMOSOME **P** = PATERNAL CHROMOSOME

HOMOLOGOUS CHROMOSOMES

DIPLOID CELL
VS
HAPLOID CELL

DIPLOID CELL



DIPLOID CELL

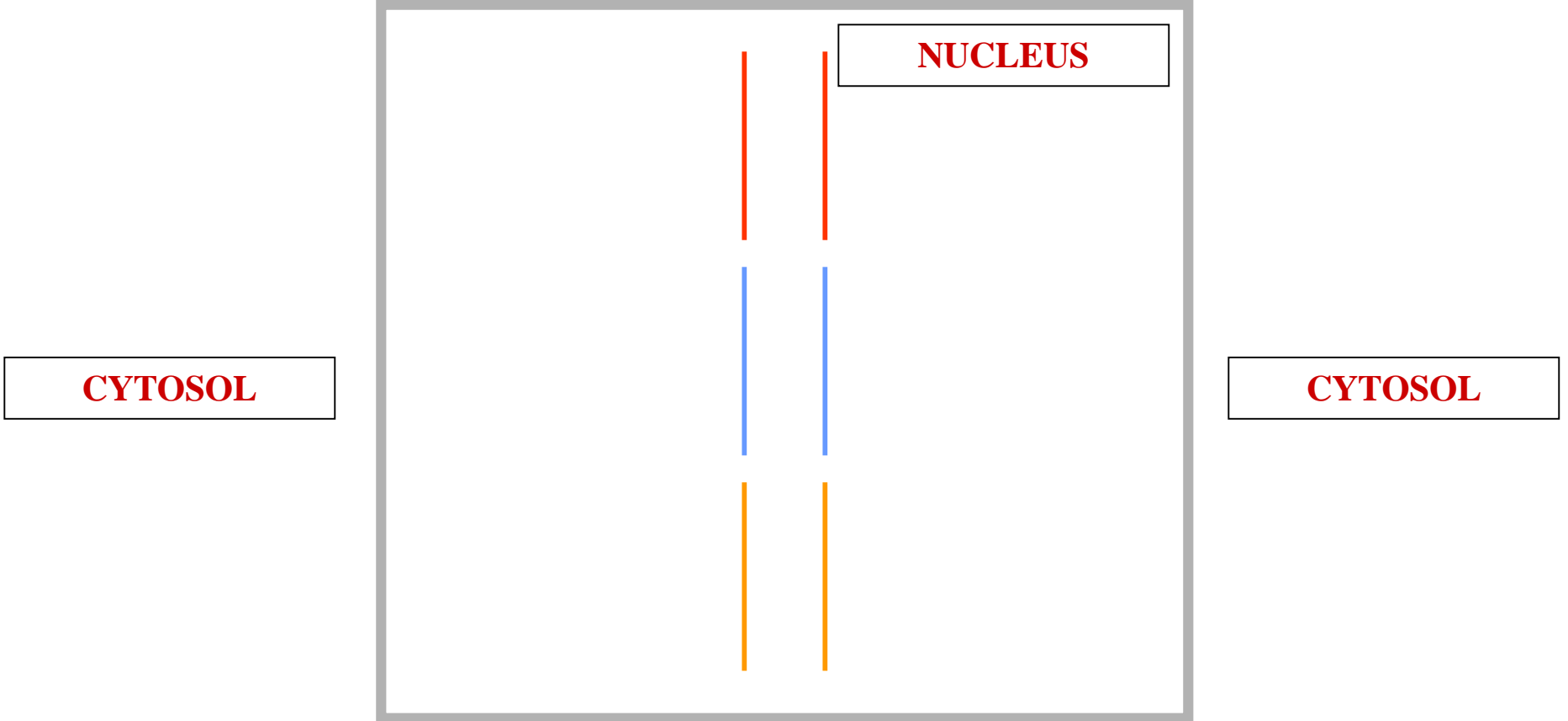
**2 HOMOLOGOUS
CHROMOSOME SETS**

=

2N

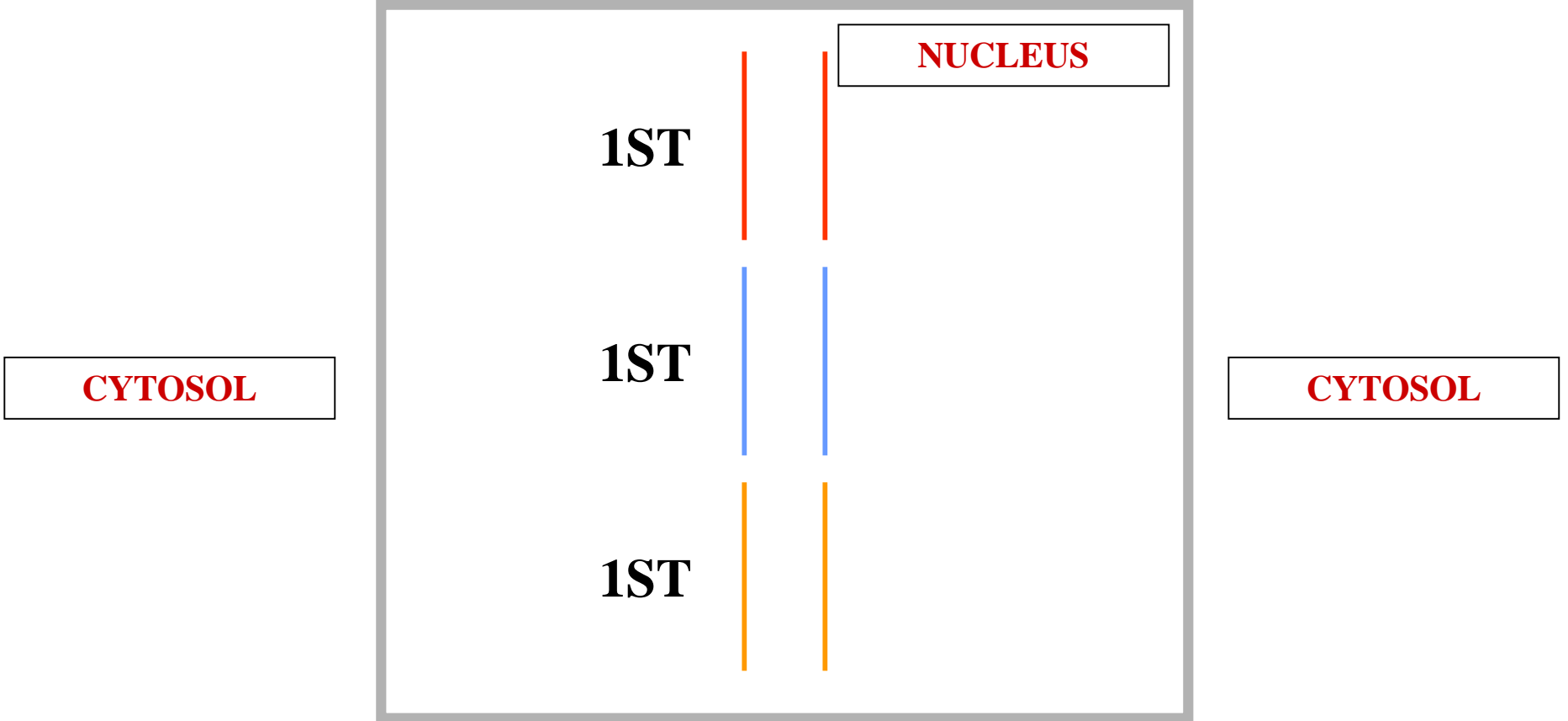
DIPLOID CELL

TRUE PLANT CELL



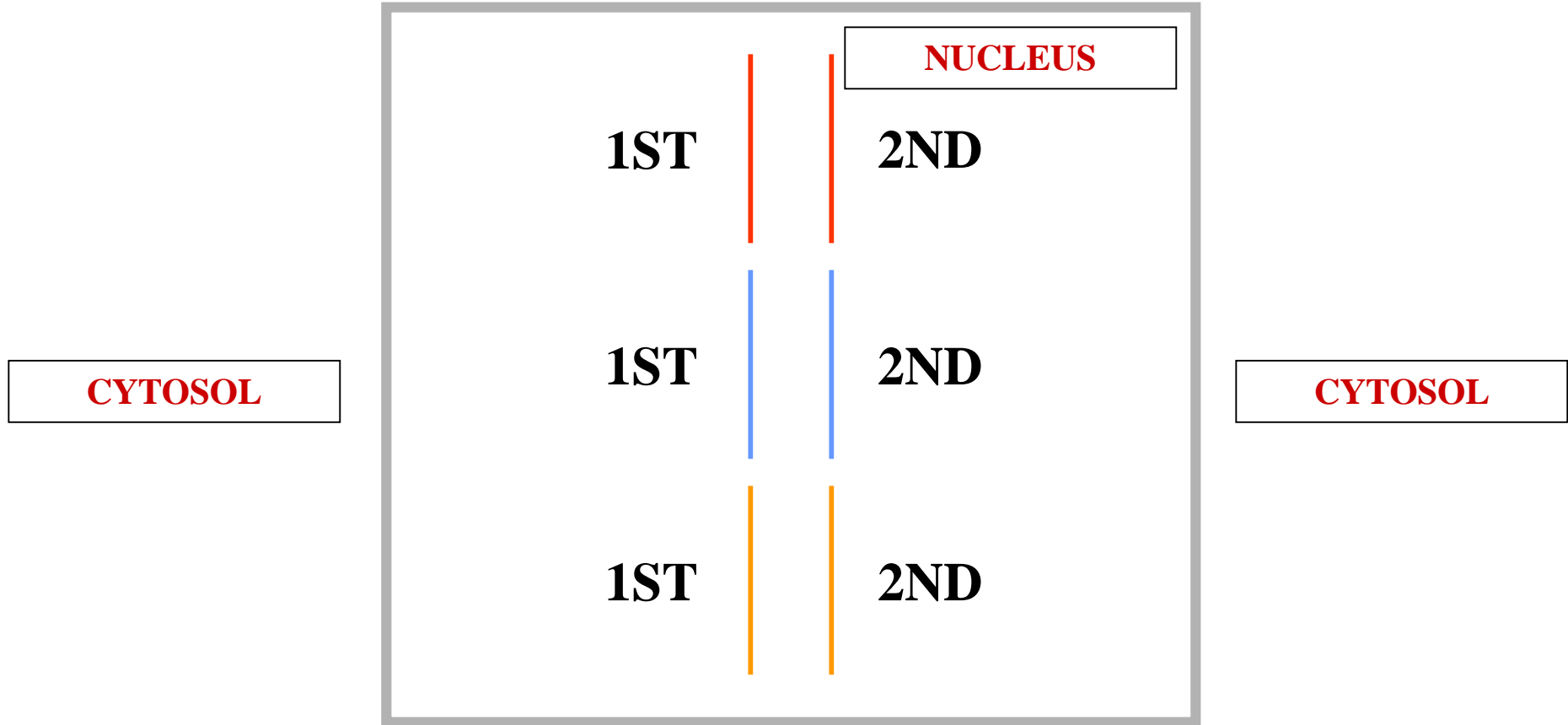
6 CHROMOSOMES

TRUE PLANT CELL



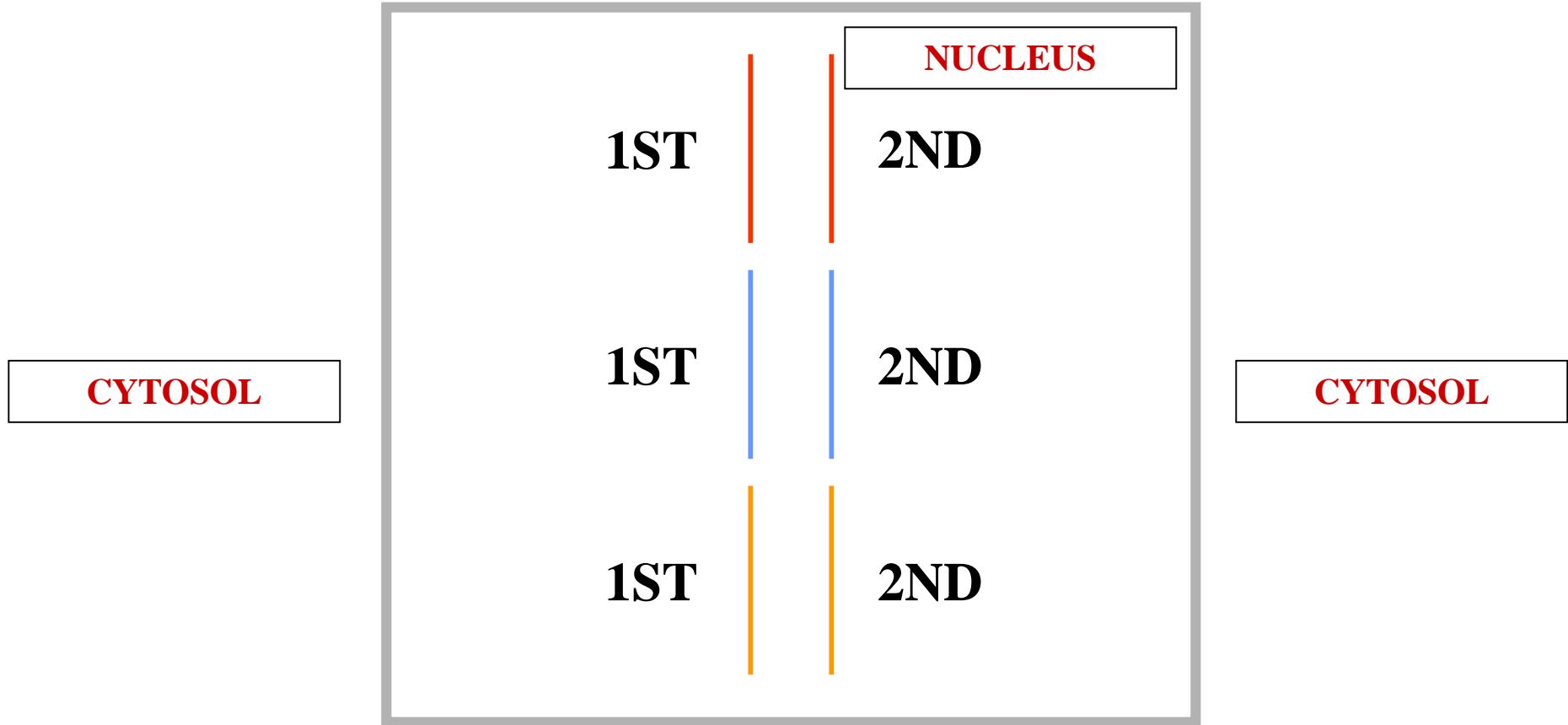
6 CHROMOSOMES

TRUE PLANT CELL



6 CHROMOSOMES

TRUE PLANT CELL



DIPLOID CELL

$$2N = 6$$

HAPLOID CELL



HAPLOID CELL

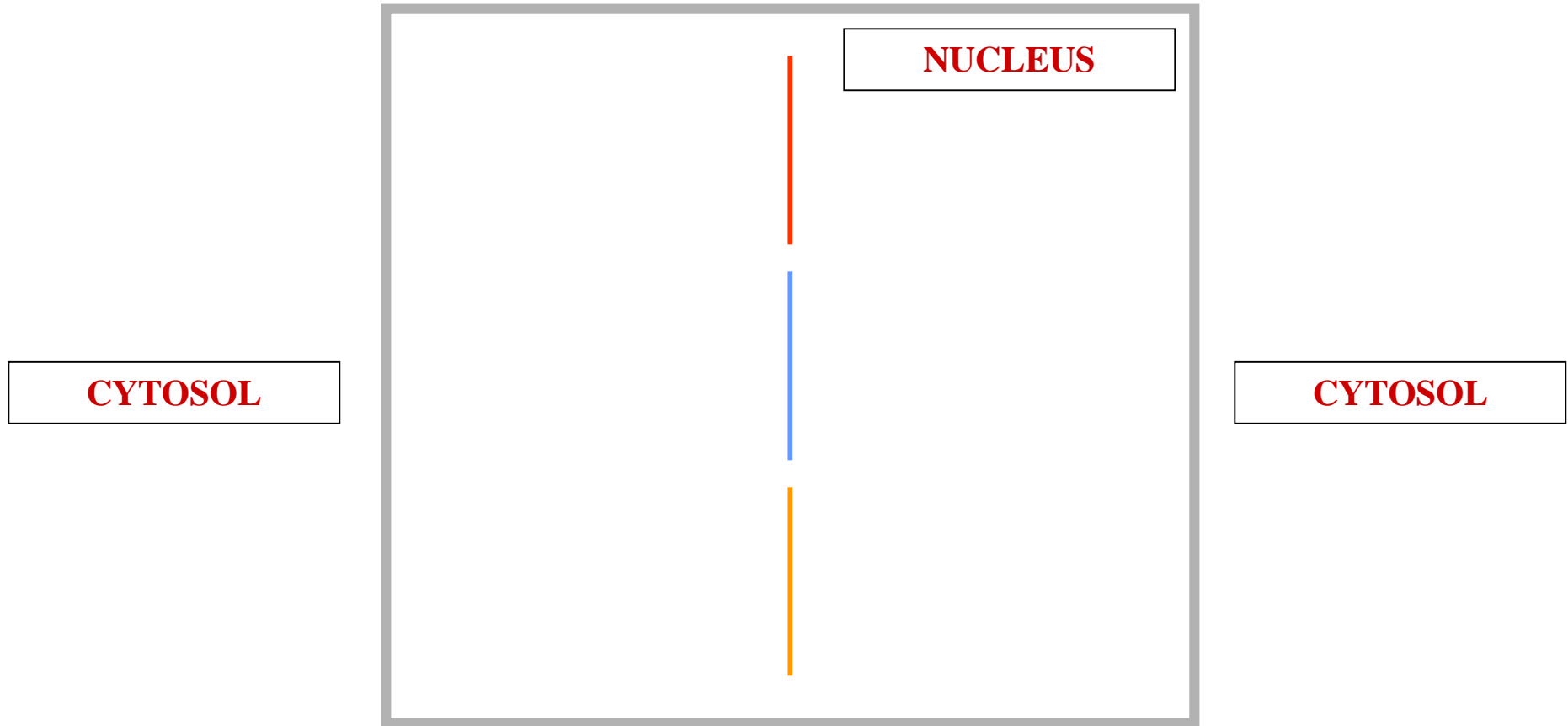
**1 HOMOLOGOUS
CHROMOSOME SET**

=

1N

HAPLOID CELL

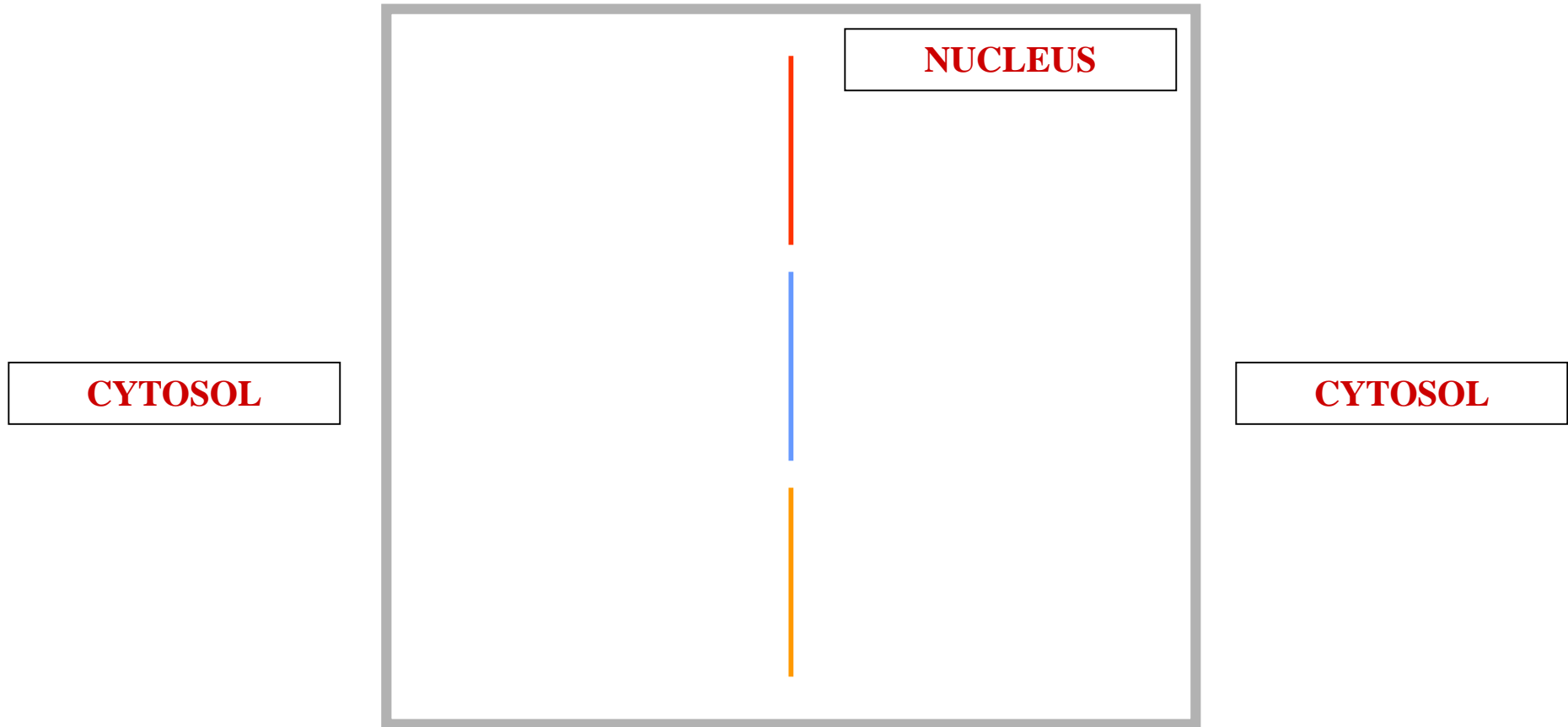
TRUE PLANT CELL



3 CHROMOSOMES




TRUE PLANT CELL



HAPLOID CELL

$$1N = 3$$



PLOIDY LEVEL APPLIED

TRUE PLANT GERM CELL

NUCLEUS
20
CHROMOSOMES

GERM CELL

TRUE PLANT GERM CELL



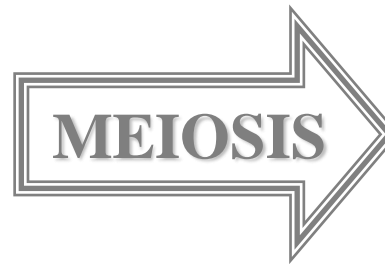
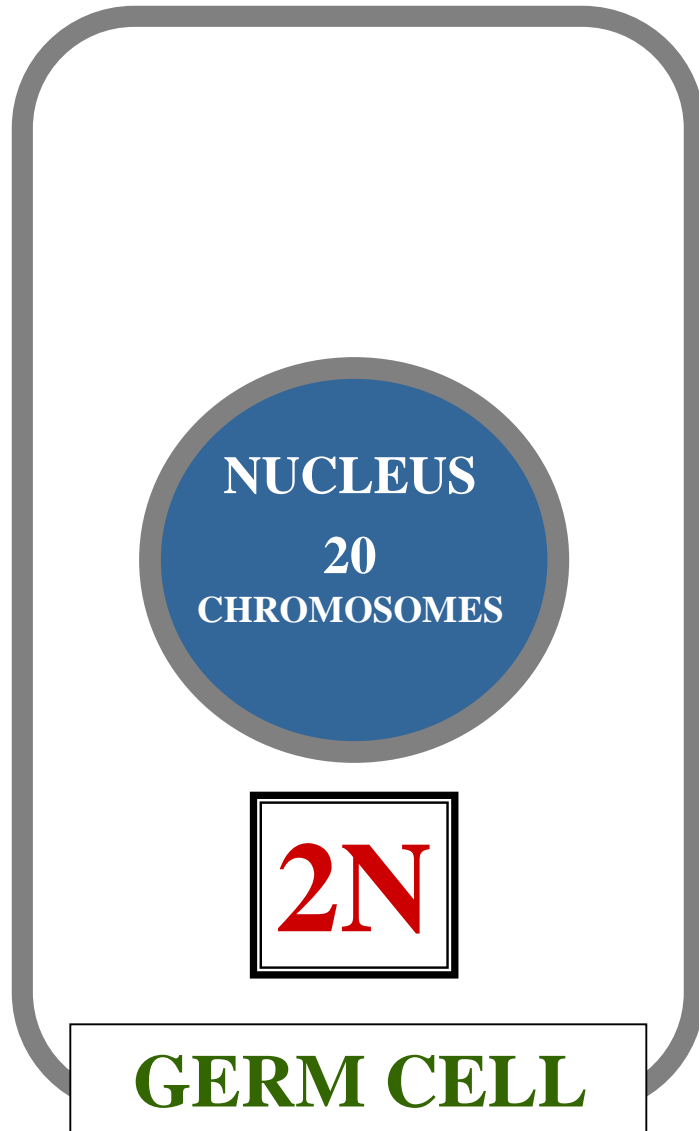
NUCLEUS
20
CHROMOSOMES

2N

GERM CELL

TRUE PLANT GERM CELL

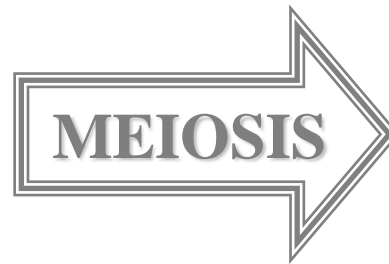
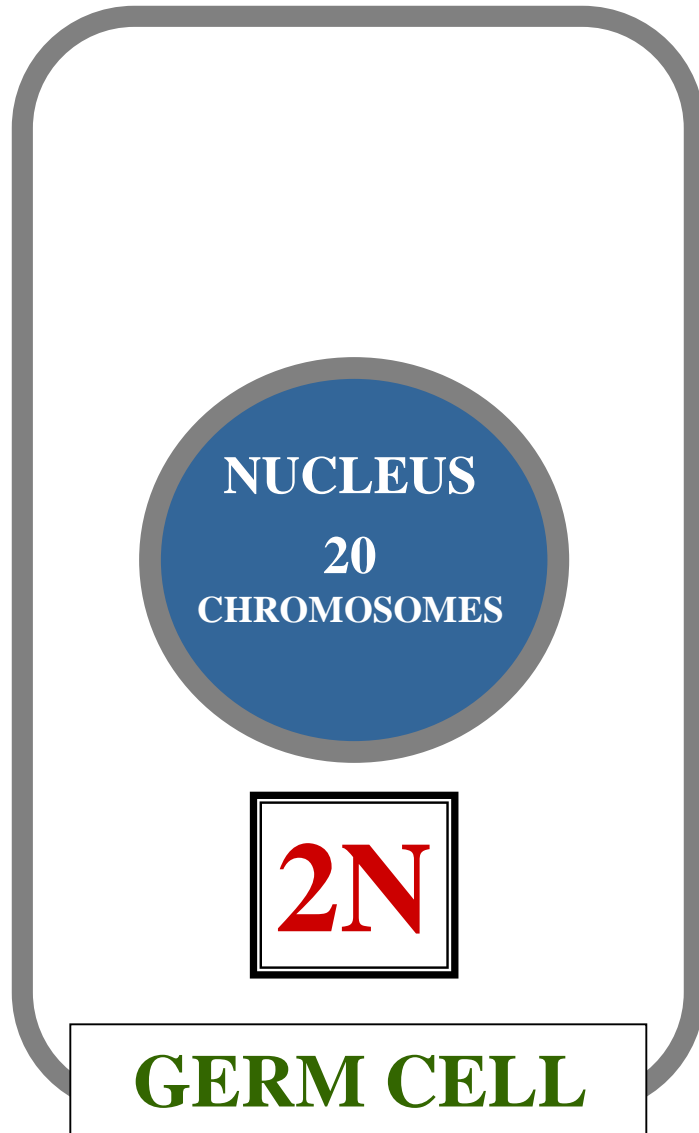
?



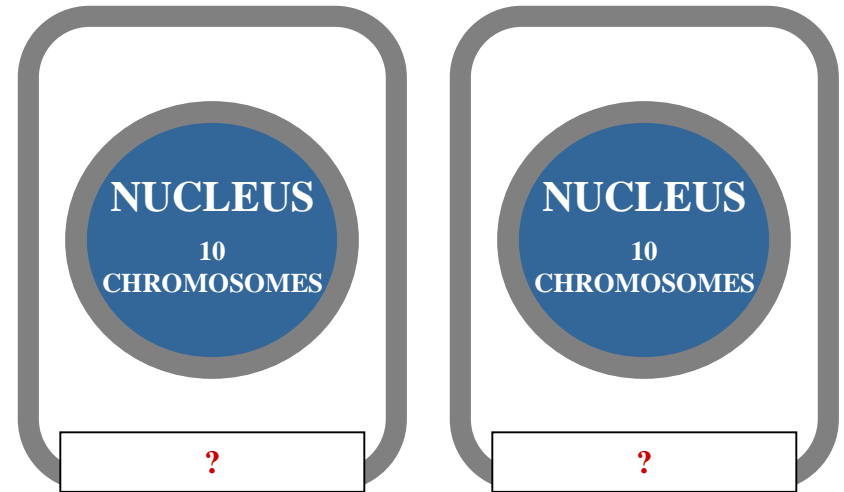
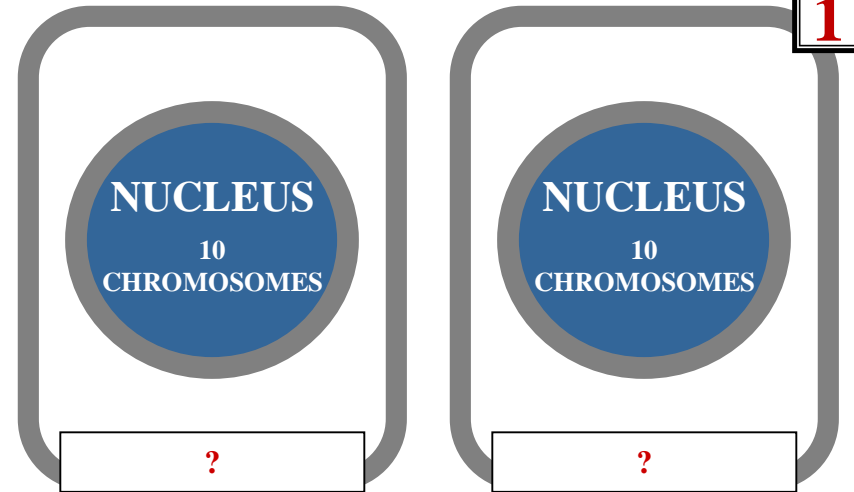
1/2 REDUCTION

A white rectangular box with a black border containing the text '1/2 REDUCTION' in a bold, serif font.

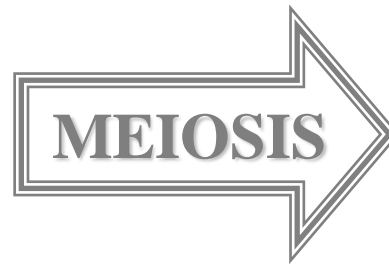
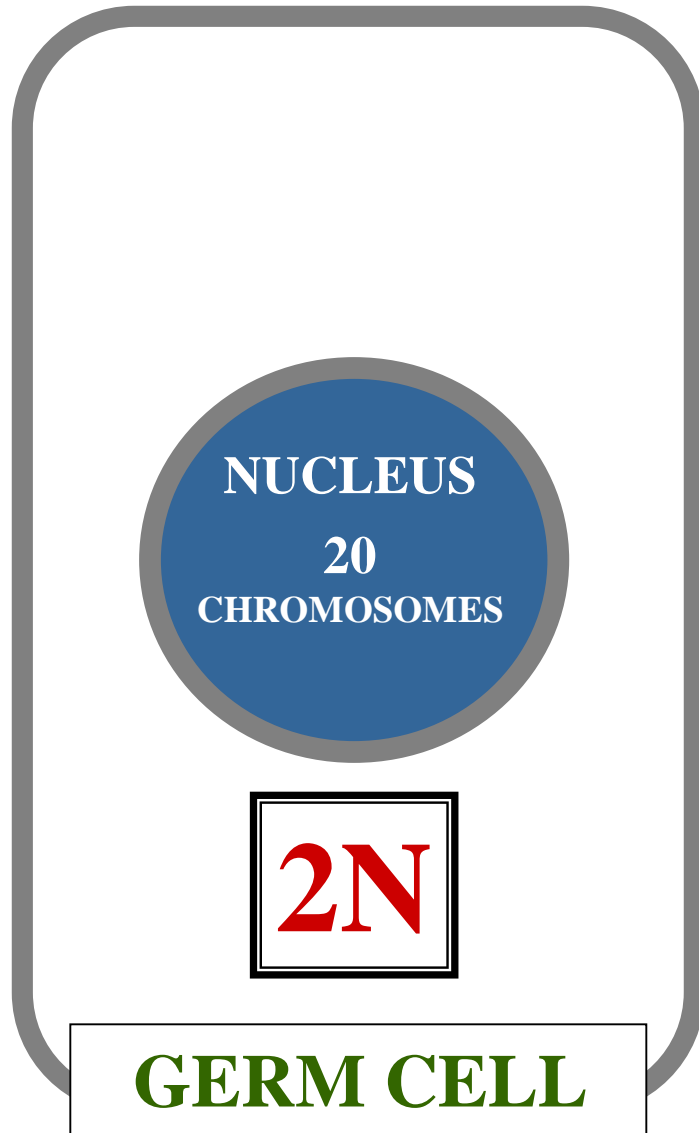
TRUE PLANT GERM CELL



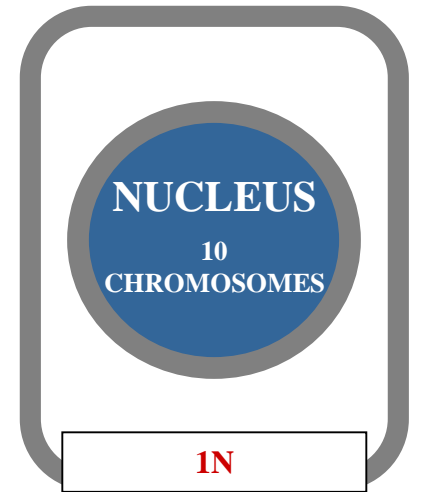
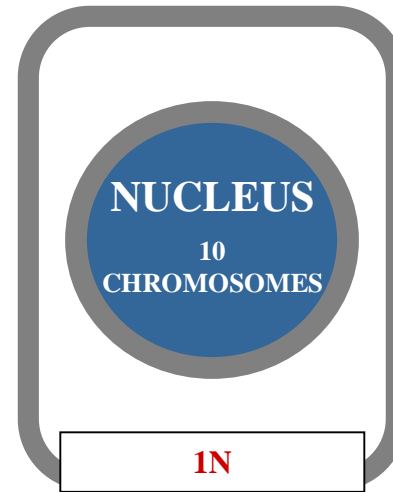
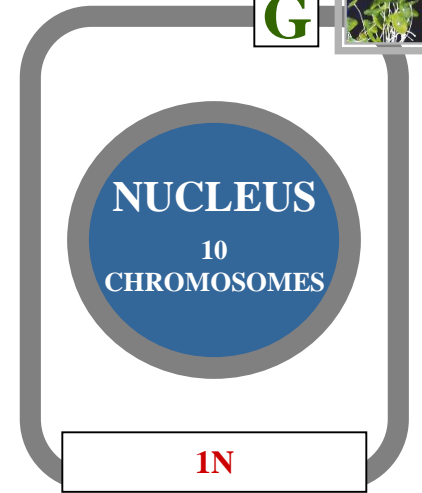
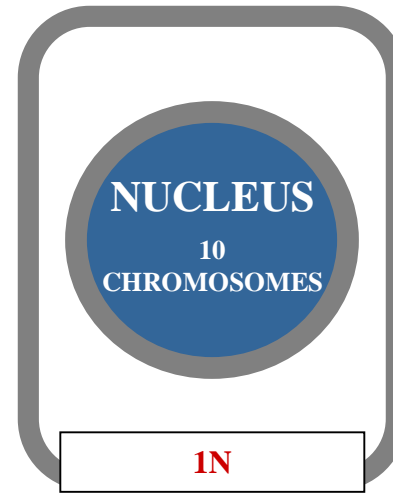
1/2 REDUCTION



TRUE PLANT GERM CELL



1/2 REDUCTION



TRUE PLANT GERM CELL



NUCLEUS
20
CHROMOSOMES

GAMETANGIA

GERM CELL

MEIOSIS

1/2 REDUCTION

NUCLEUS
10
CHROMOSOMES

1N / GAMETE

NUCLEUS
10
CHROMOSOMES

1N / GAMETE

S



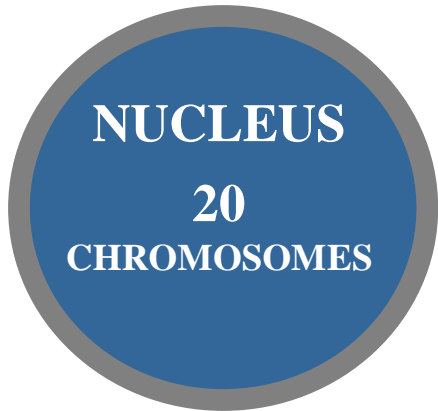
NUCLEUS
10
CHROMOSOMES

1N / GAMETE

NUCLEUS
10
CHROMOSOMES

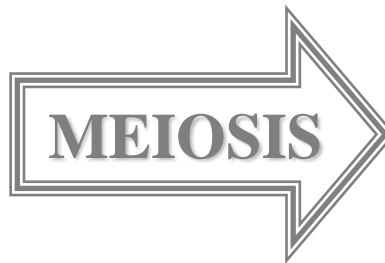
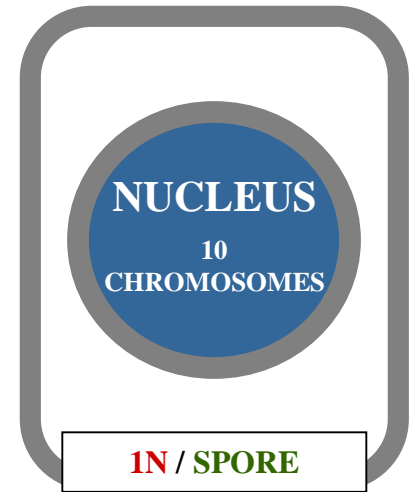
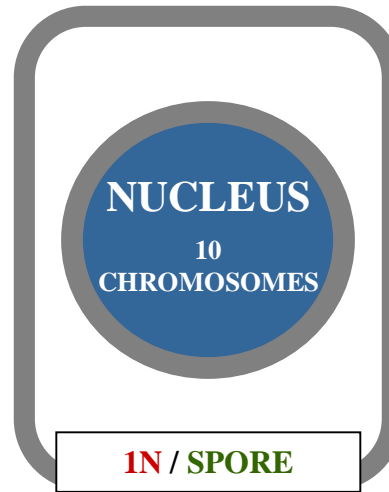
1N / GAMETE

TRUE PLANT GERM CELL

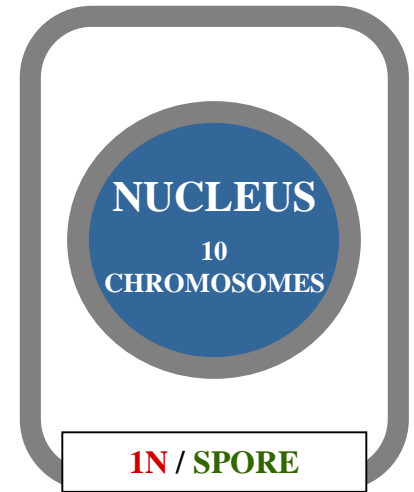
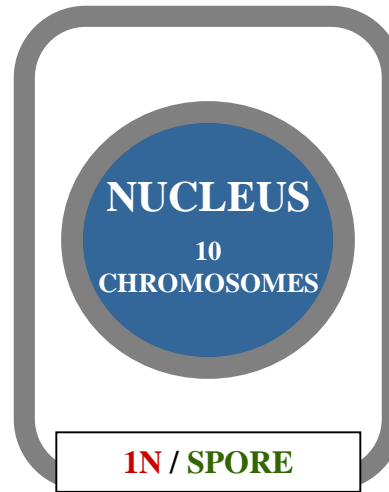


SPORANGIA

GERM CELL



1/2 REDUCTION



**TRUE PLANT
GERM
CELL CYCLE
STAGES**

GERM CELL CYCLE STAGES

INTERPHASE-I

GERM CELL CYCLE STAGES

GERM CELL CYCLE STAGES

**INTERPHASE-I
KARYOKINESIS-I**

GERM CELL CYCLE STAGES

GERM CELL CYCLE STAGES

**INTERPHASE-I
KARYOKINESIS-I
CYTOKINESIS-I**

GERM CELL CYCLE STAGES

GERM CELL CYCLE STAGES

INTERPHASE-I

KARYOKINESIS-I

CYTOKINESIS-I

INTERPHASE-II

GERM CELL CYCLE STAGES

GERM CELL CYCLE STAGES

INTERPHASE-I

KARYOKINESIS-I

CYTOKINESIS-I

INTERPHASE-II

KARYOKINESIS-II

GERM CELL CYCLE STAGES

GERM CELL CYCLE STAGES



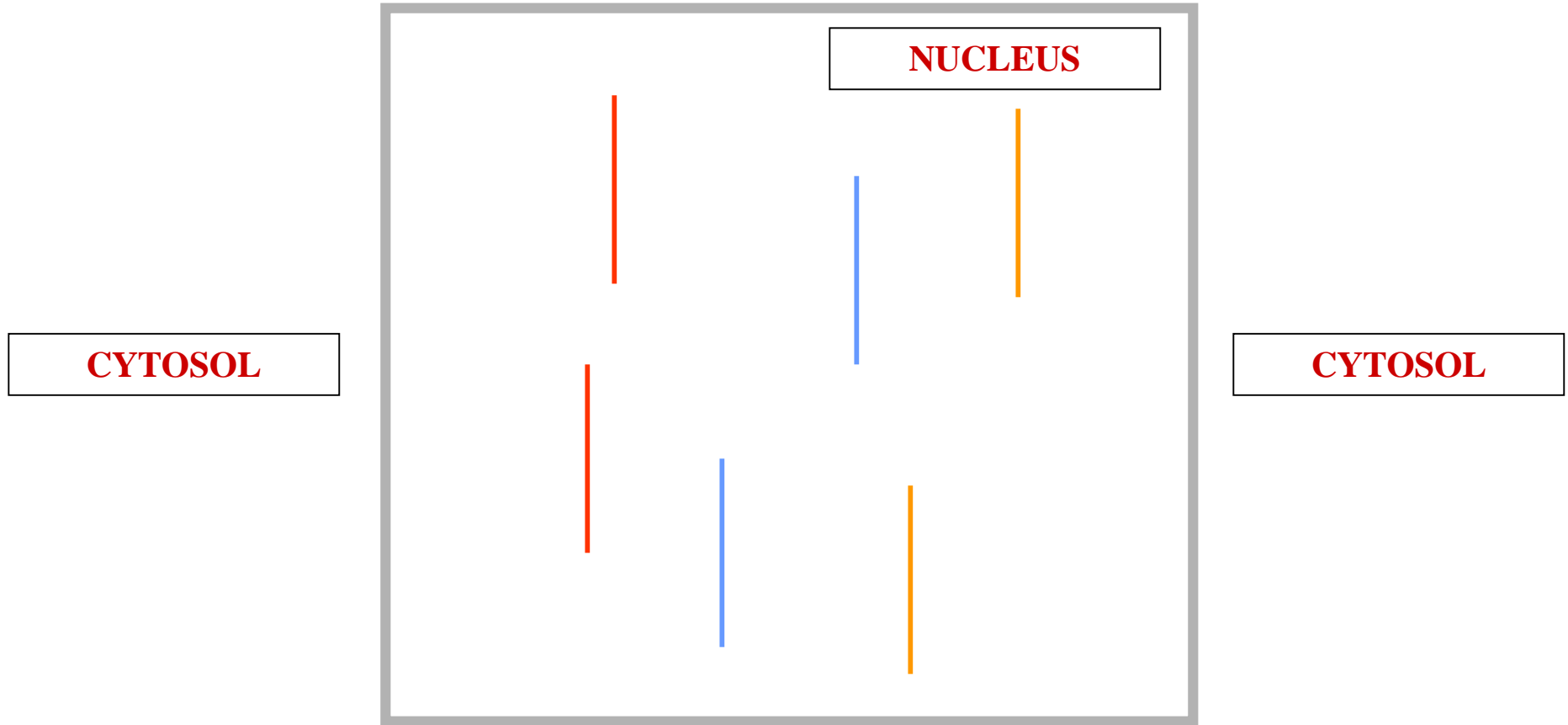
INTERPHASE-I
KARYOKINESIS-I
CYTOKINESIS-I

INTERPHASE-II
KARYOKINESIS-II
CYTOKINESIS-II

GERM CELL CYCLE
STAGES

**TRUE PLANT
GERM
CELL CYCLE
SPECIFICS**

GERM MOTHER CELL

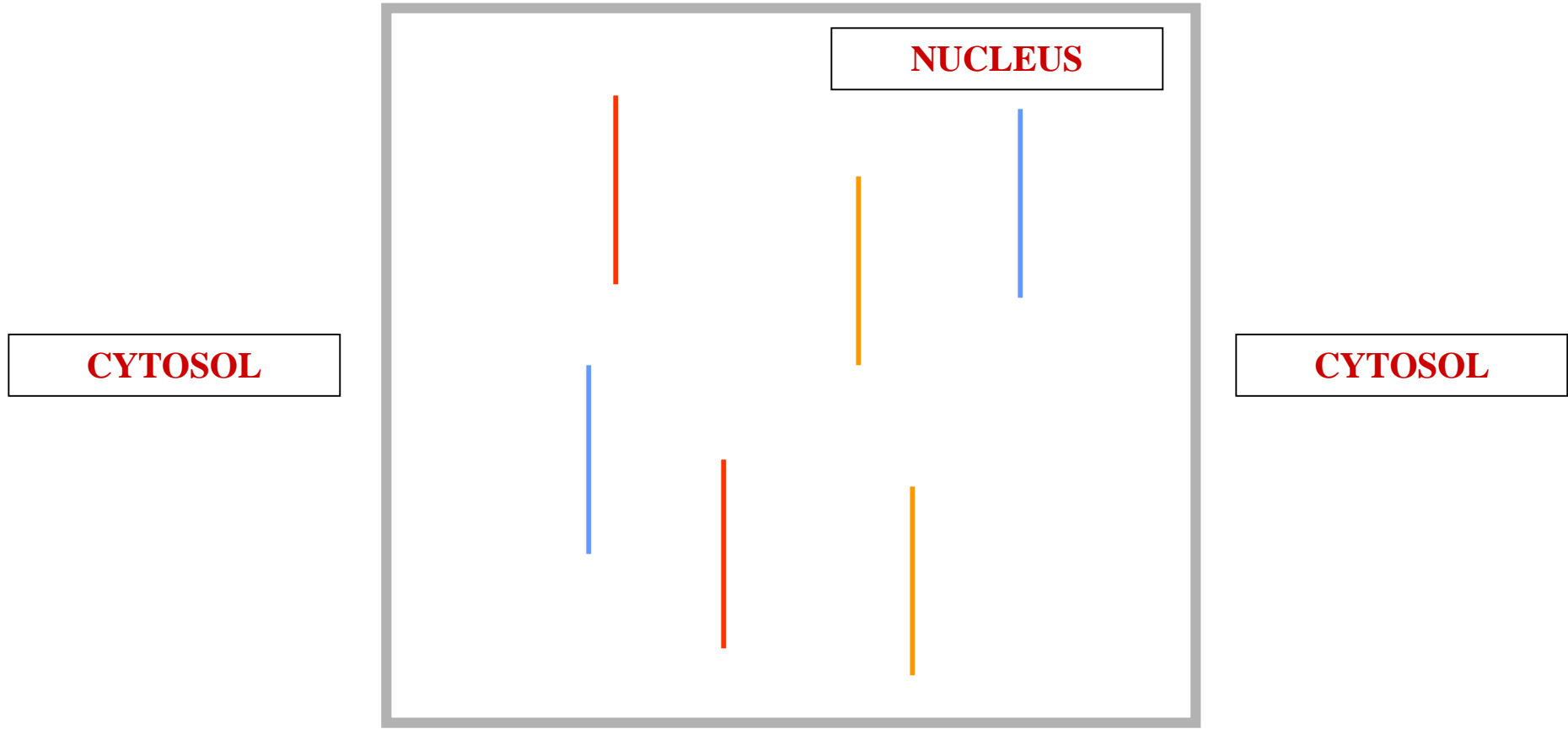


6 CHROMOSOMES



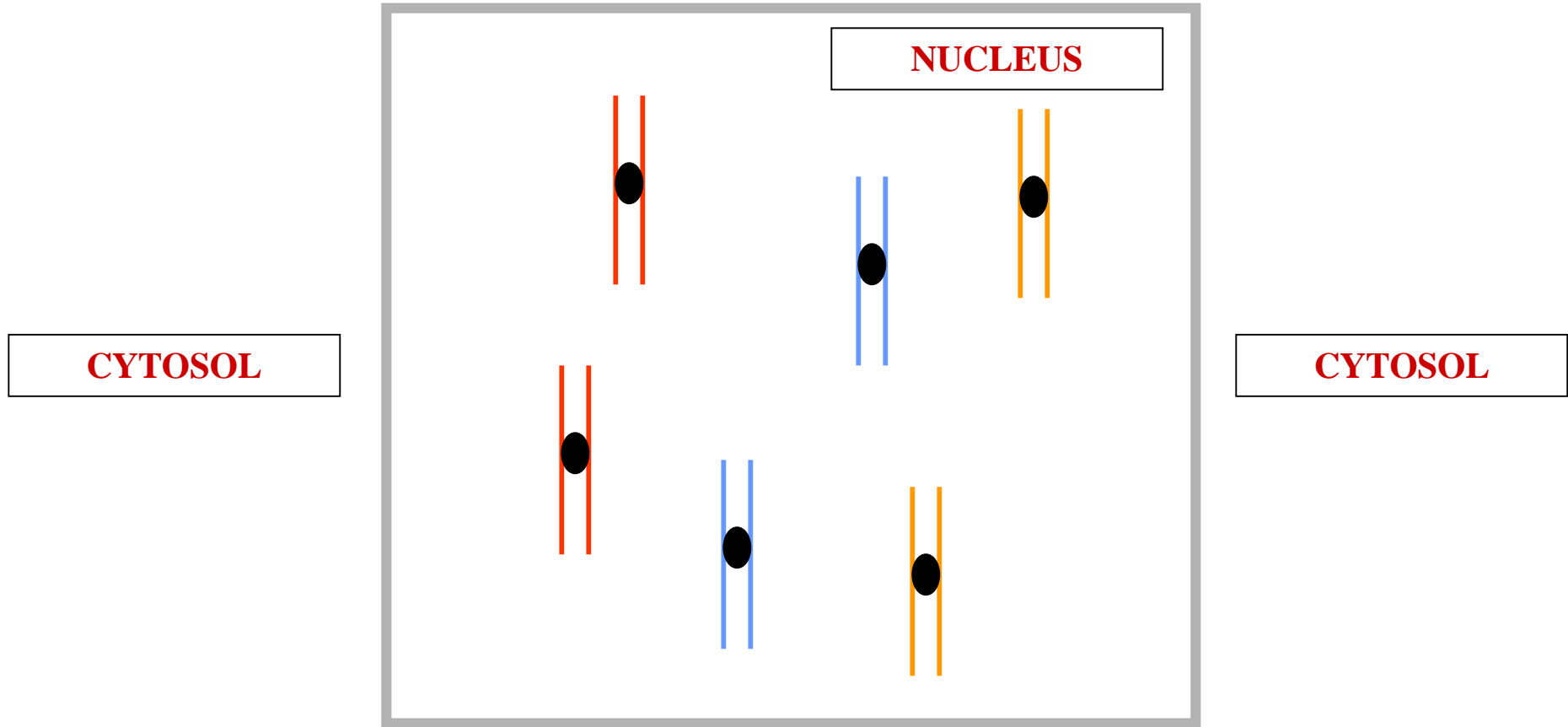
INTERPHASE-I

INTERPHASE - I



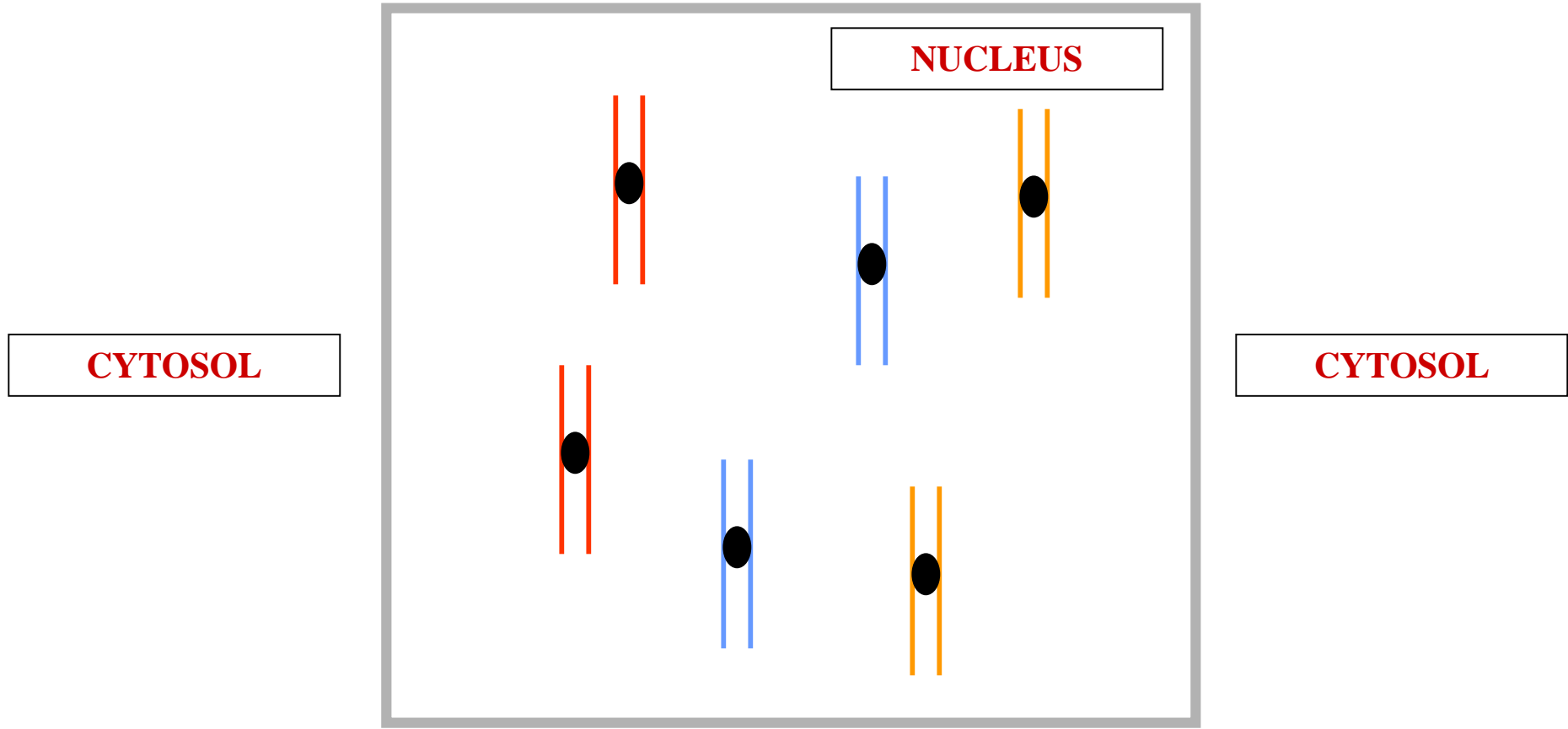
6 CHROMOSOMES

INTERPHASE - I



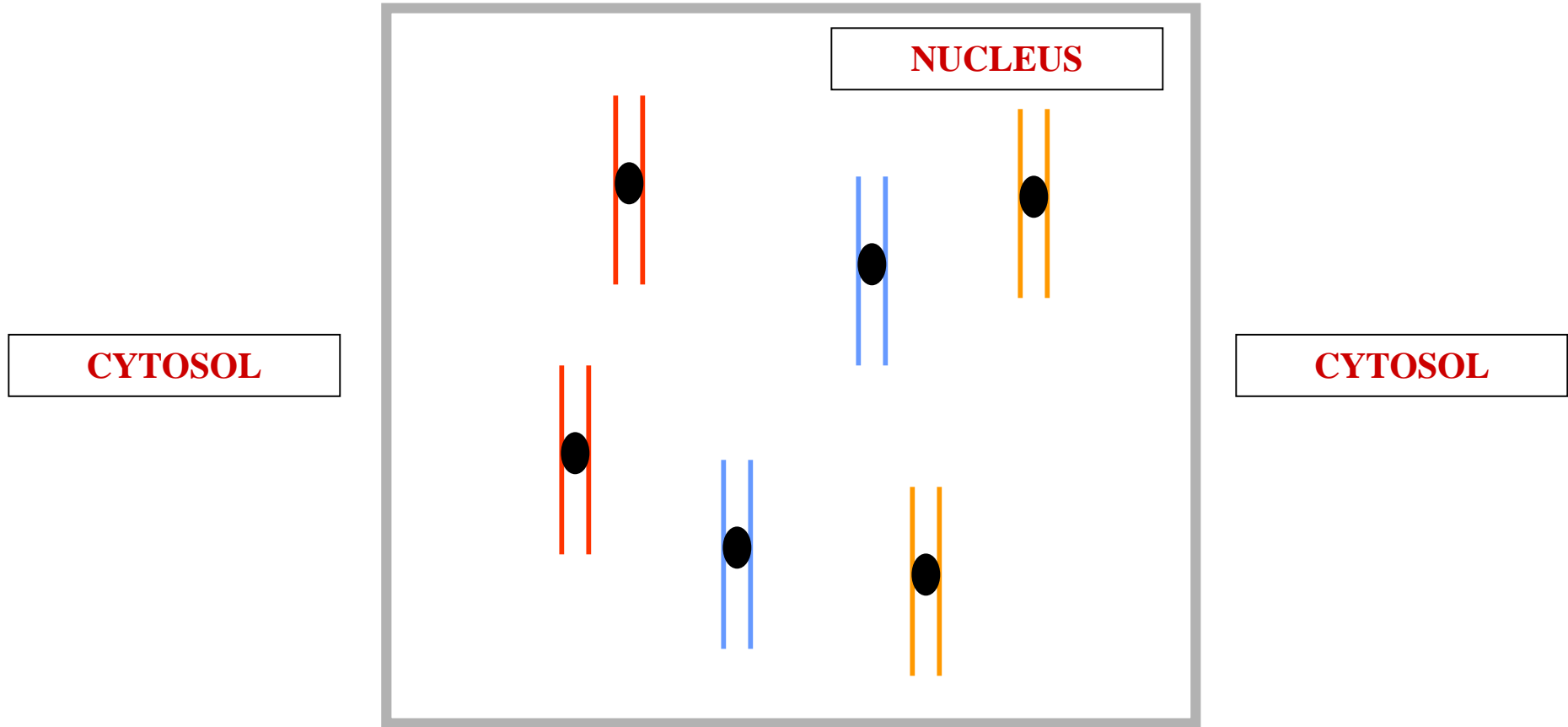
CHROMOSOMES REPLICATE

INTERPHASE - I



TWO CHROMATIDS

INTERPHASE - I



DNA CONTENT DOUBLED

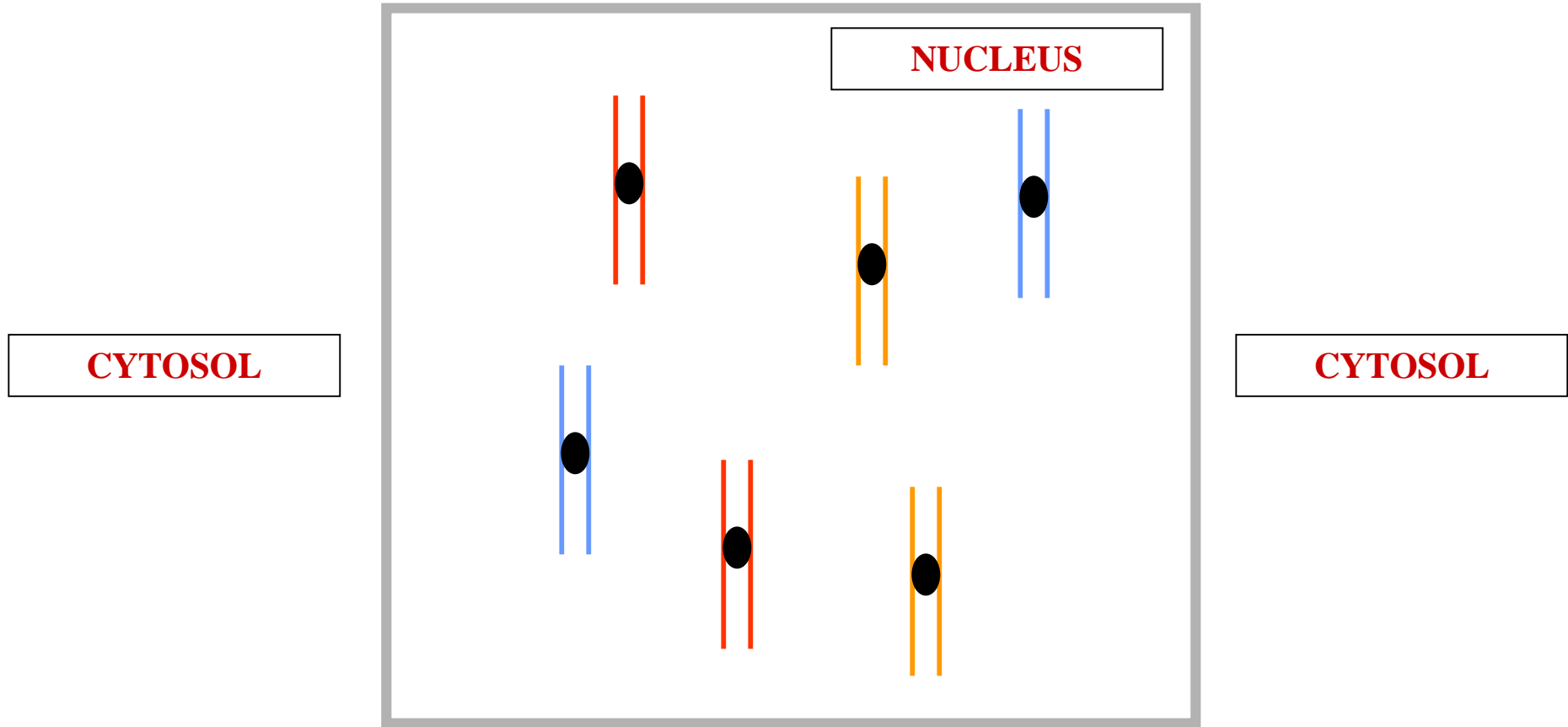
KARYOKINESIS-I

MEIOSIS-I

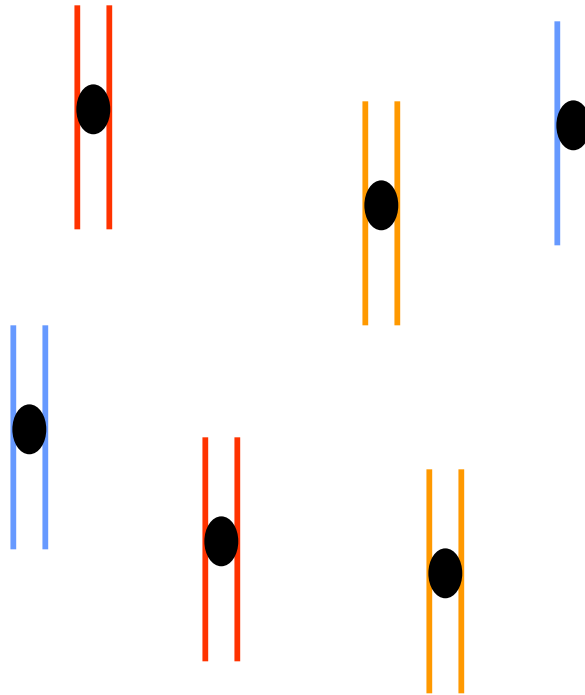


PROPHASE-I

PROPHASE - I



PROPHASE - I

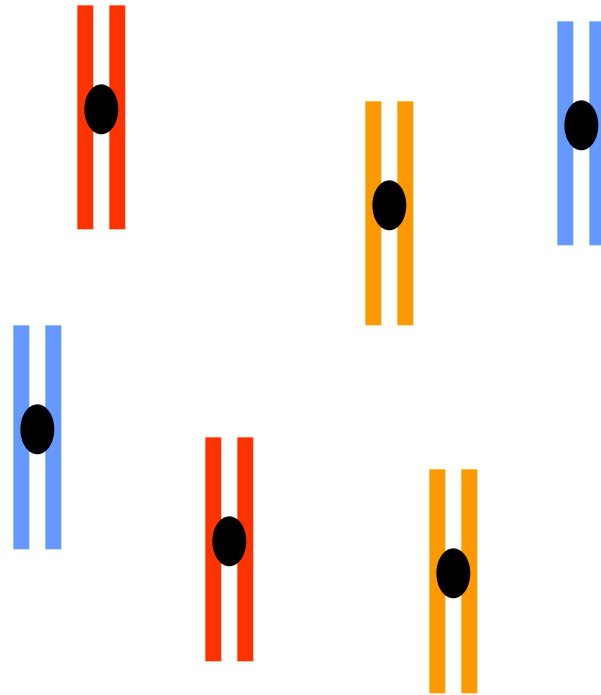


**NUCLEAR
MEMBRANE
DISSIPATES**

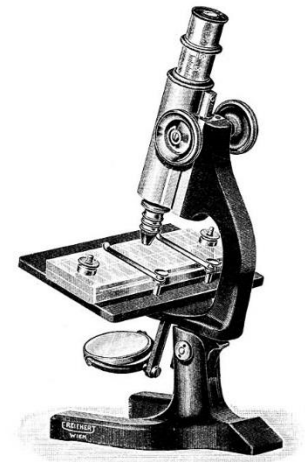
PROPHASE - I



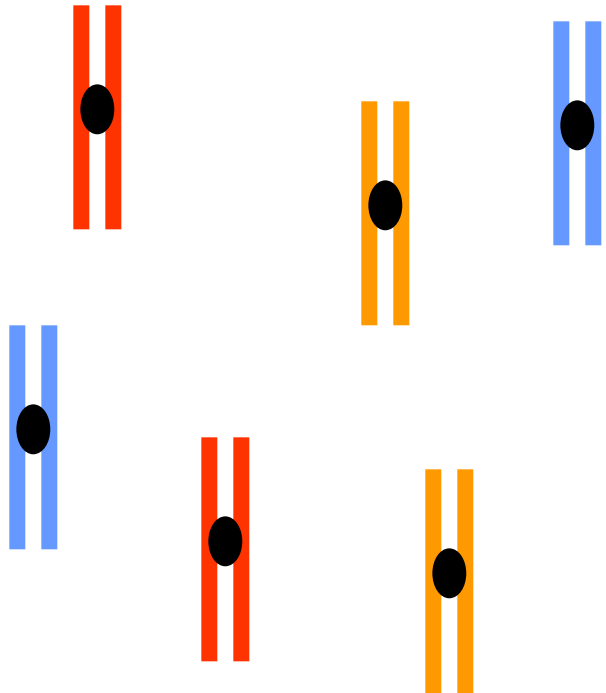
HC



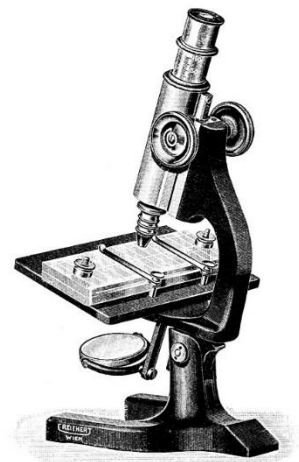
**CHROMOSOMES
CONDENSE**



PROPHASE - I



**HOMOLOGOUS
CHROMOSOMES**

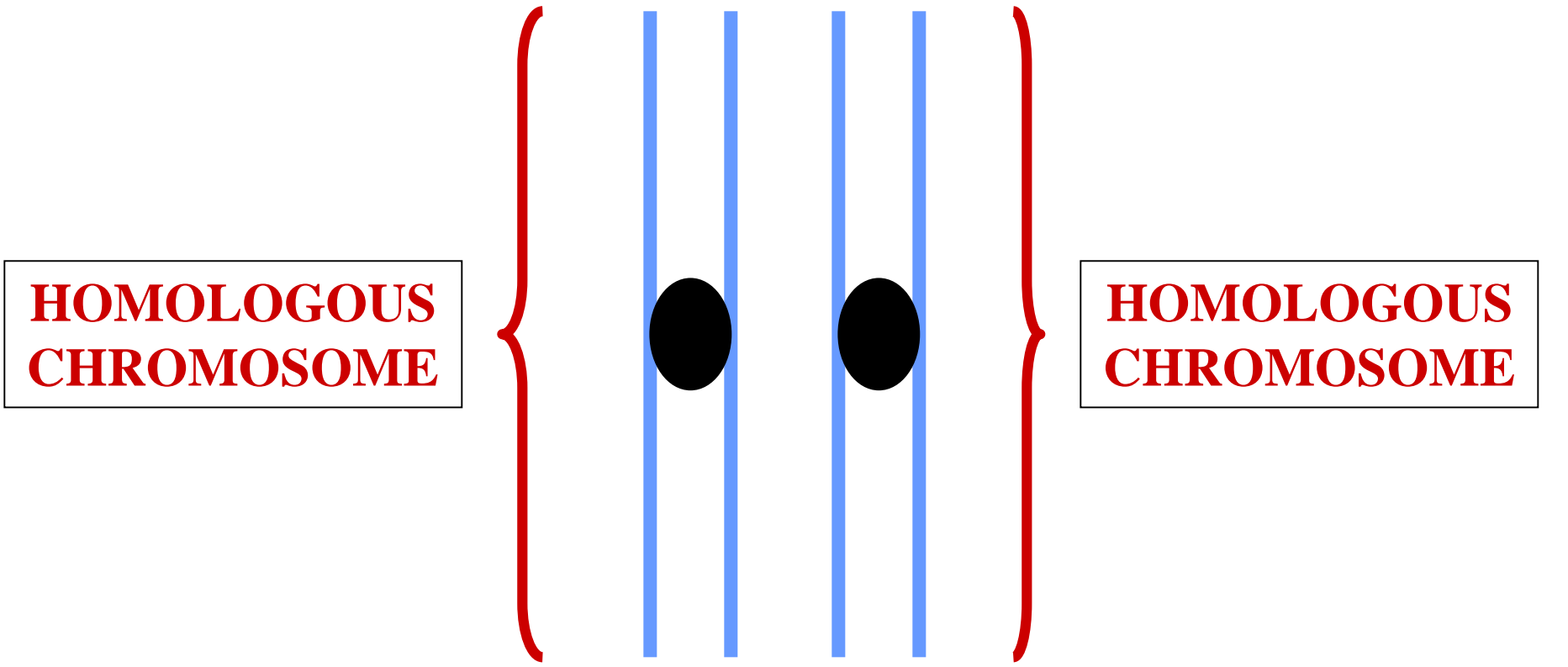


PROPHASE - I



**HOMOLOGOUS
CHROMOSOMES
PAIR**

PROPHASE - I



**HOMOLOGOUS
CHROMOSOME**

**HOMOLOGOUS
CHROMOSOME**

PROPHASE - I

