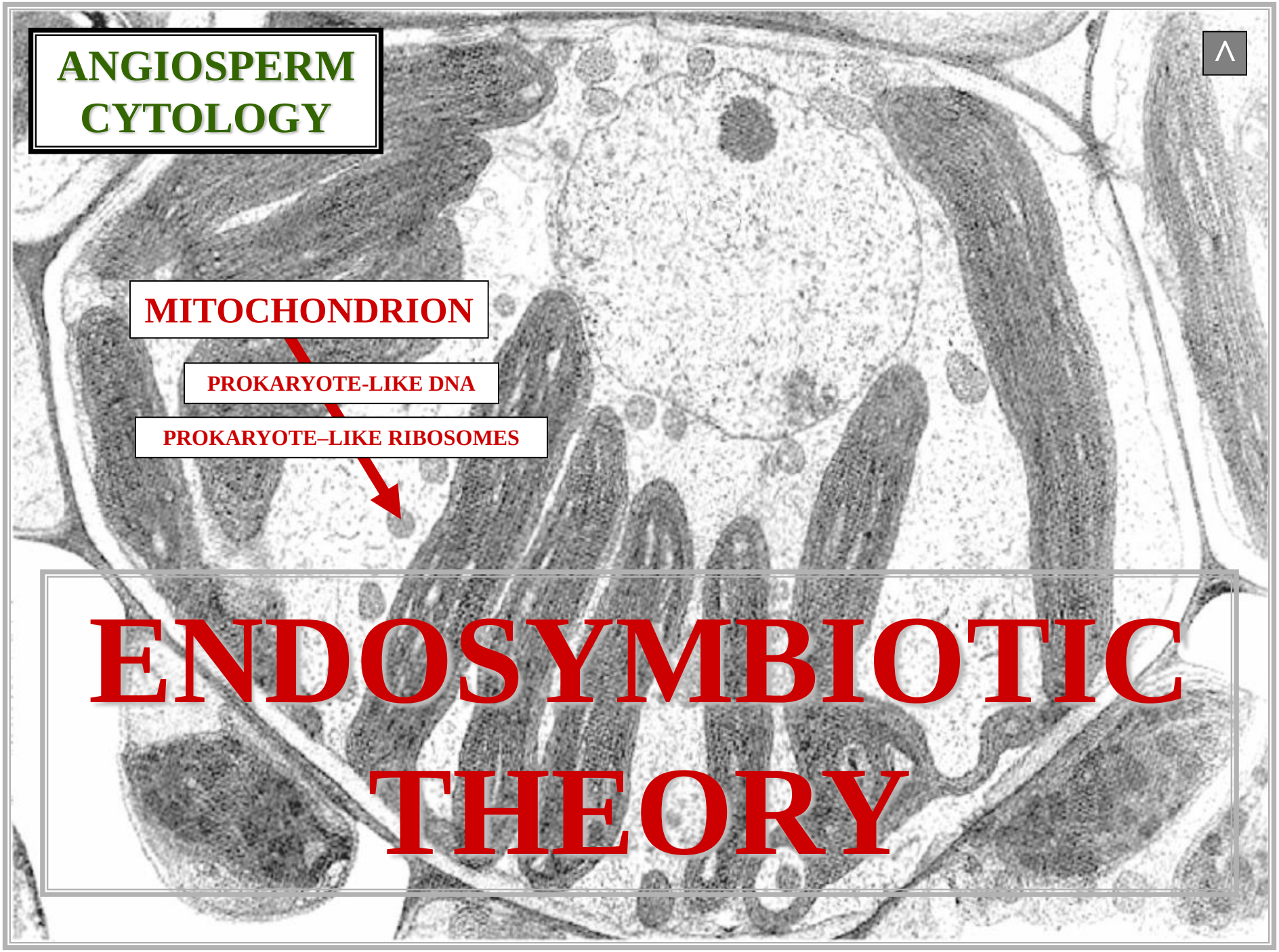


ANGIOSPERM CYTOLOGY

MITOCHONDRION

PROKARYOTE-LIKE DNA

PROKARYOTE–LIKE RIBOSOMES

ENDOSYMBIOTIC THEORY

NUCLEUS

NUCLEUS

NUCLEUS

KNOWN MOST EUKARYOTES

NUCLEUS

NUCLEUS

KNOWN MOST EUKARYOTES

CHROMOSOME LOCATION

NUCLEUS

NUCLEUS

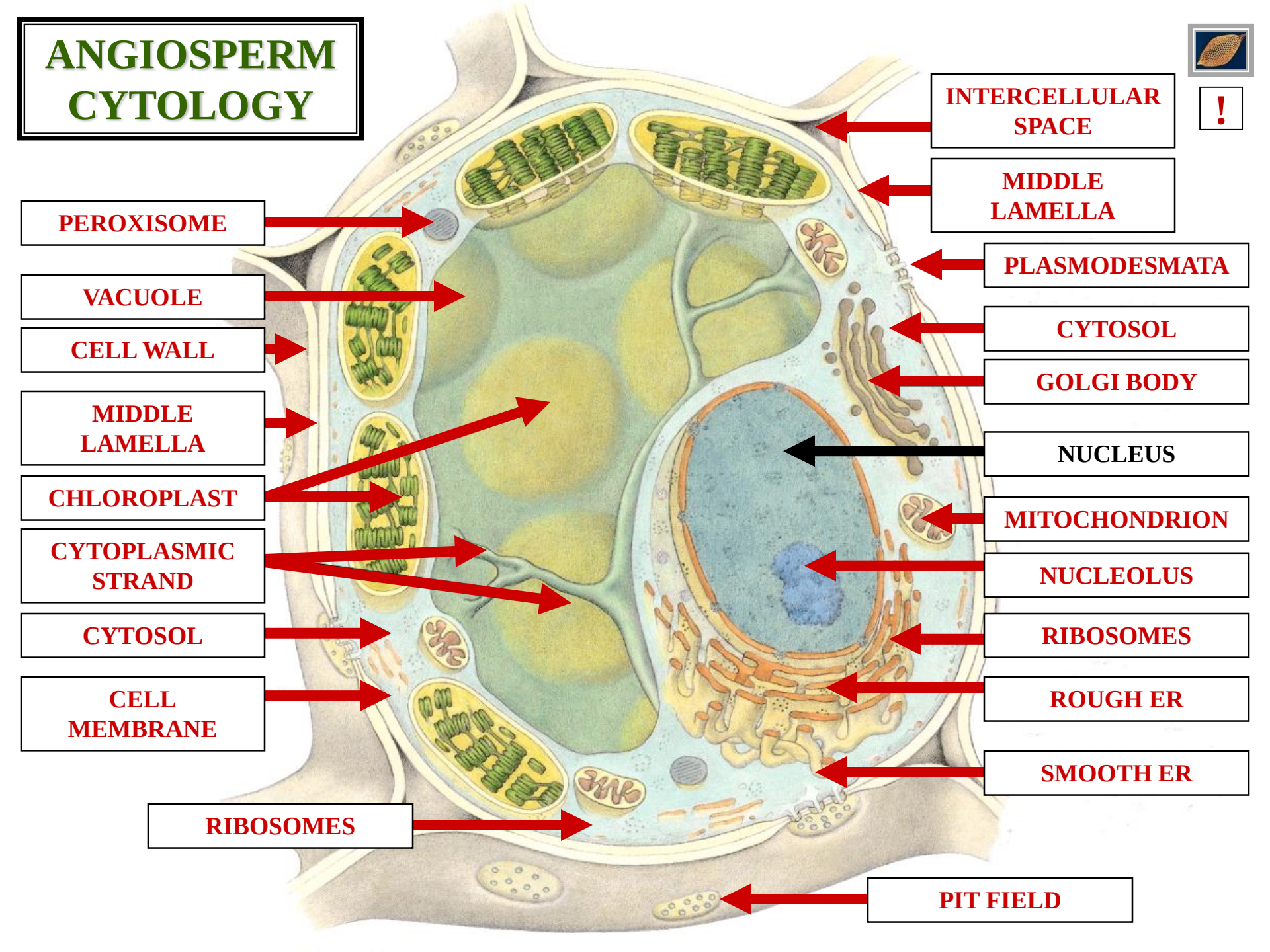
KNOWN MOST EUKARYOTES

CHROMOSOME LOCATION

REGULATES CELL METABOLISM

NUCLEUS

ANGIOSPERM CYTOLOGY



INTERCELLULAR SPACE

MIDDLE LAMELLA

PLASMODESMATA

CYTOSOL

GOLGI BODY

NUCLEUS

MITOCHONDRION

NUCLEOLUS

RIBOSOMES

ROUGH ER

SMOOTH ER

PIT FIELD

PEROXISOME

VACUOLE

CELL WALL

MIDDLE LAMELLA

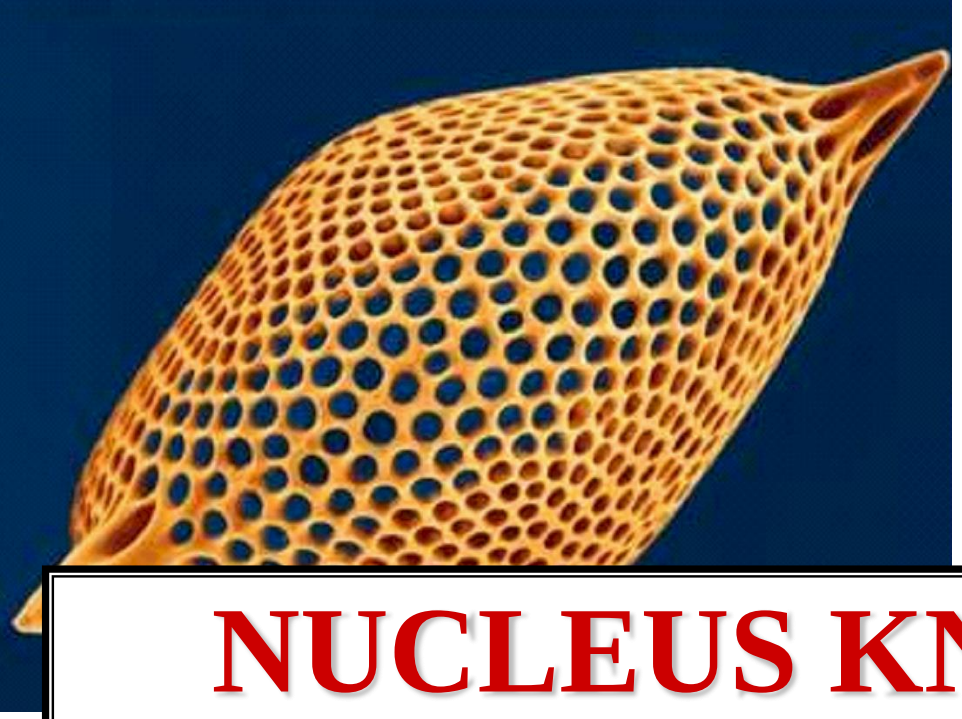
CHLOROPLAST

CYTOPLASMIC STRAND

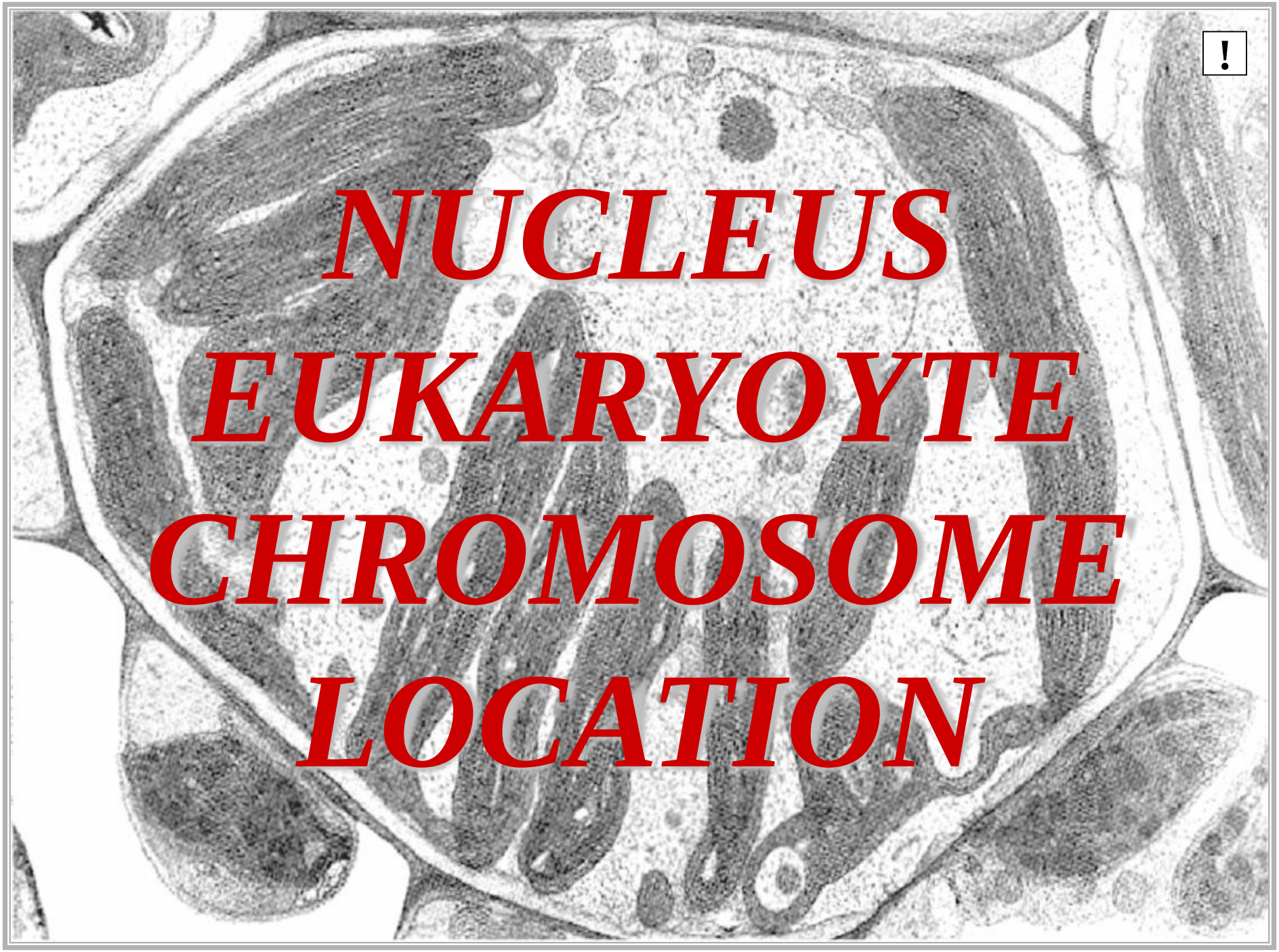
CYTOSOL

CELL MEMBRANE

RIBOSOMES



NUCLEUS KNOWN MOST EUKARYOTES

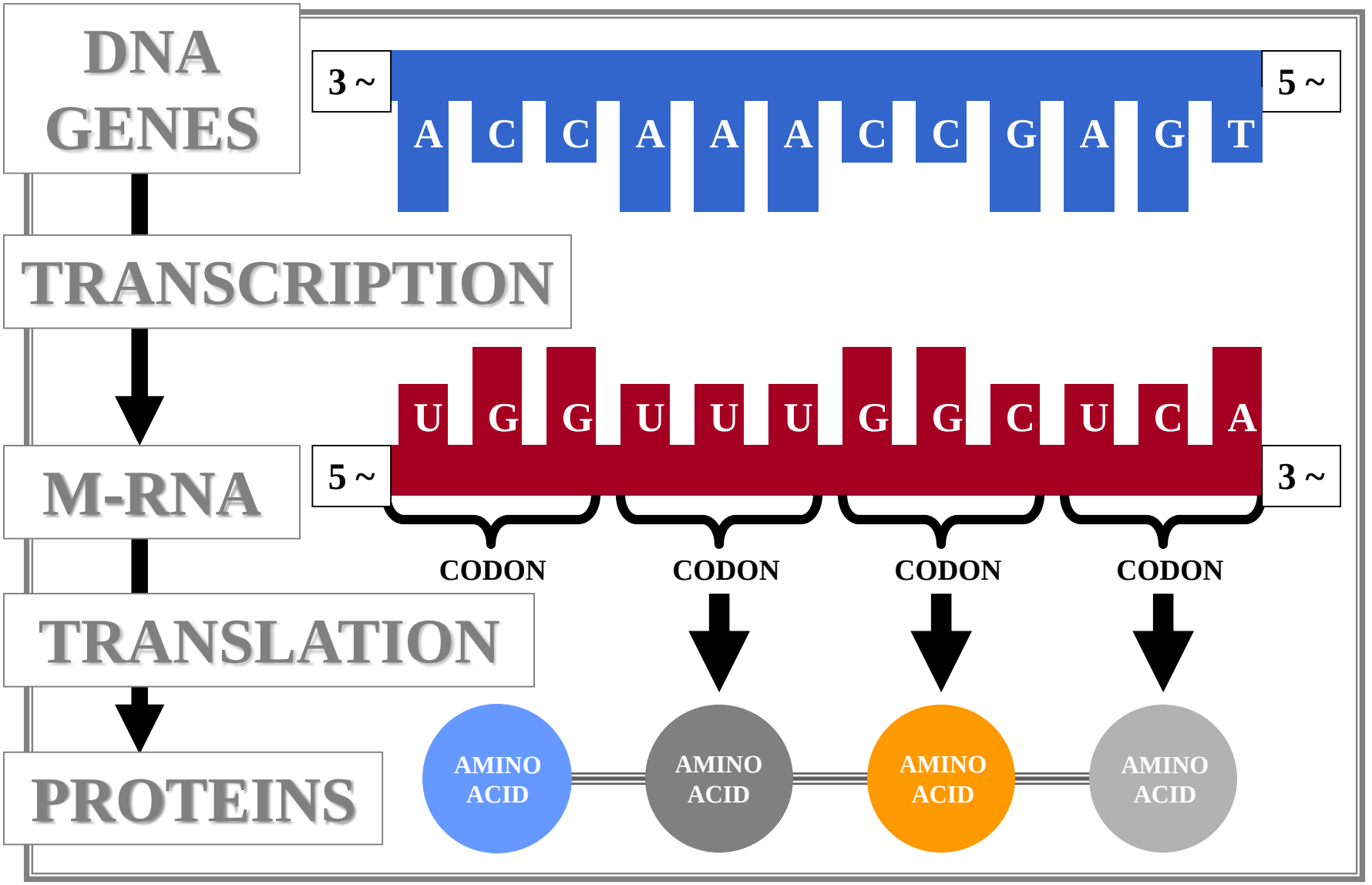


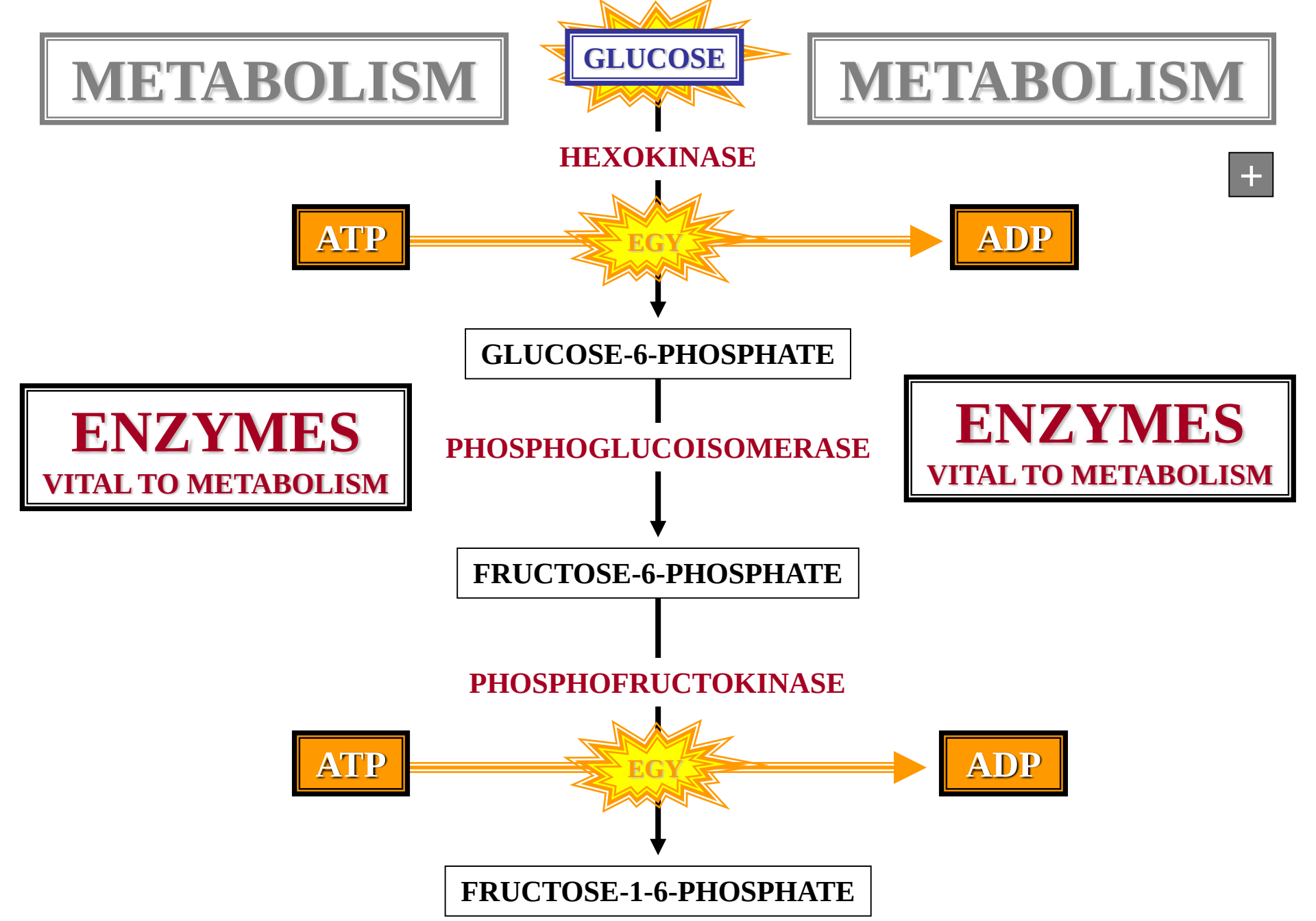
NUCLEUS
EUKARYOYTE
CHROMOSOME
LOCATION

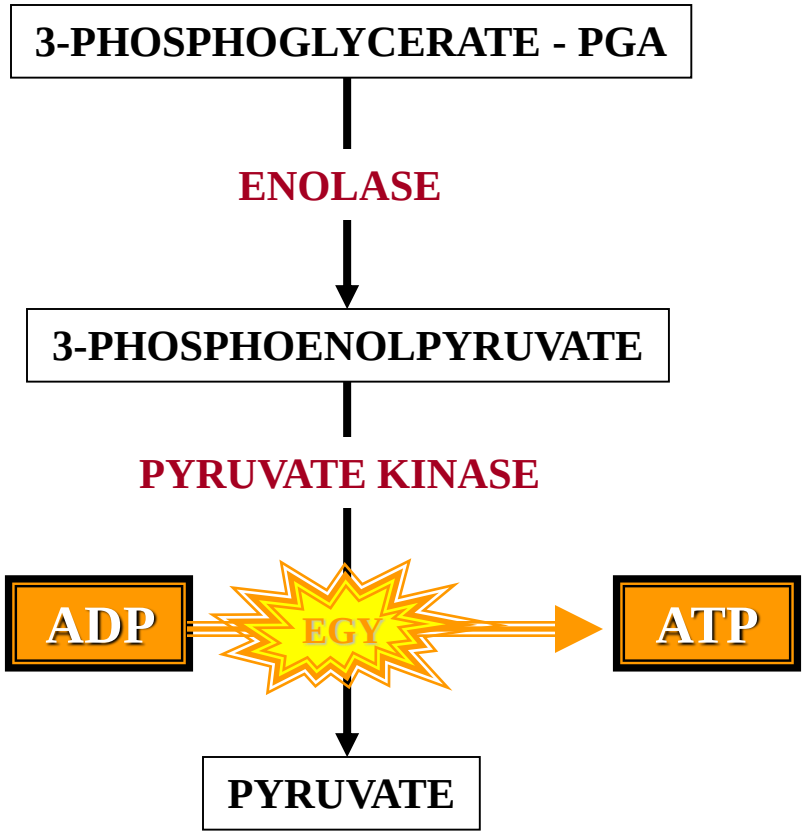
!

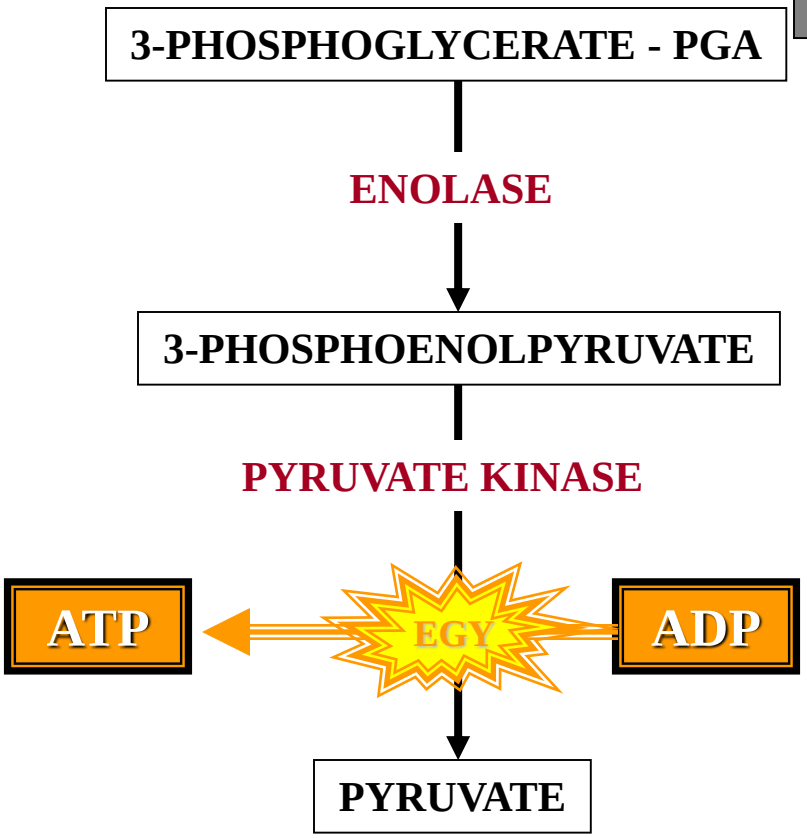
NUCLEUS REGULATES EUKARYOTE METABOLISM

PROTEIN SYNTHESIS




METABOLISM
GLUCOSE
METABOLISM
HEXOKINASE
ATP
EGY
ADP
GLUCOSE-6-PHOSPHATE
ENZYMES
VITAL TO METABOLISM
PHOSPHOGLUCOISOMERASE
ENZYMES
VITAL TO METABOLISM
FRUCTOSE-6-PHOSPHATE
PHOSPHOFRUCTOKINASE
ATP
EGY
ADP
FRUCTOSE-1-6-PHOSPHATE





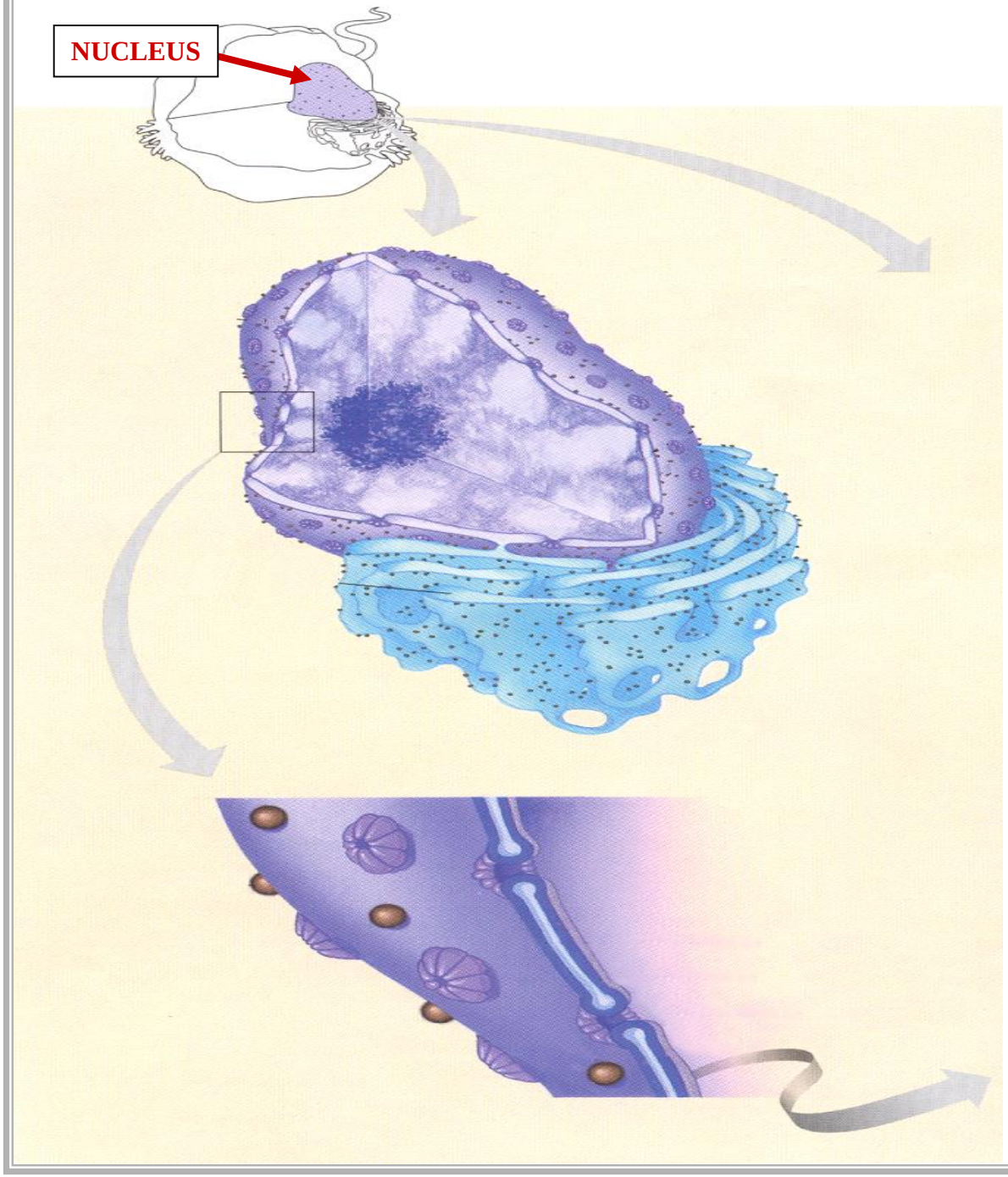
ENZYMES

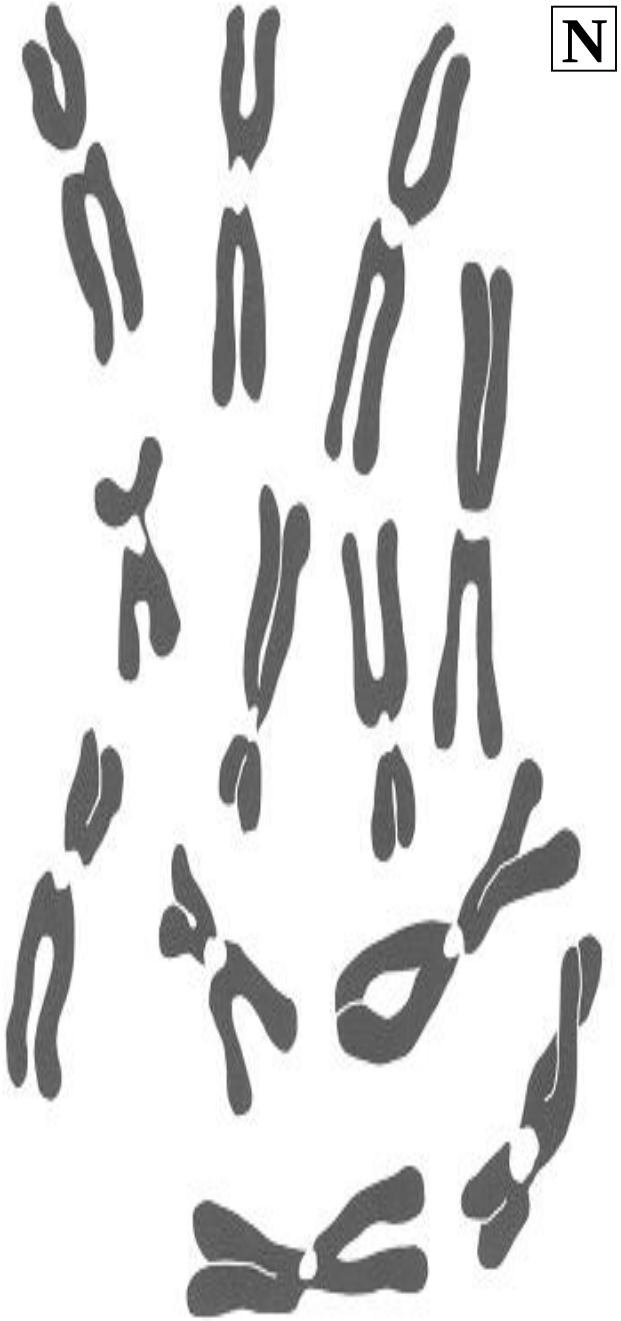
ENZYMES

NUCLEUS REGULATES ENZYME SYNTHESIS

NUCLEUS REGULATES CELL METABOLISM

NUCLEUS
ULTRASTRUCTURE


NUCLEUS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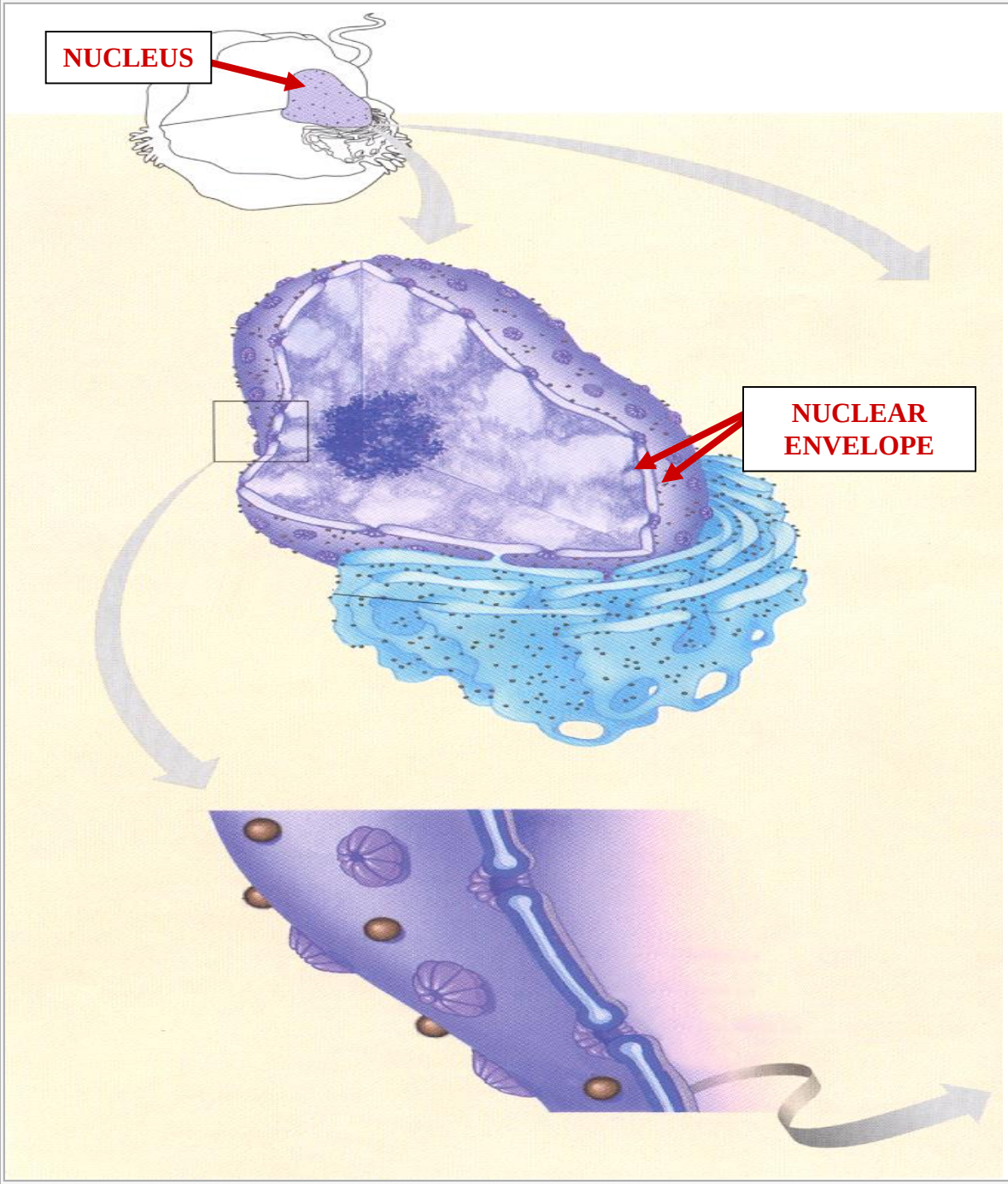
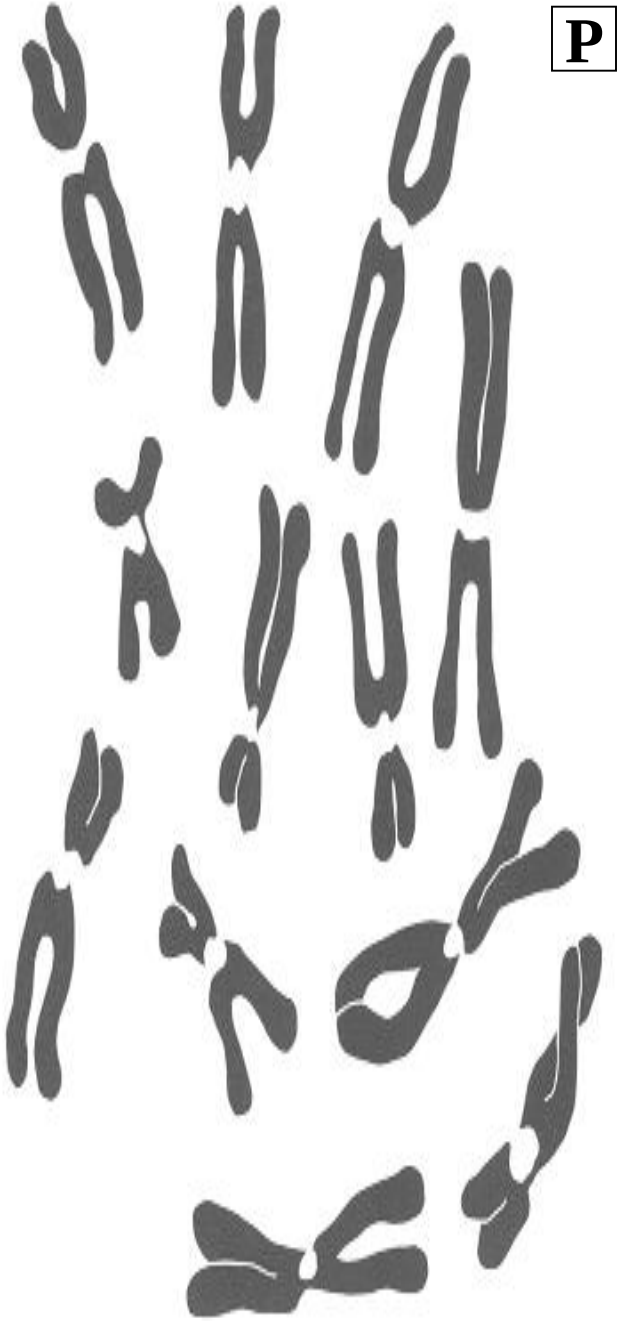
NUCLEAR ENVELOPE

NUCLEAR ENVELOPE

NUCLEUS
DOUBLE MEMBRANE

NUCLEAR ENVELOPE


NUCLEUS
NUCLEAR ENVELOPE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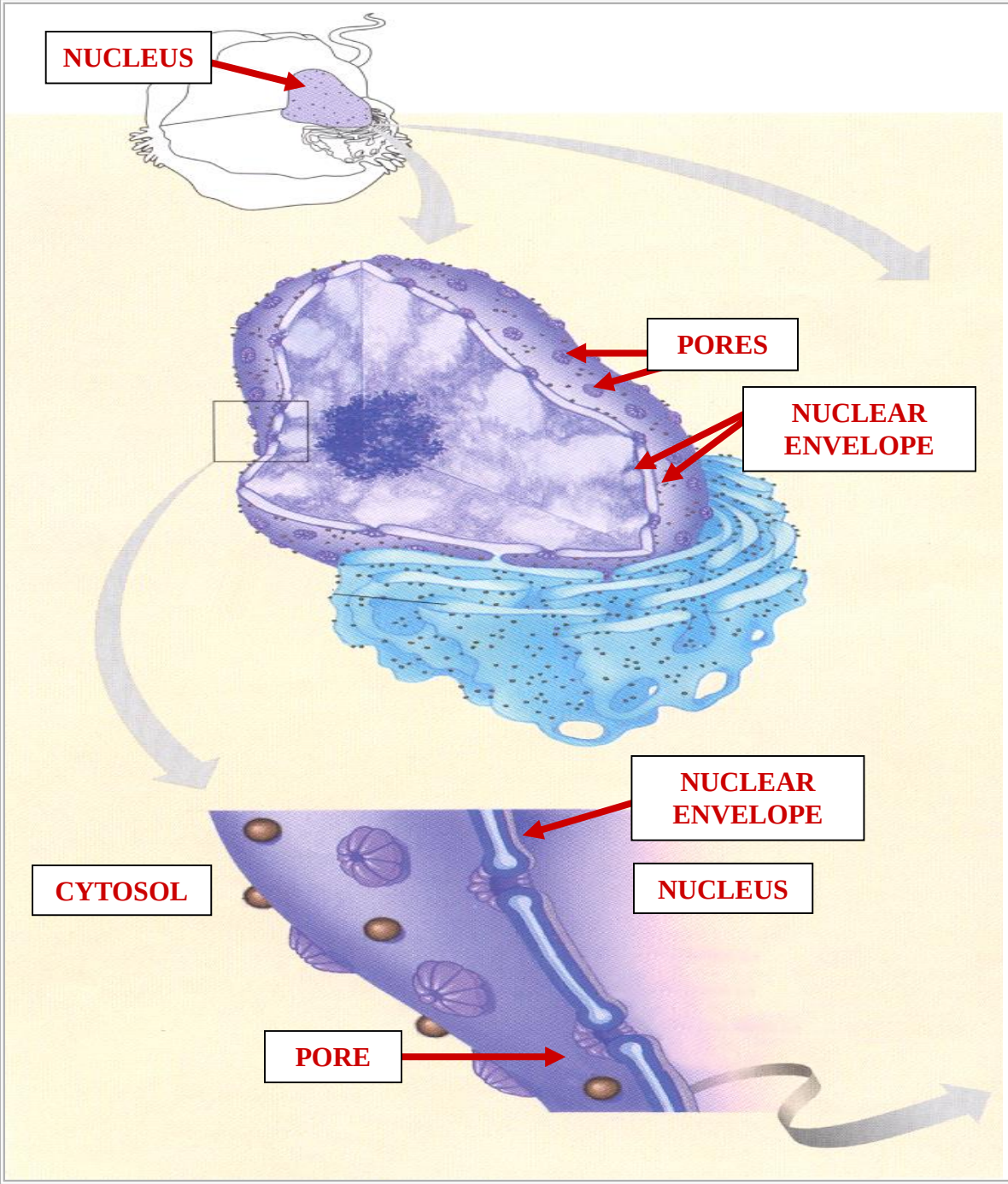
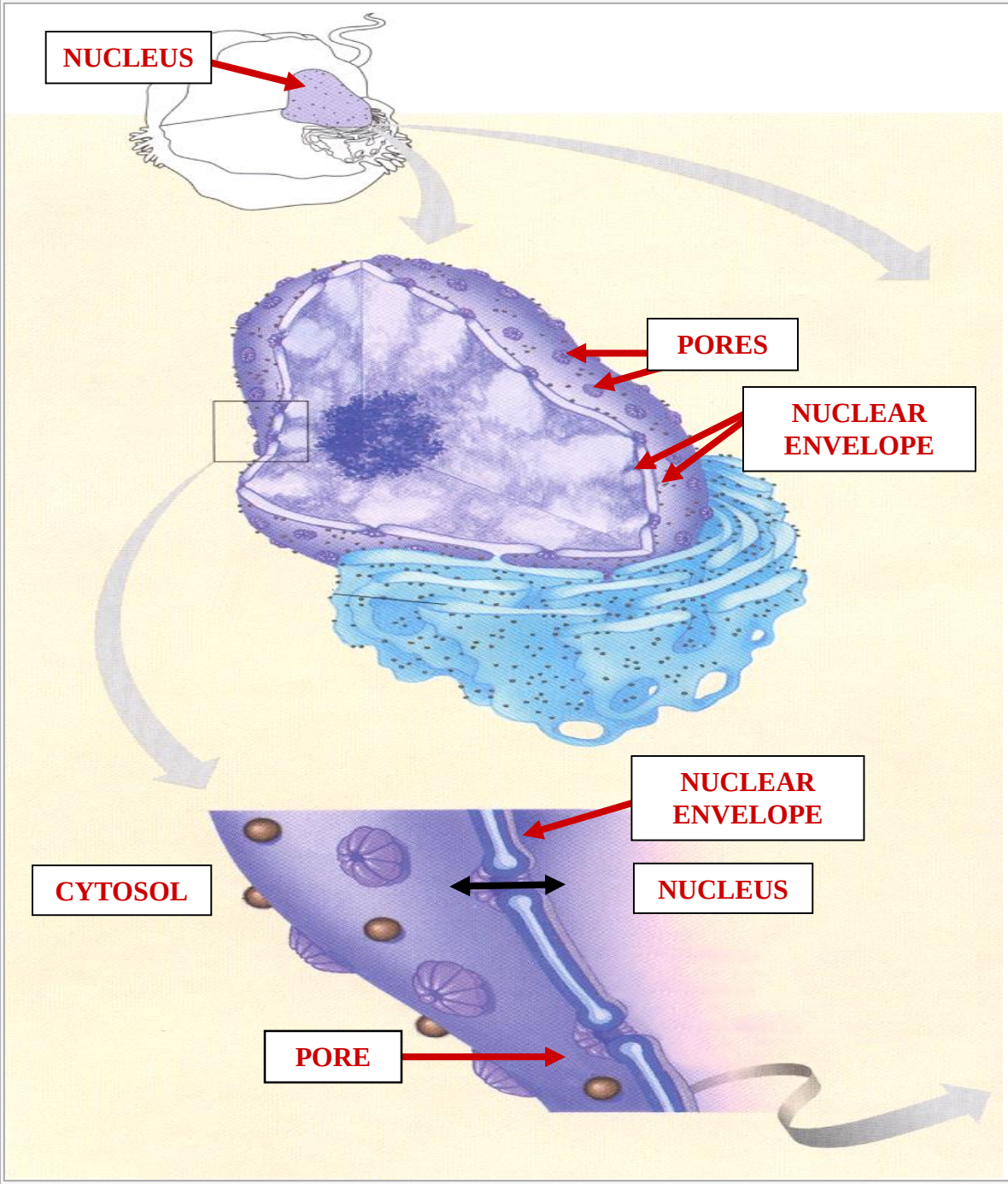
NUCLEAR ENVELOPE PORES

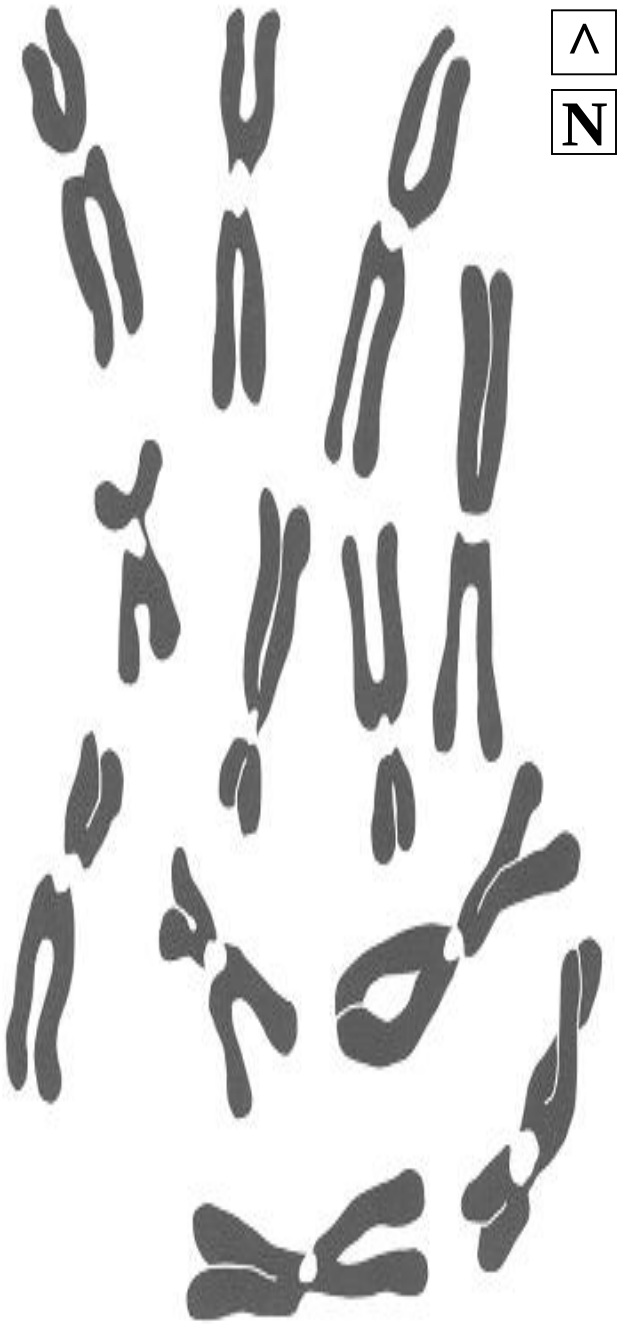
NUCLEAR ENVELOPE PORES

COMMUNICATION CONDUITS BETWEEN NUCLEUS & CYTOSOL

NUCLEAR ENVELOPE PORES


NUCLEUS
PORES
NUCLEAR ENVELOPE
NUCLEAR ENVELOPE
CYTOSOL
NUCLEUS
PORE


NUCLEUS
PORES
NUCLEAR ENVELOPE
NUCLEAR ENVELOPE
CYTOSOL
NUCLEUS
PORE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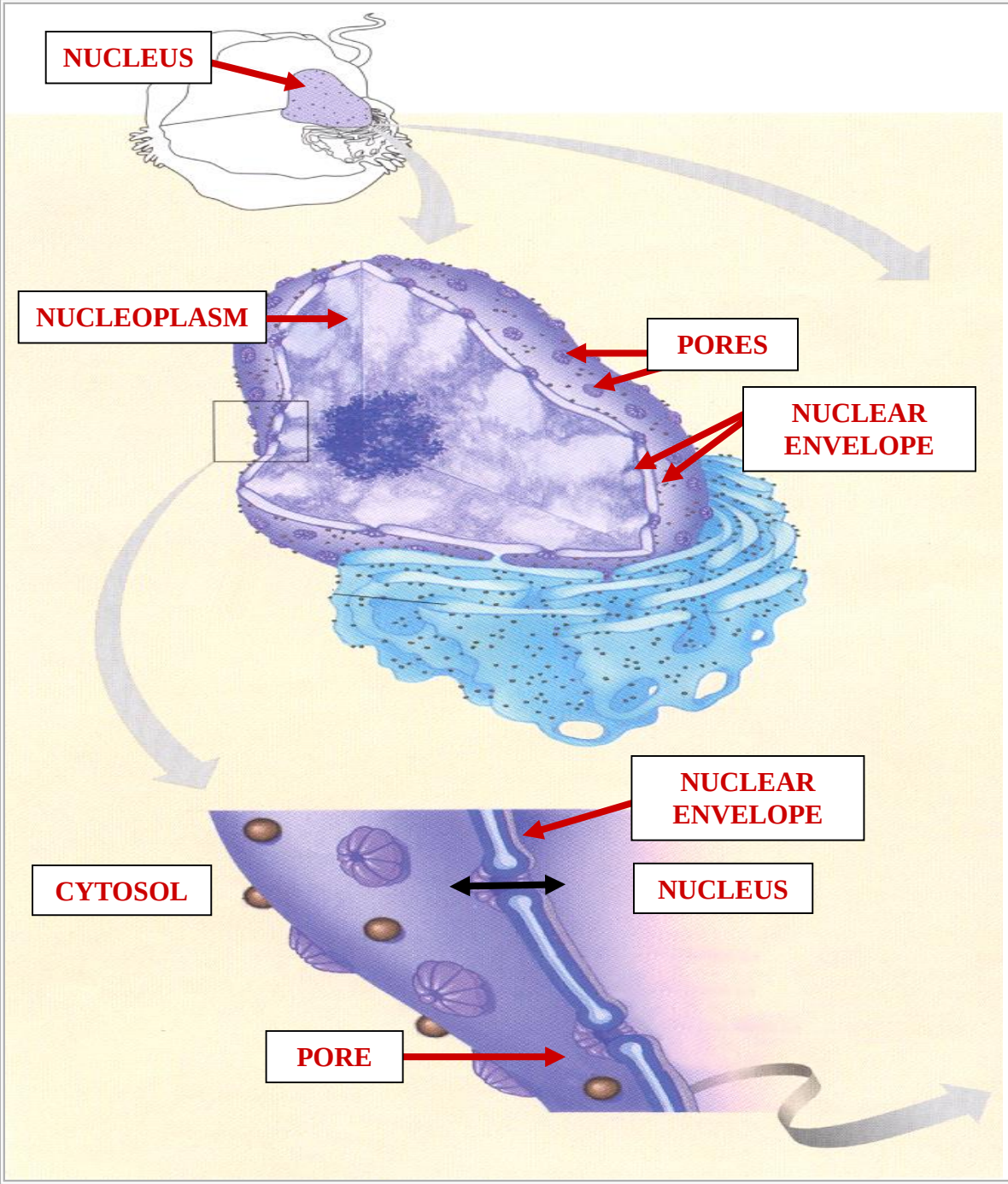
N

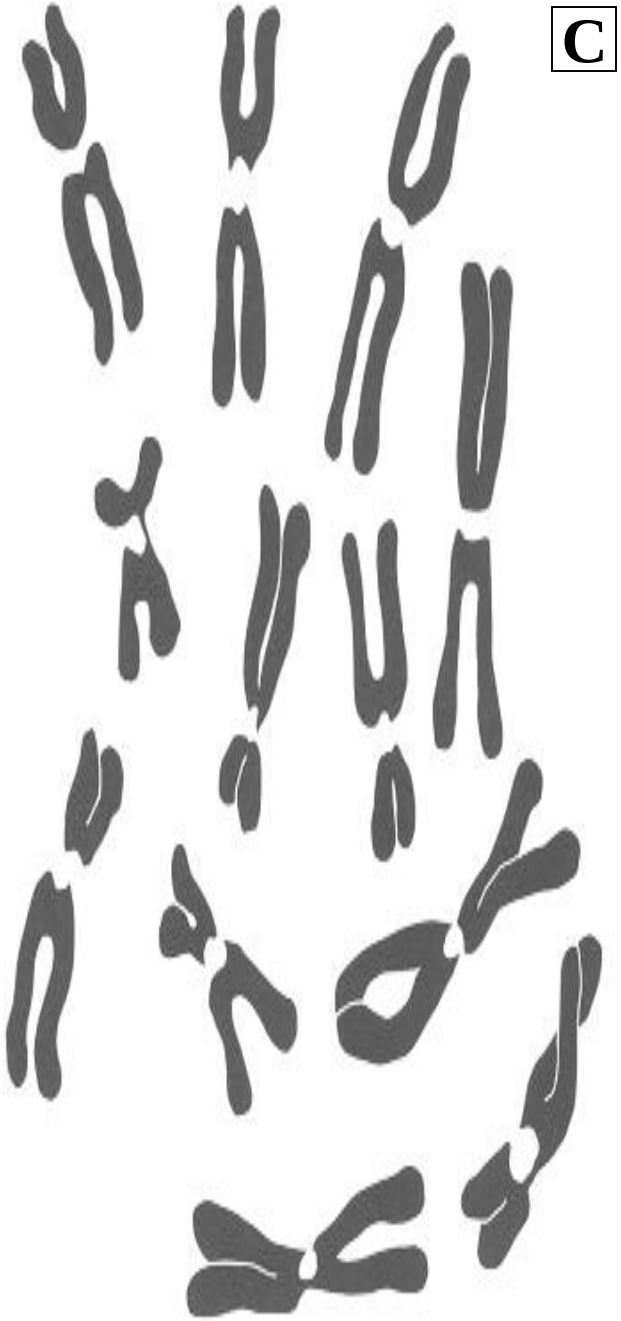
NUCLEOPLASM

NUCLEUS
NUCLEOPLASM

NUCLEUS
FLUID MATRIX

NUCLEUS
NUCLEOPLASM


NUCLEUS
NUCLEOPLASM
PORES
NUCLEAR ENVELOPE
NUCLEAR ENVELOPE
CYTOSOL
NUCLEUS
PORE


C

EUKARYOTE CHROMOSOMES

NUCLEUS
CHROMOSOMES

LINEAR DNA

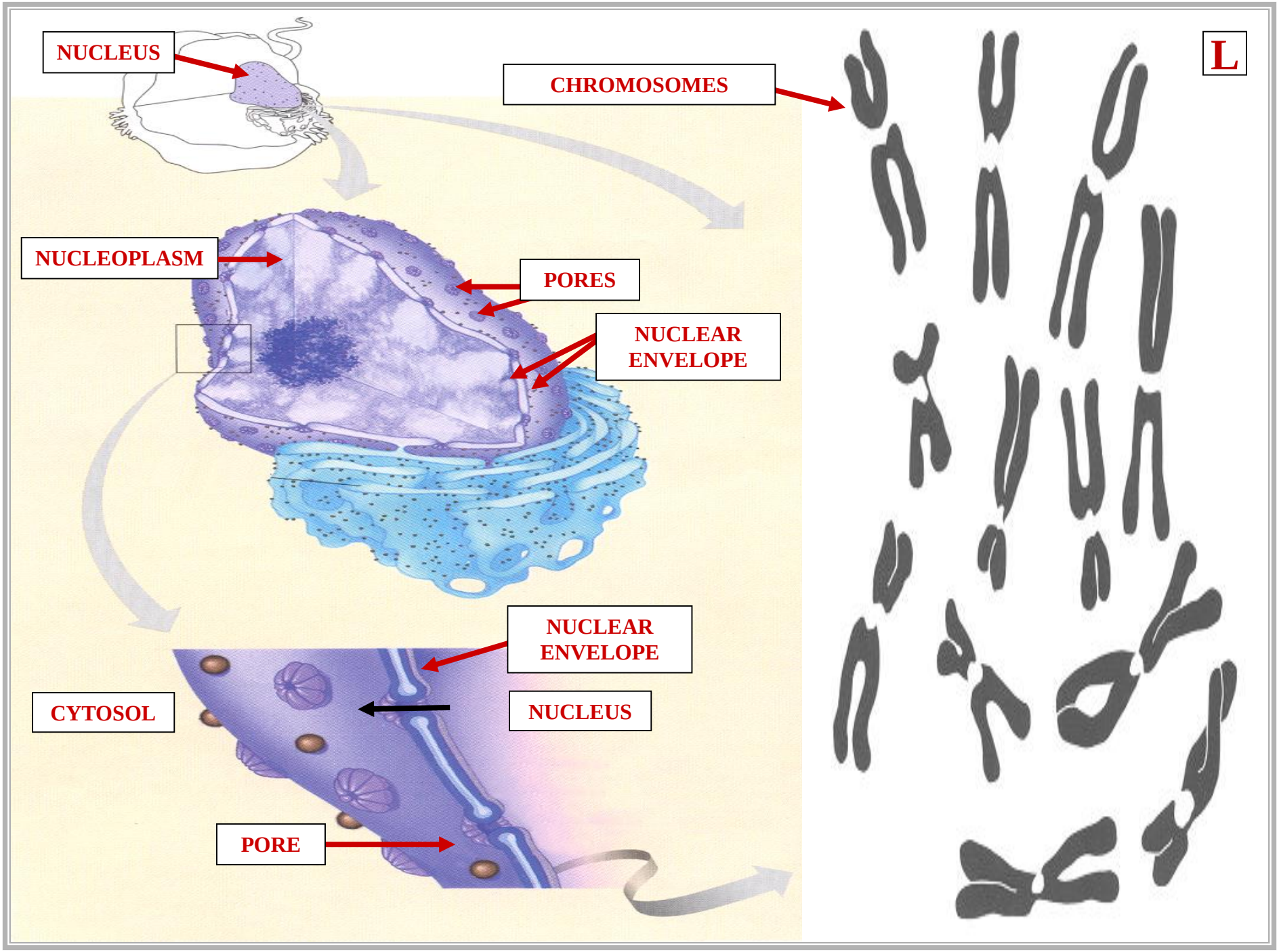
NUCLEUS
CHROMOSOMES

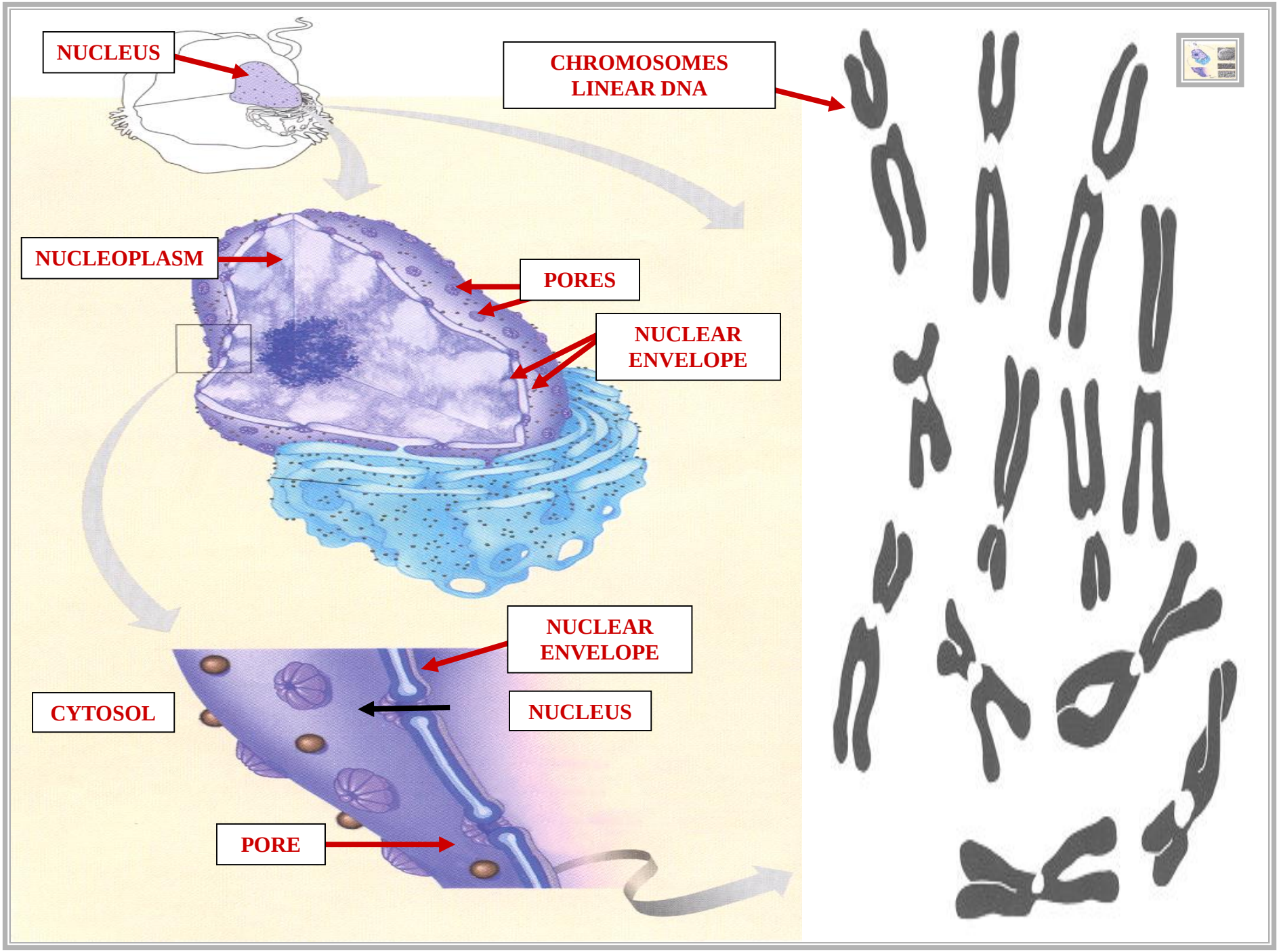
NUCLEUS
CHROMOSOMES

LINEAR DNA

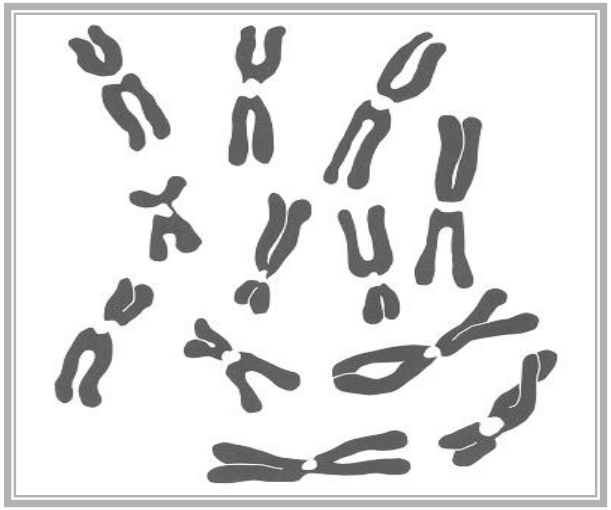
HISTONE PROTEINS PRESENT

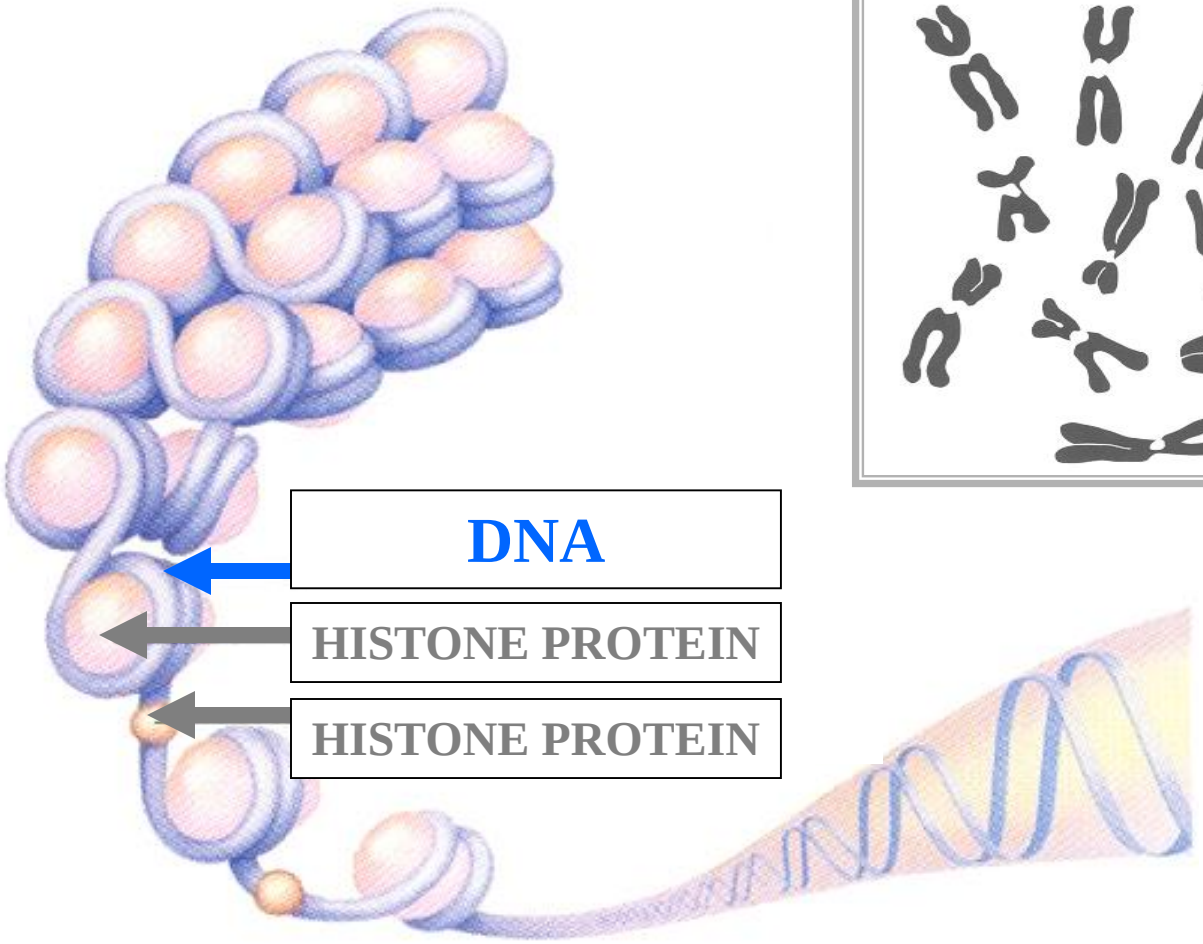
NUCLEUS
CHROMOSOMES


NUCLEUS
CHROMOSOMES
L
NUCLEOPLASM
PORES
NUCLEAR ENVELOPE
NUCLEAR ENVELOPE
CYTOSOL
NUCLEUS
PORE


NUCLEUS
CHROMOSOMES
LINEAR DNA
NUCLEOPLASM
PORES
NUCLEAR
ENVELOPE
NUCLEAR
ENVELOPE
CYTOSOL
NUCLEUS
PORE

EUKARYOTE CHROMOSOME





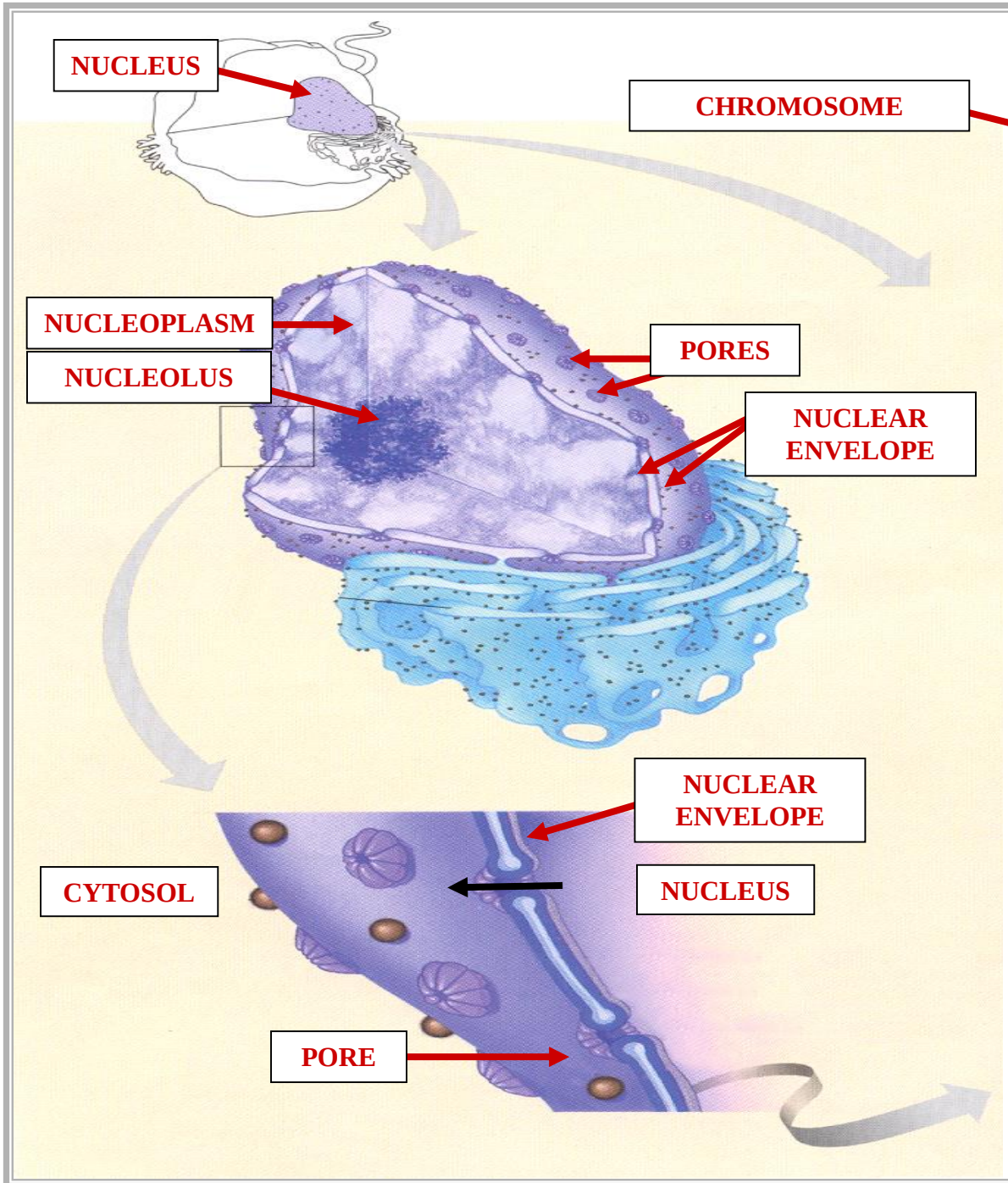
EUKARYOTE CHROMOSOME: HISTONE PROTEINS PRESENT

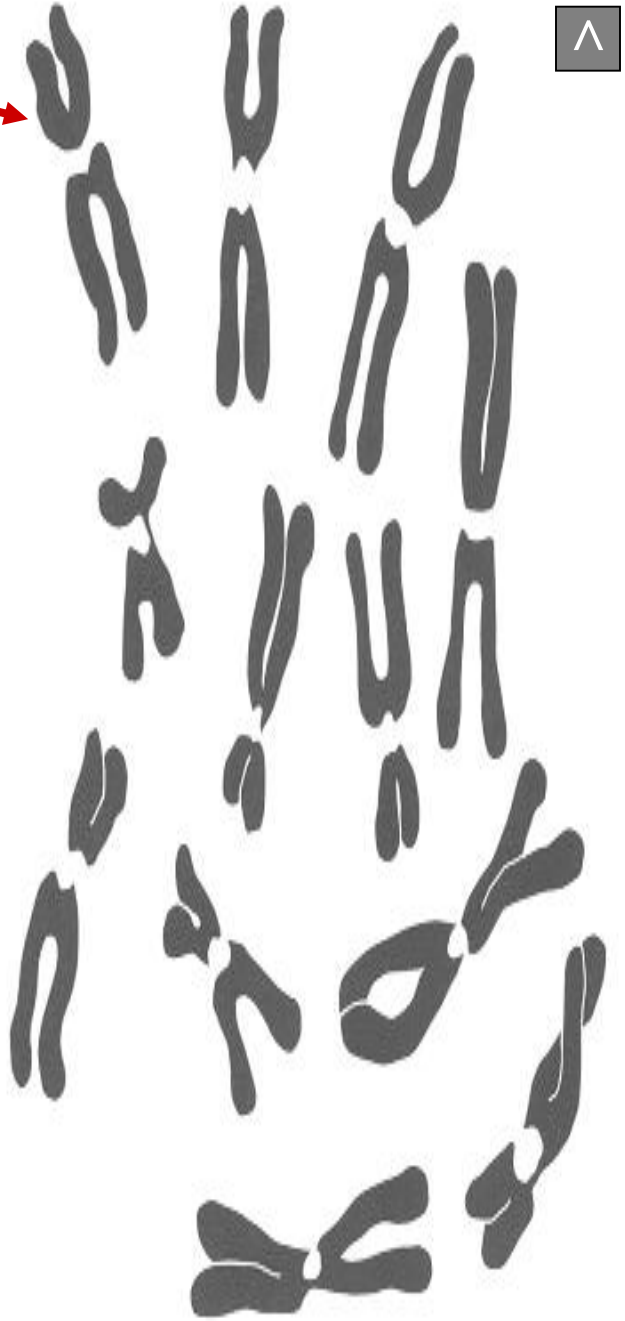
NUCLEOLUS

NUCLEOLUS

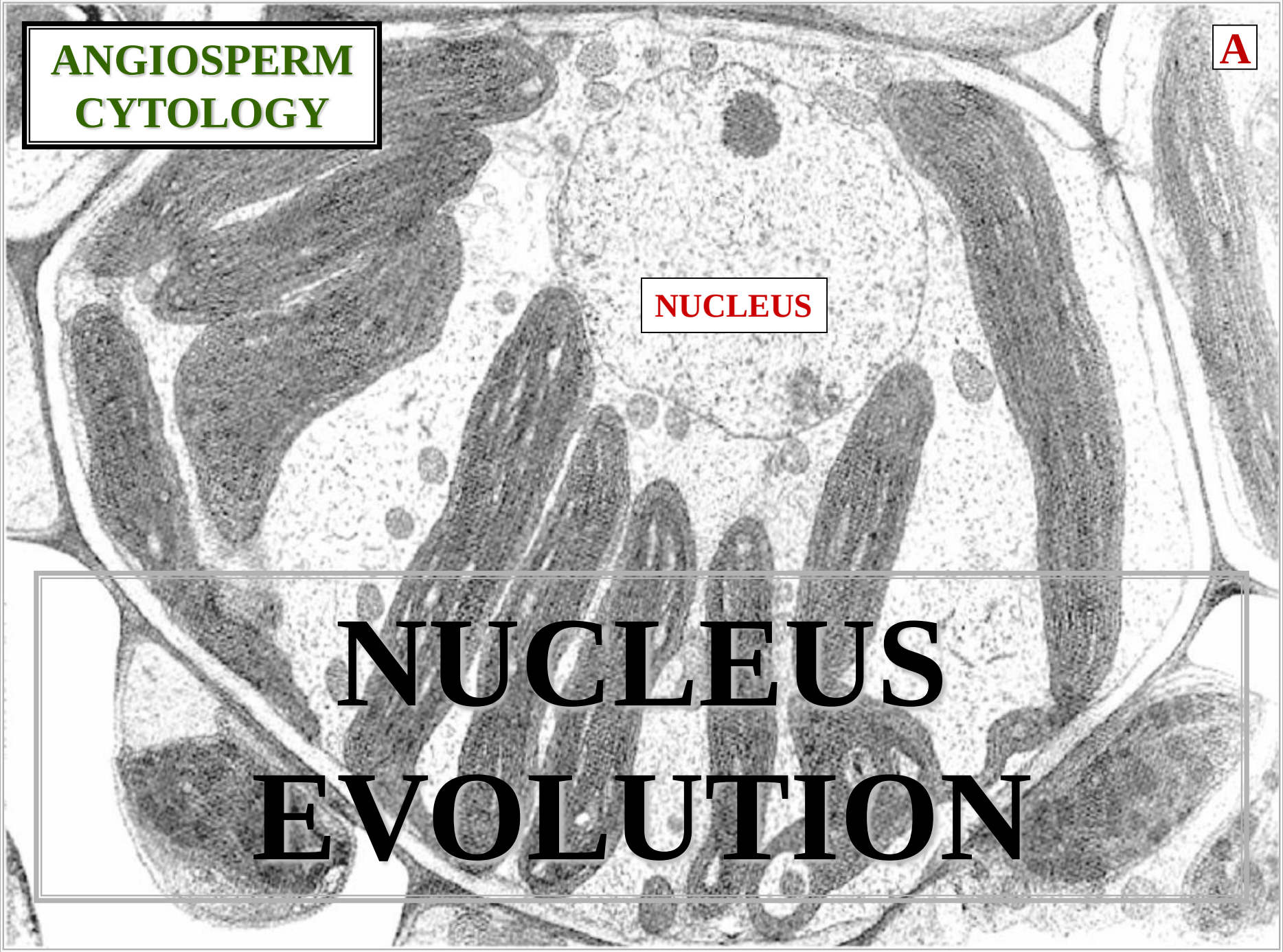
SITE: RIBOSOME SYNTHESIS

NUCLEOLUS


NUCLEUS
NUCLEOPLASM
NUCLEOLUS
PORES
NUCLEAR ENVELOPE
NUCLEAR ENVELOPE
CYTOSOL
NUCLEUS
PORE


CHROMOSOME

NUCLEUS EVOLUTION

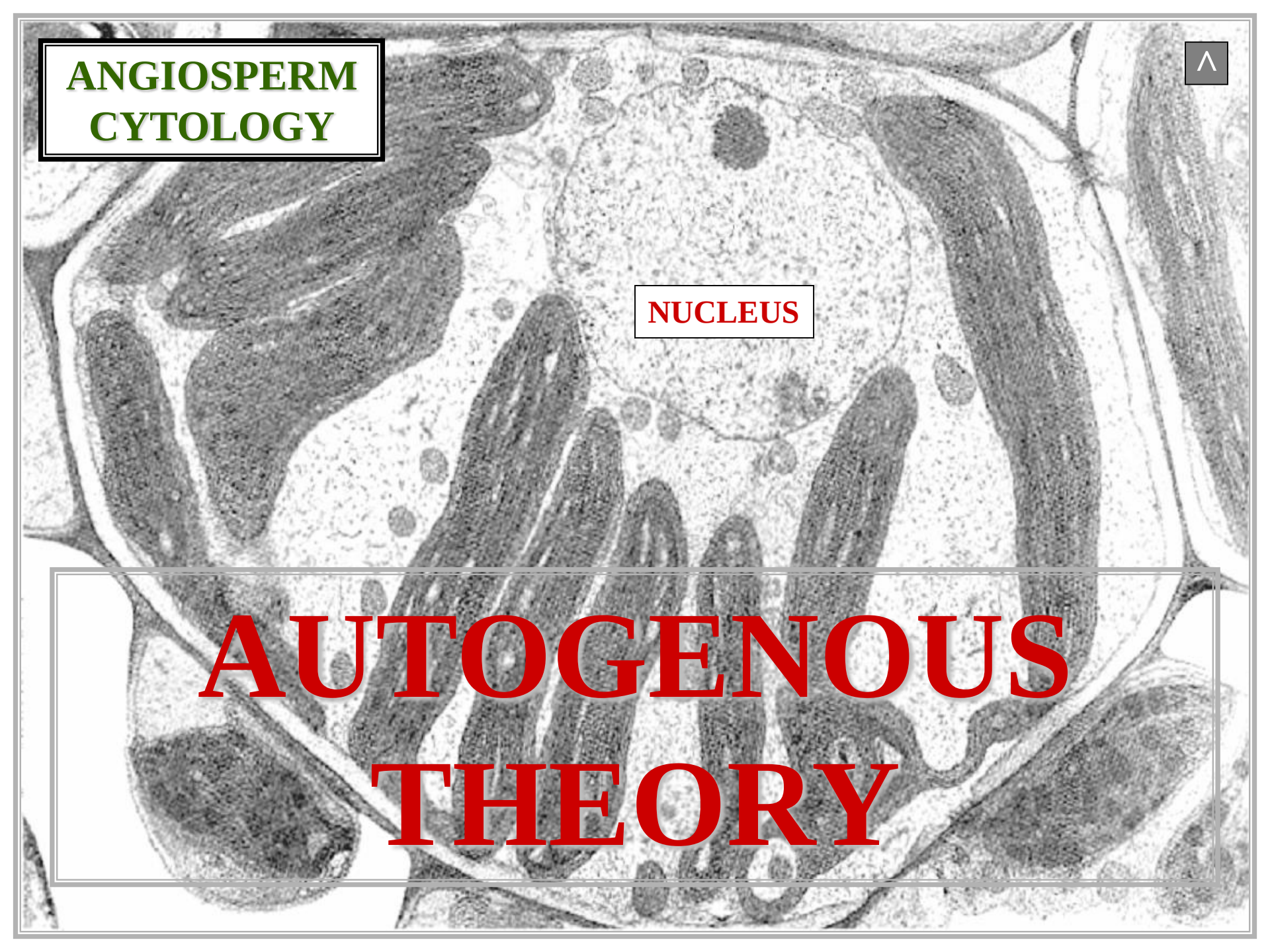


ANGIOSPERM CYTOLOGY

A

NUCLEUS

NUCLEUS EVOLUTION



ANGIOSPERM CYTOLOGY

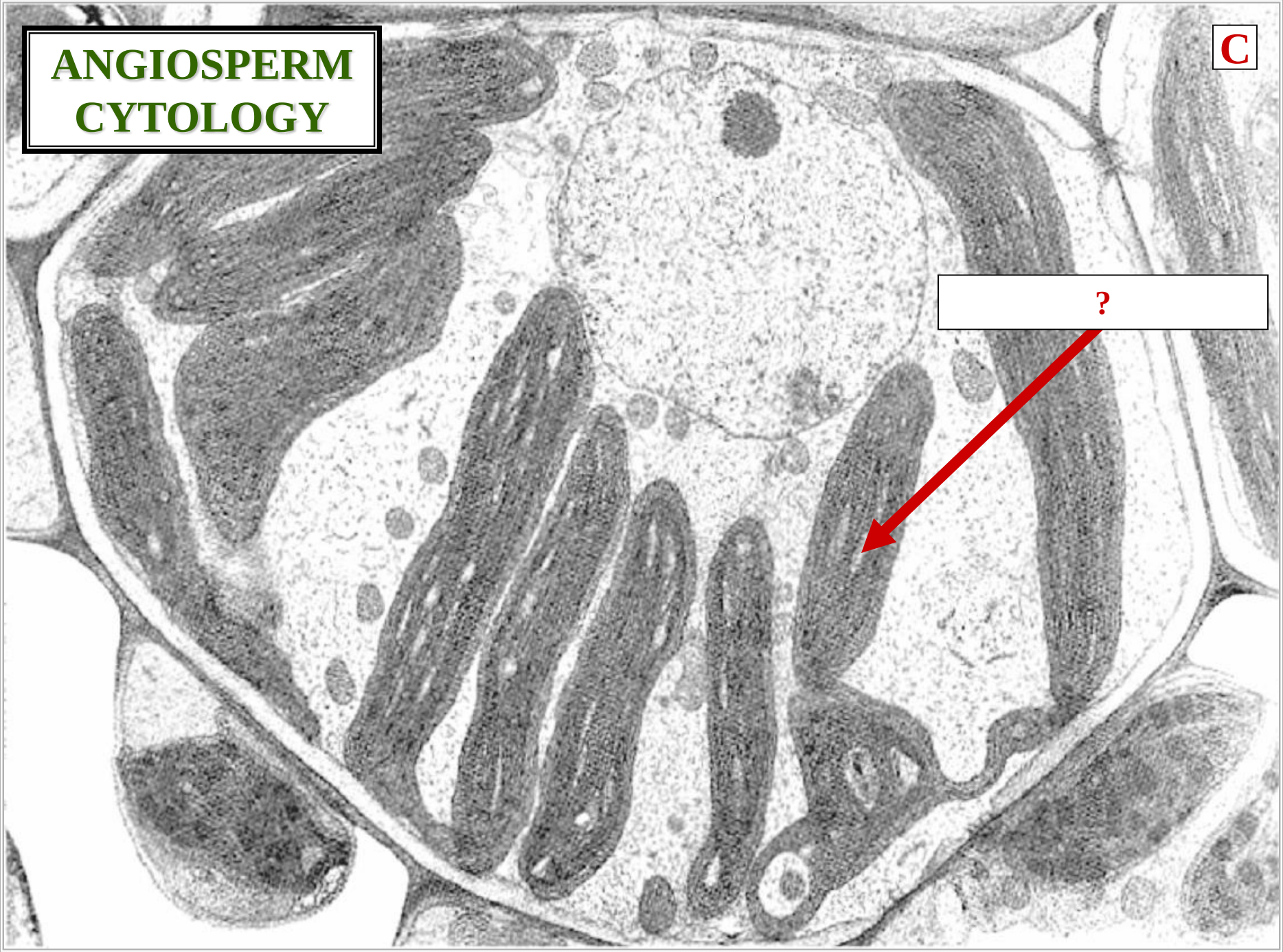
NUCLEUS

AUTOGENOUS THEORY

DOUBLE MEMBRANE BOUND ORGANELLES SUMMARY

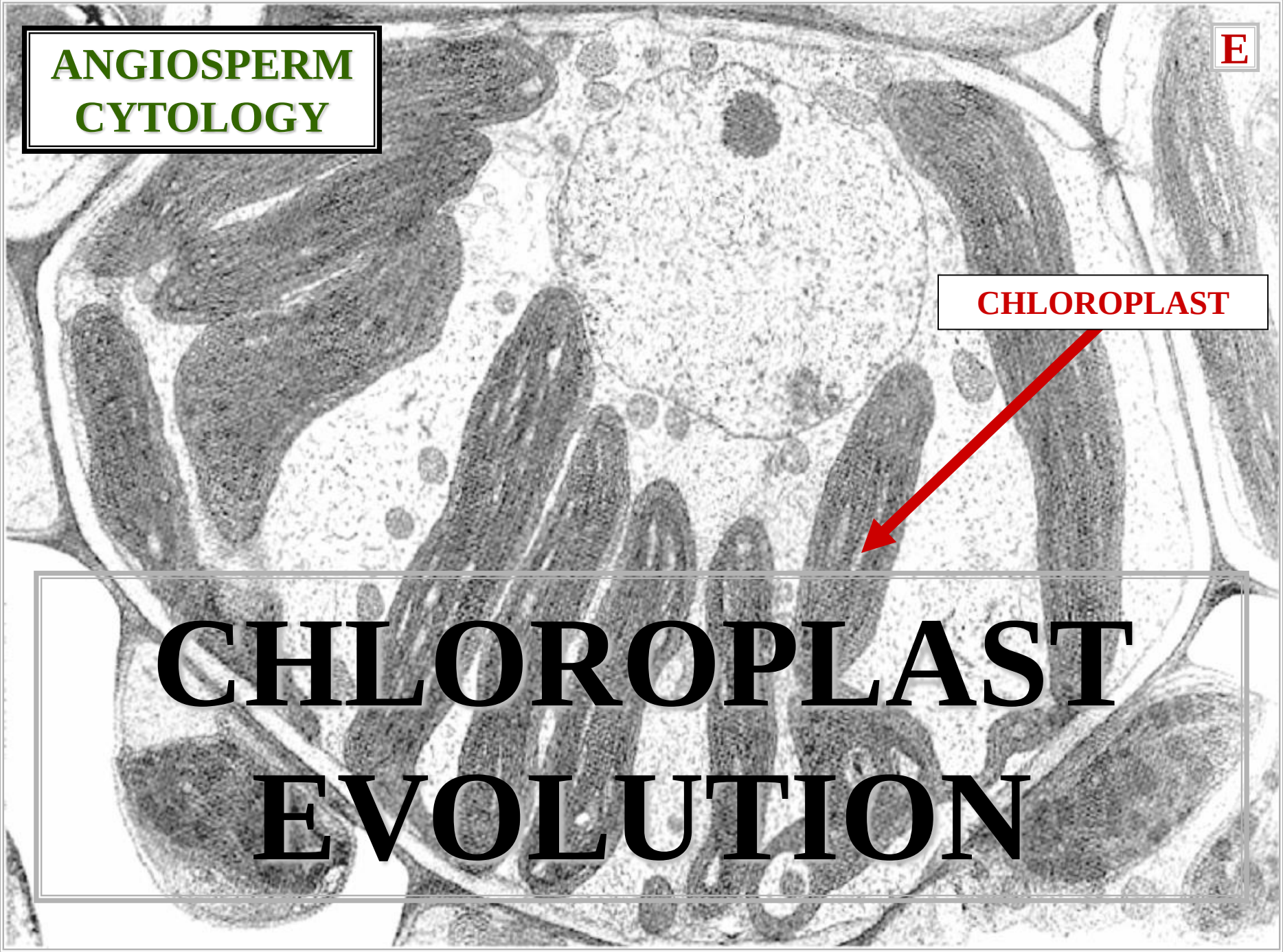
ANGIOSPERM CYTOLOGY

C

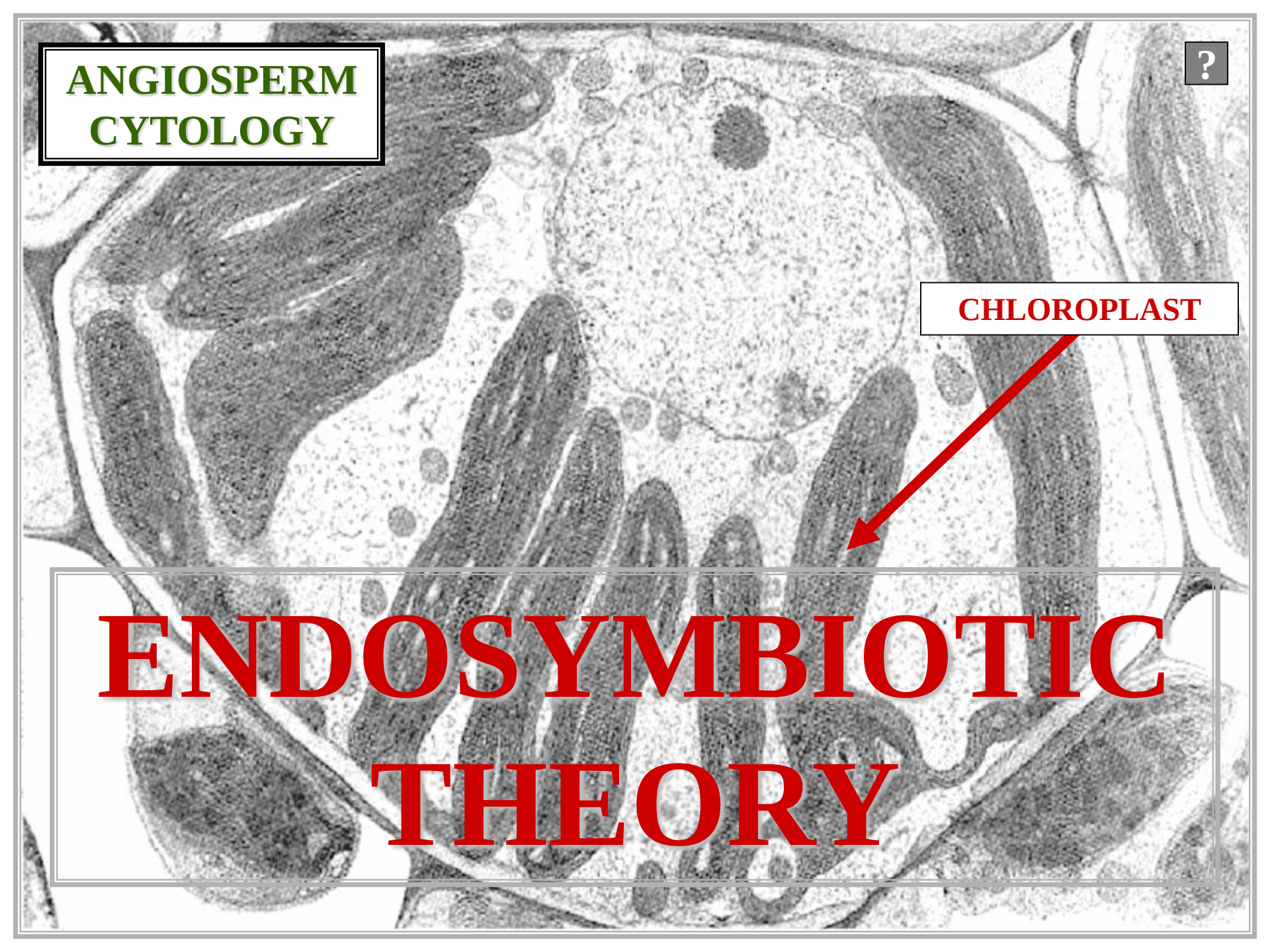


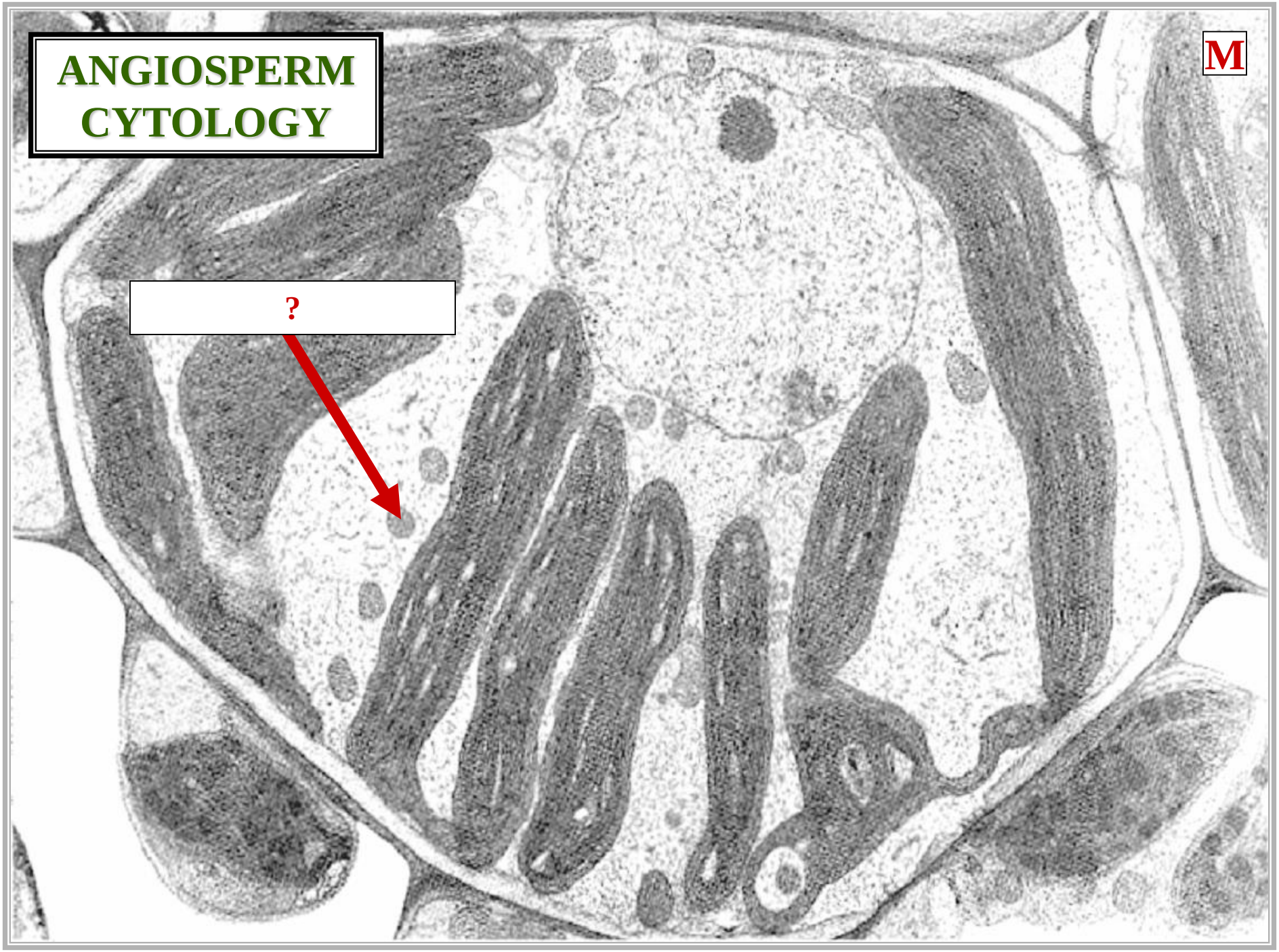
ANGIOSPERM CYTOLOGY

E



CHLOROPLAST EVOLUTION


ANGIOSPERM CYTOLOGY
?
CHLOROPLAST
ENDOSYMBIOTIC THEORY


ANGIOSPERM CYTOLOGY
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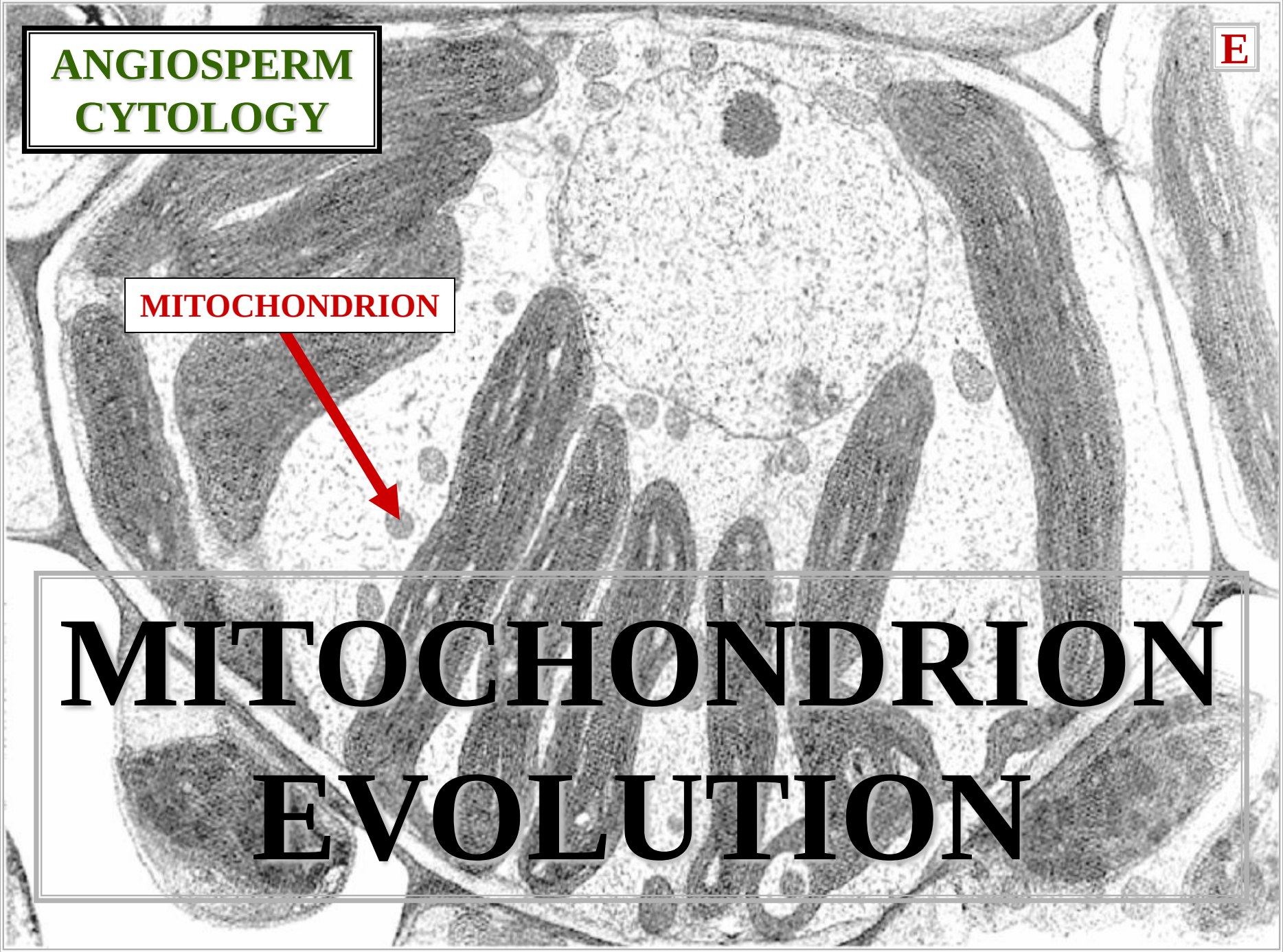
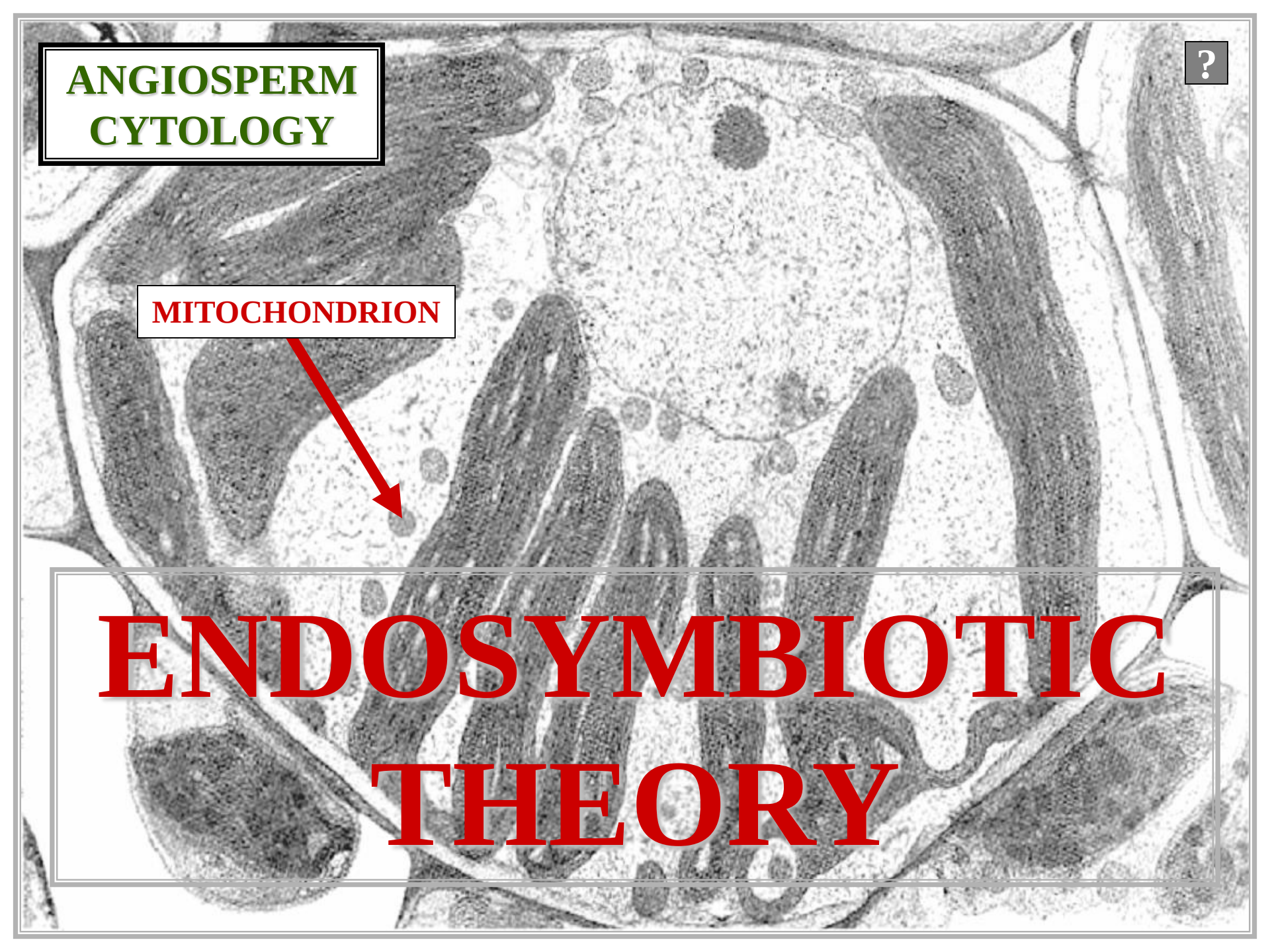
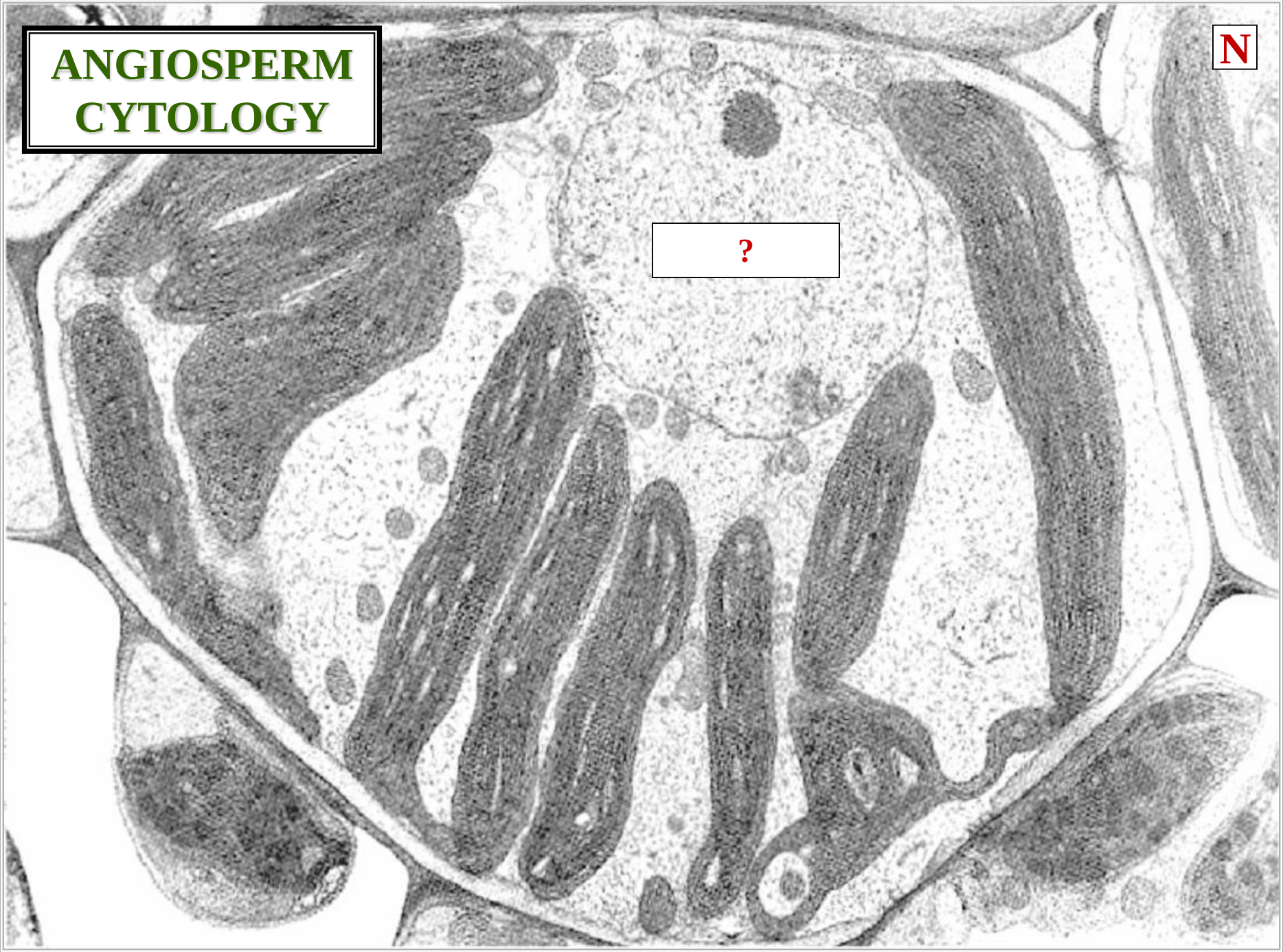
M


ANGIOSPERM
CYTOLOGY
E
MITOCHONDRION
MITOCHONDRION
EVOLUTION


ANGIOSPERM CYTOLOGY
?
MITOCHONDRION
ENDOSYMBIOTIC THEORY

ANGIOSPERM CYTOLOGY



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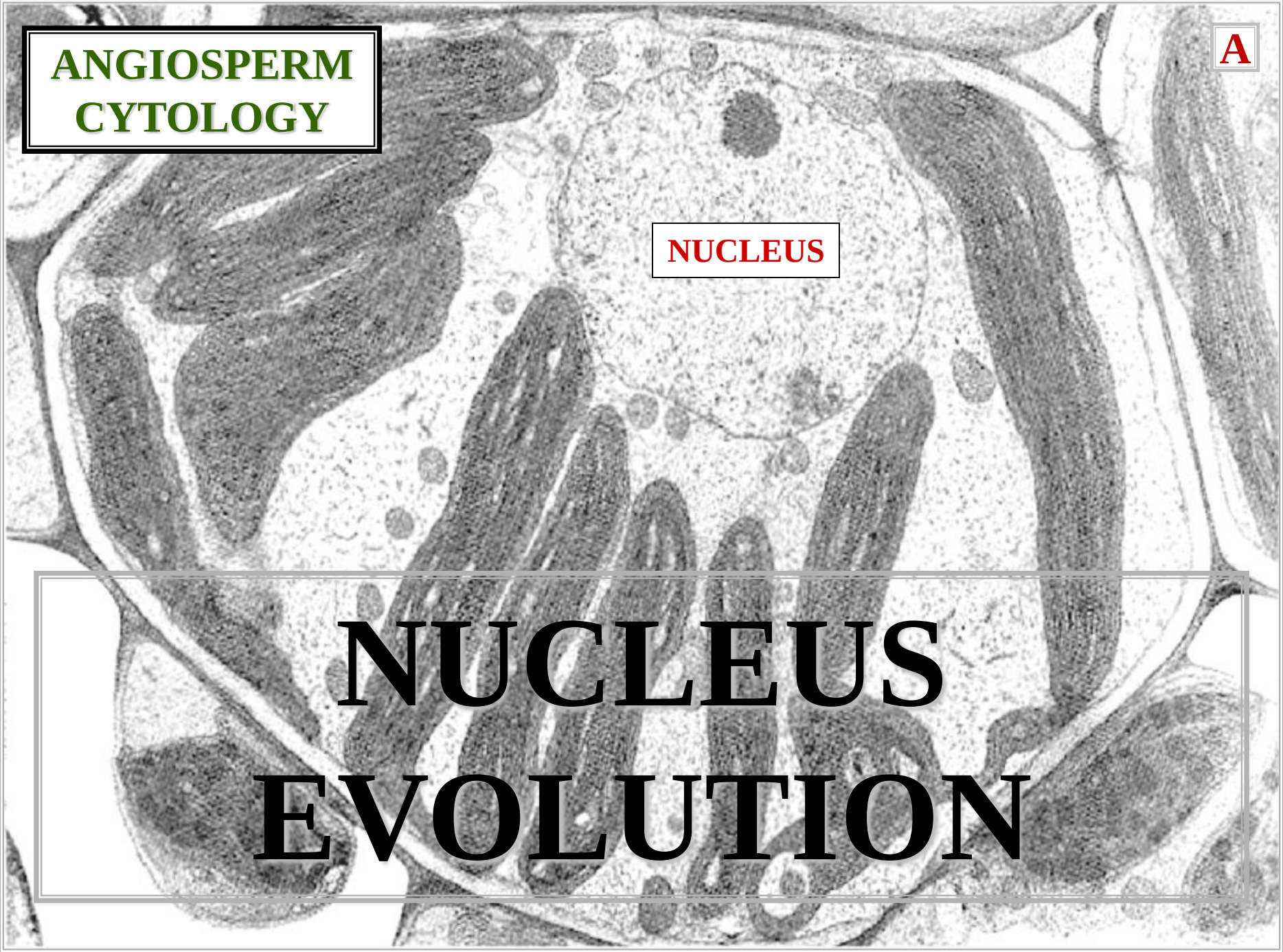
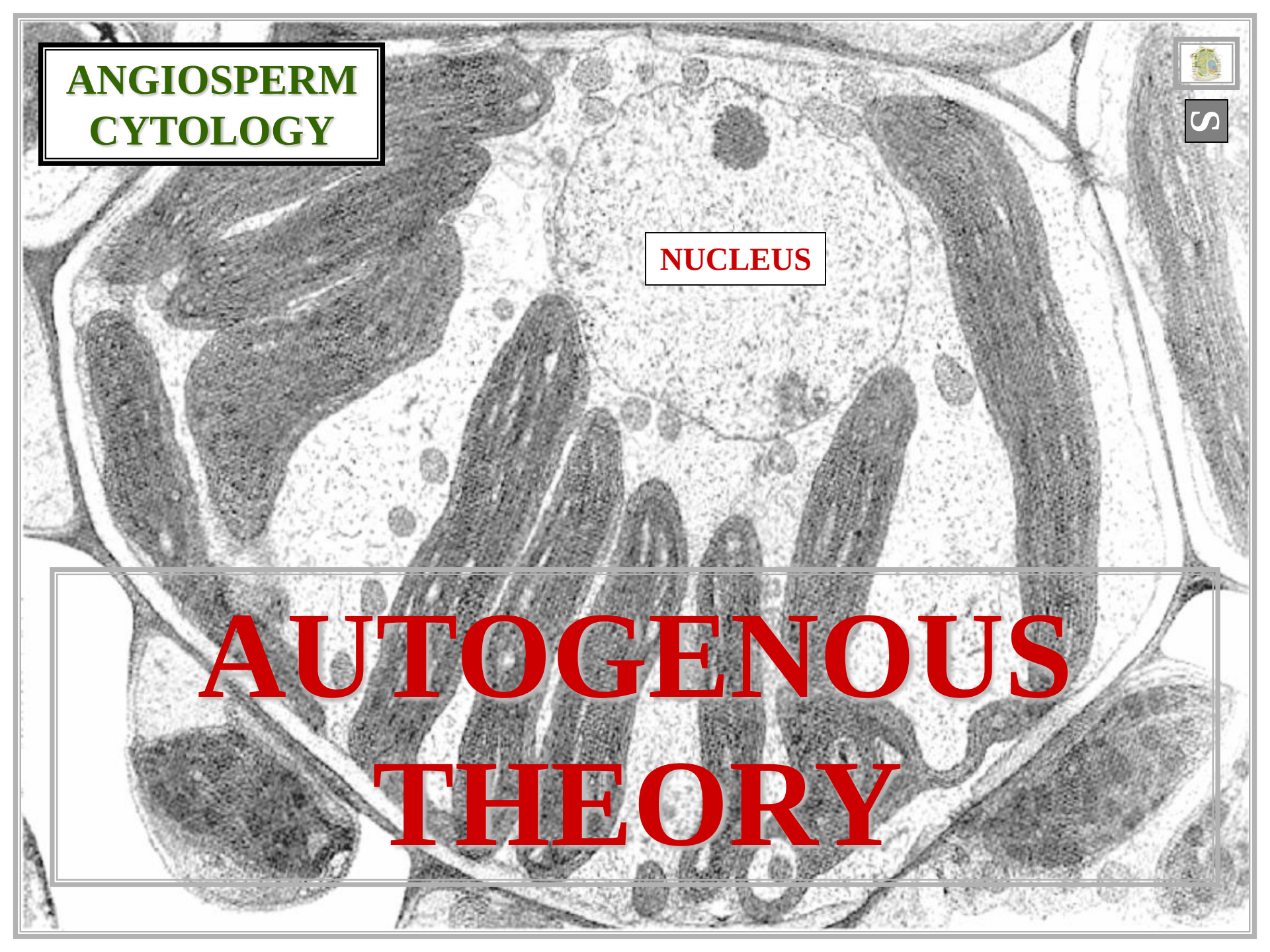


ANGIOSPERM CYTOLOGY

A

NUCLEUS

NUCLEUS EVOLUTION



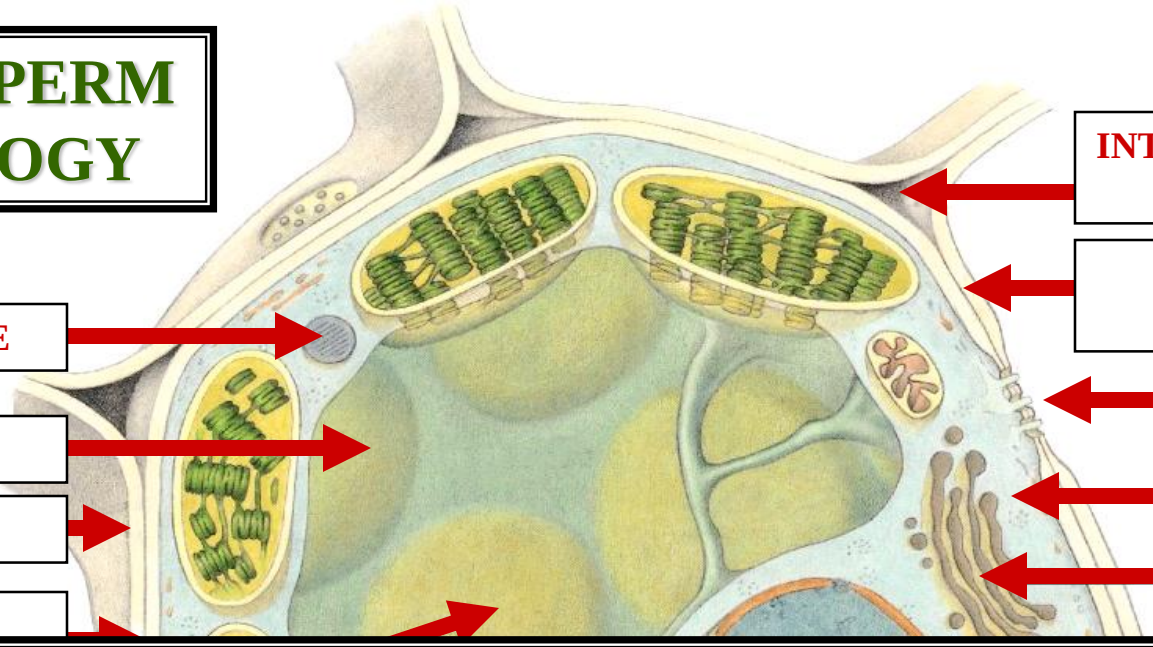
ANGIOSPERM CYTOLOGY

NUCLEUS

AUTOGENOUS THEORY

ANGIOSPERM CYTOLOGY

D



INTERCELLULAR SPACE

MIDDLE LAMELLA

PLASMODESMATA

CYTOSOL

GOLGI BODY

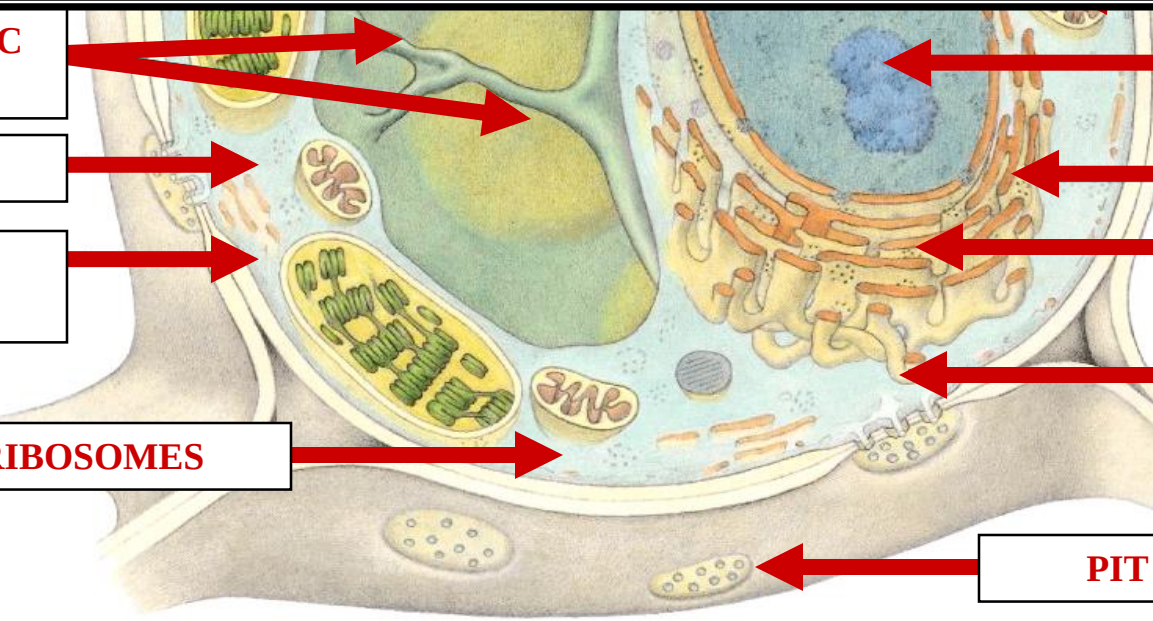
PEROXISOME

VACUOLE

CELL WALL

MIDDLE

SUMMARY



CYTOPLASMIC STRAND

CYTOSOL

CELL MEMBRANE

RIBOSOMES

NUCLEOLUS

RIBOSOMES

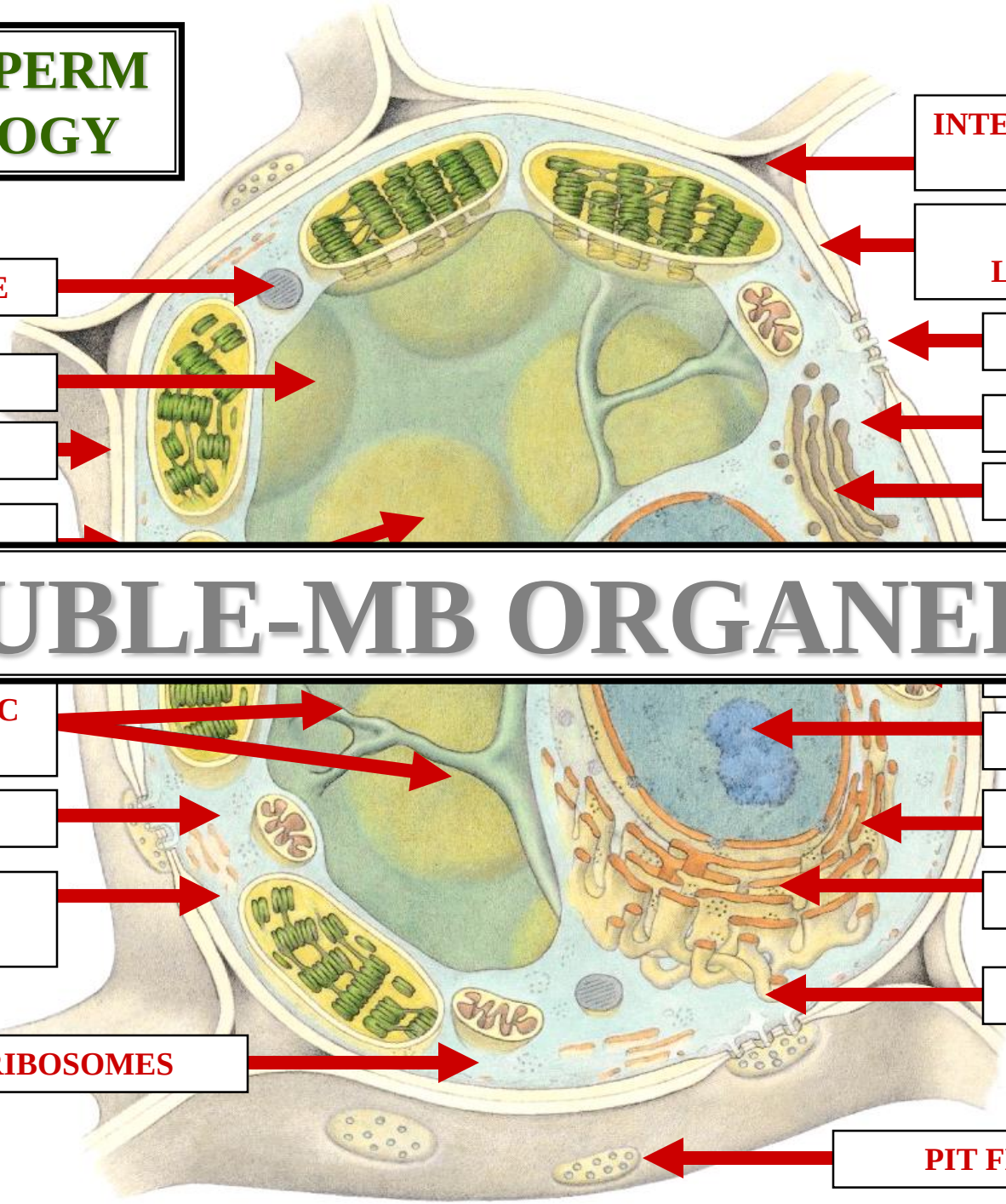
ROUGH ER

SMOOTH ER

PIT FIELD

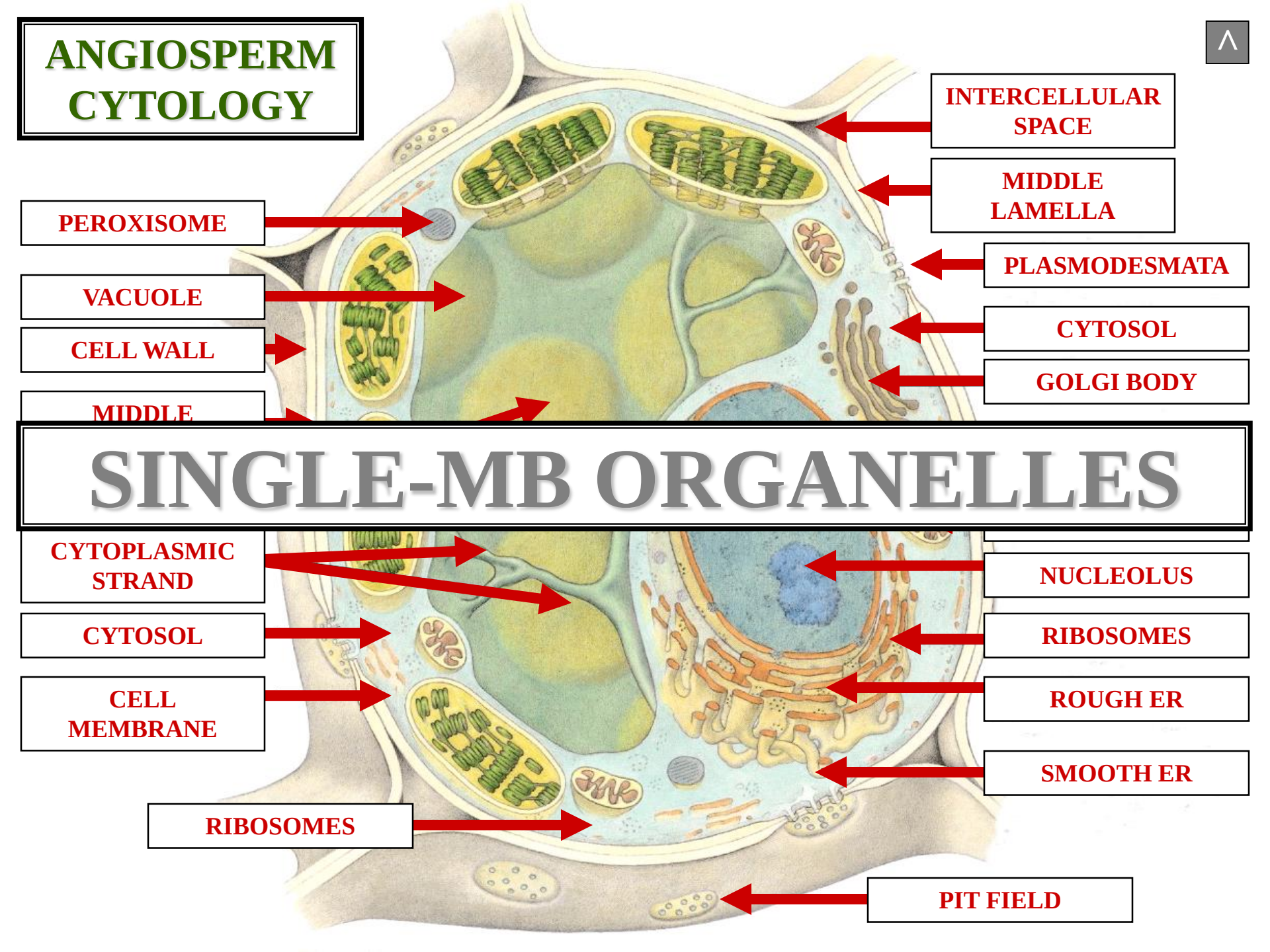
ANGIOSPERM CYTOLOGY

S



DOUBLE-MB ORGANELLES

ANGIOSPERM CYTOLOGY



SINGLE MEMBRANE BOUND ORGANELLES

SINGLE MEMBRANE BOUND ORGANELLE TYPES

SMBO
ORGANELLE TYPES

VACUOLE

SMBO
ORGANELLE TYPES

SMBO
ORGANELLE TYPES

VACUOLE

PEROXISOME

SMBO
ORGANELLE TYPES

VACUOLE

VACUOLE

VACUOLE

PLANT CELLS ONLY

VACUOLE

VACUOLE

PLANT CELLS ONLY

LARGEST ORGANELLE

VACUOLE

VACUOLE

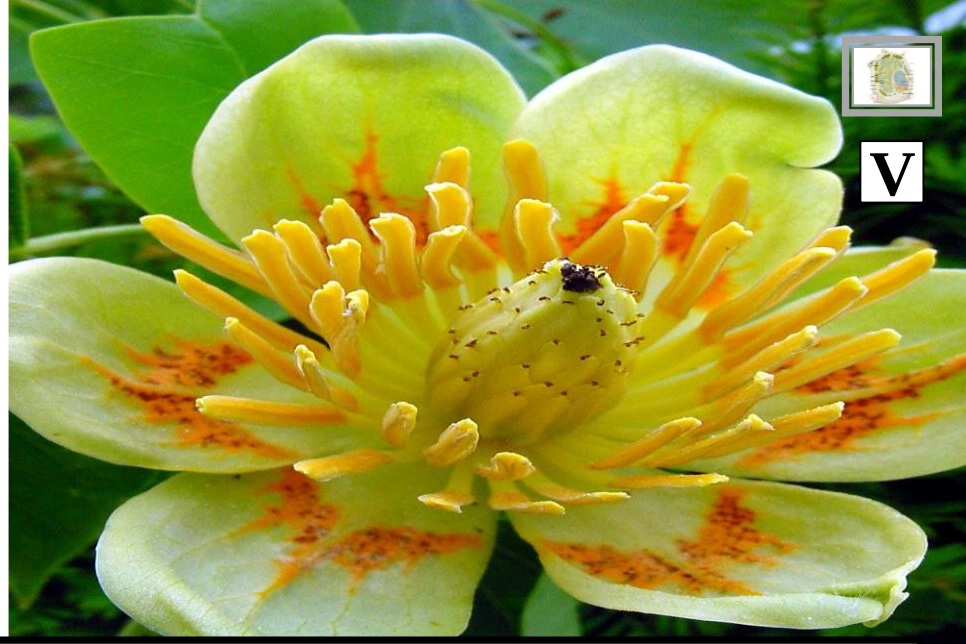
!

PLANT CELLS ONLY

LARGEST ORGANELLE

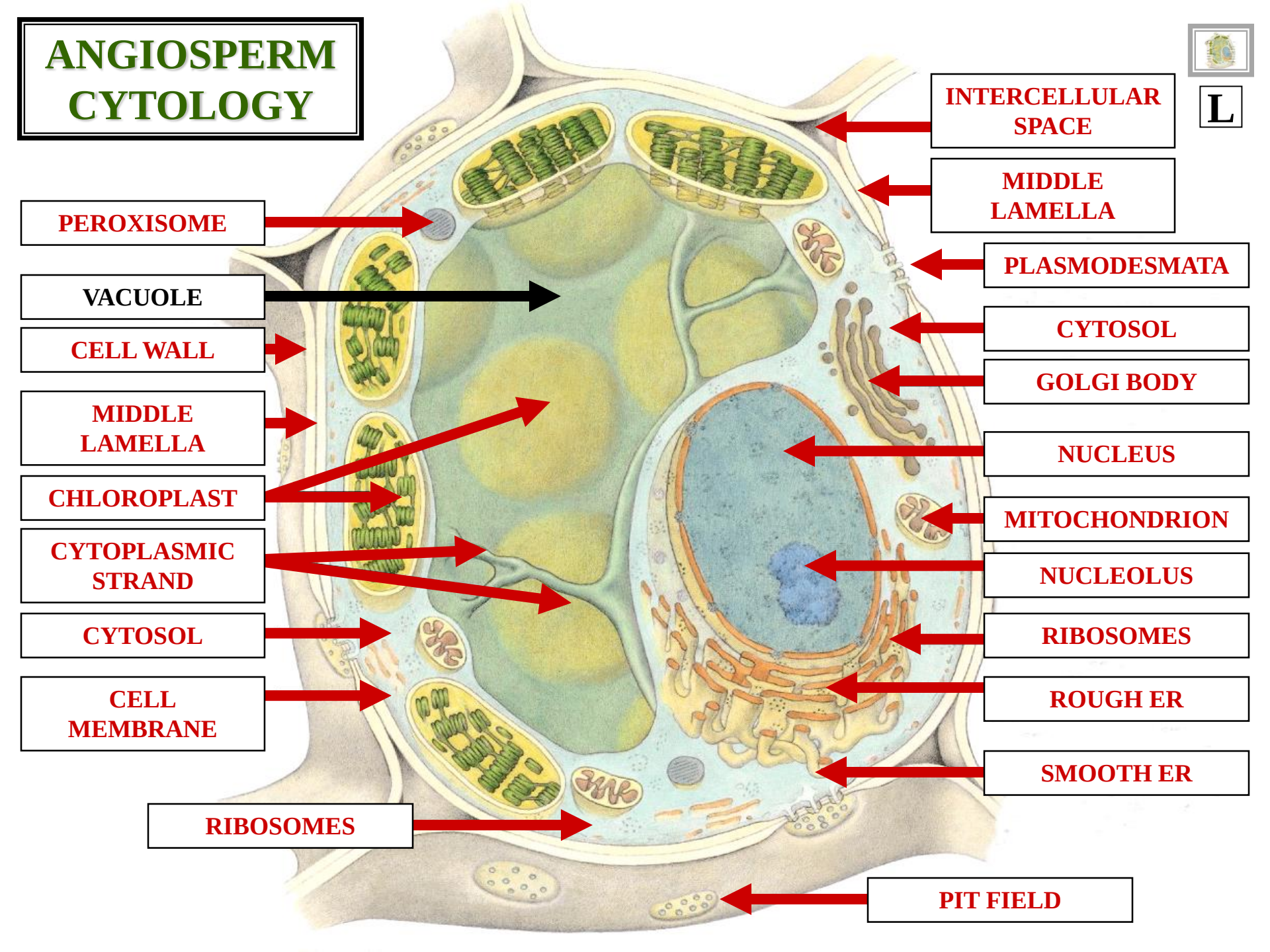
STORAGE ORGANELLE

VACUOLE



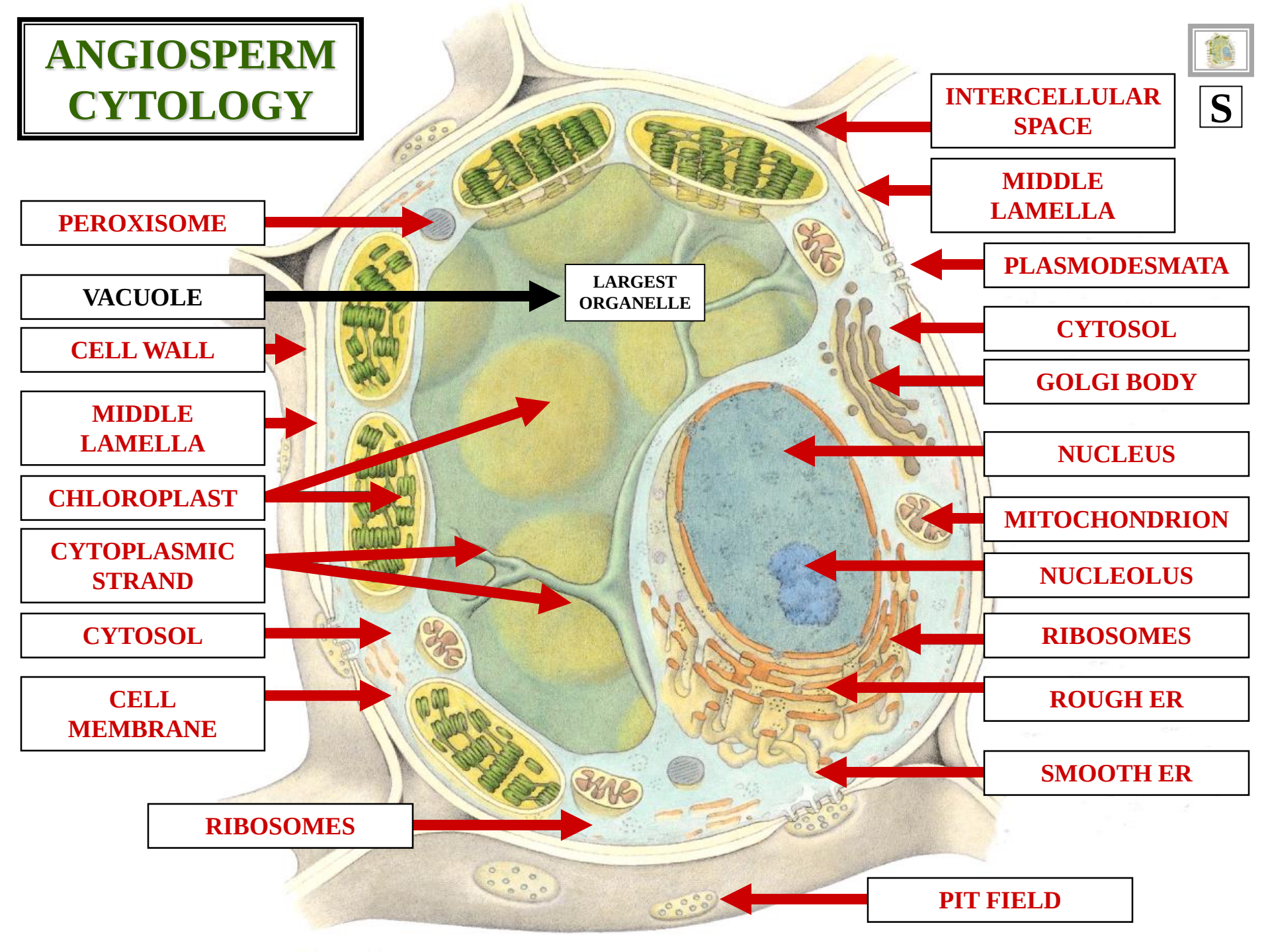
PLANT CELLS ONLY

ANGIOSPERM CYTOLOGY

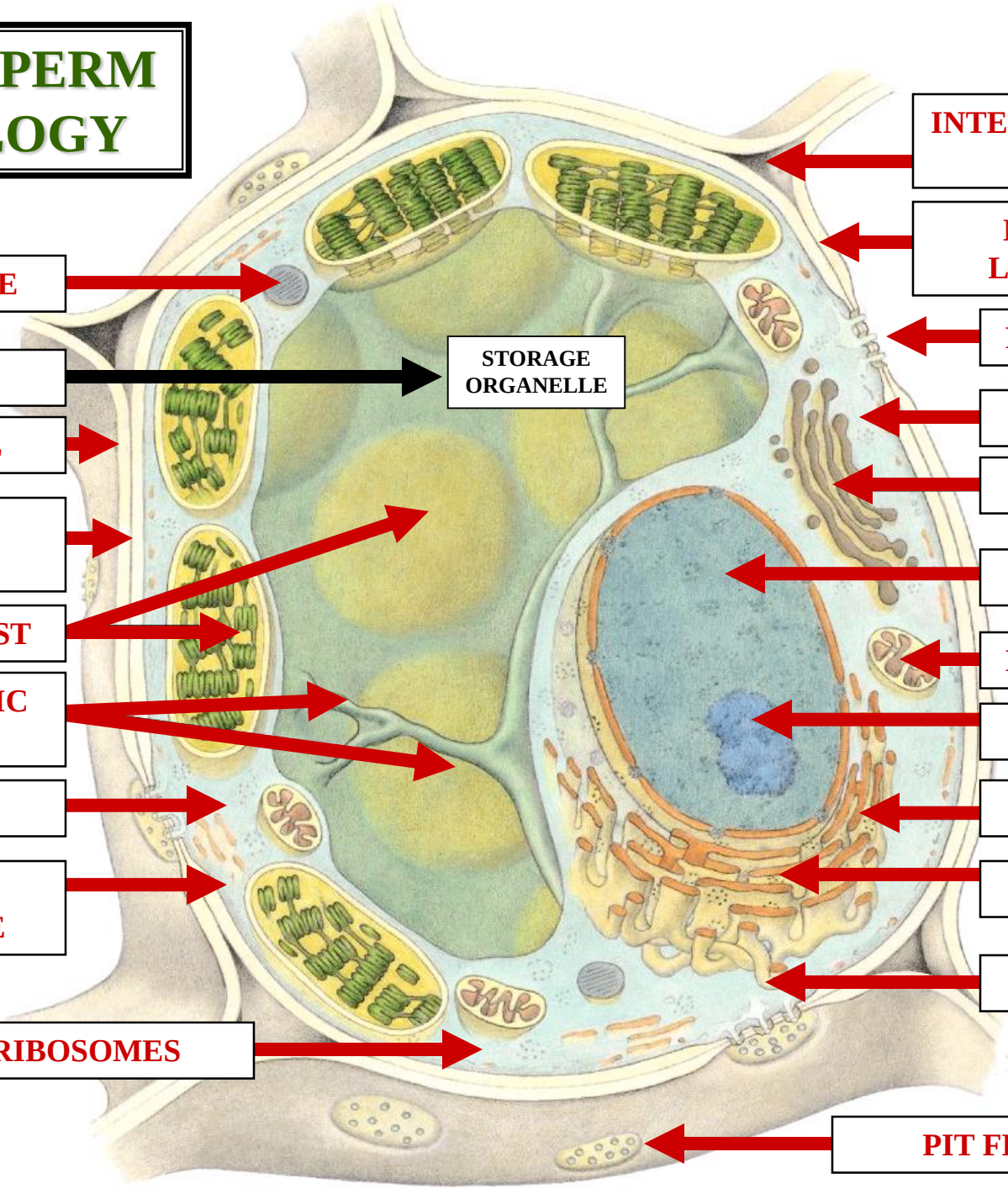


PEROXISOME
VACUOLE
CELL WALL
MIDDLE LAMELLA
CHLOROPLAST
CYTOPLASMIC STRAND
CYTOSOL
CELL MEMBRANE
RIBOSOMES
INTERCELLULAR SPACE
MIDDLE LAMELLA
PLASMODESMATA
CYTOSOL
GOLGI BODY
NUCLEUS
MITOCHONDRION
NUCLEOLUS
RIBOSOMES
ROUGH ER
SMOOTH ER
PIT FIELD
L

ANGIOSPERM CYTOLOGY



ANGIOSPERM CYTOLOGY



PEROXISOME

VACUOLE

STORAGE ORGANELLE

CELL WALL

MIDDLE LAMELLA

CHLOROPLAST

CYTOPLASMIC STRAND

CYTOSOL

CELL MEMBRANE

RIBOSOMES

INTERCELLULAR SPACE

MIDDLE LAMELLA

PLASMODESMATA

CYTOSOL

GOLGI BODY

NUCLEUS

MITOCHONDRION

NUCLEOLUS

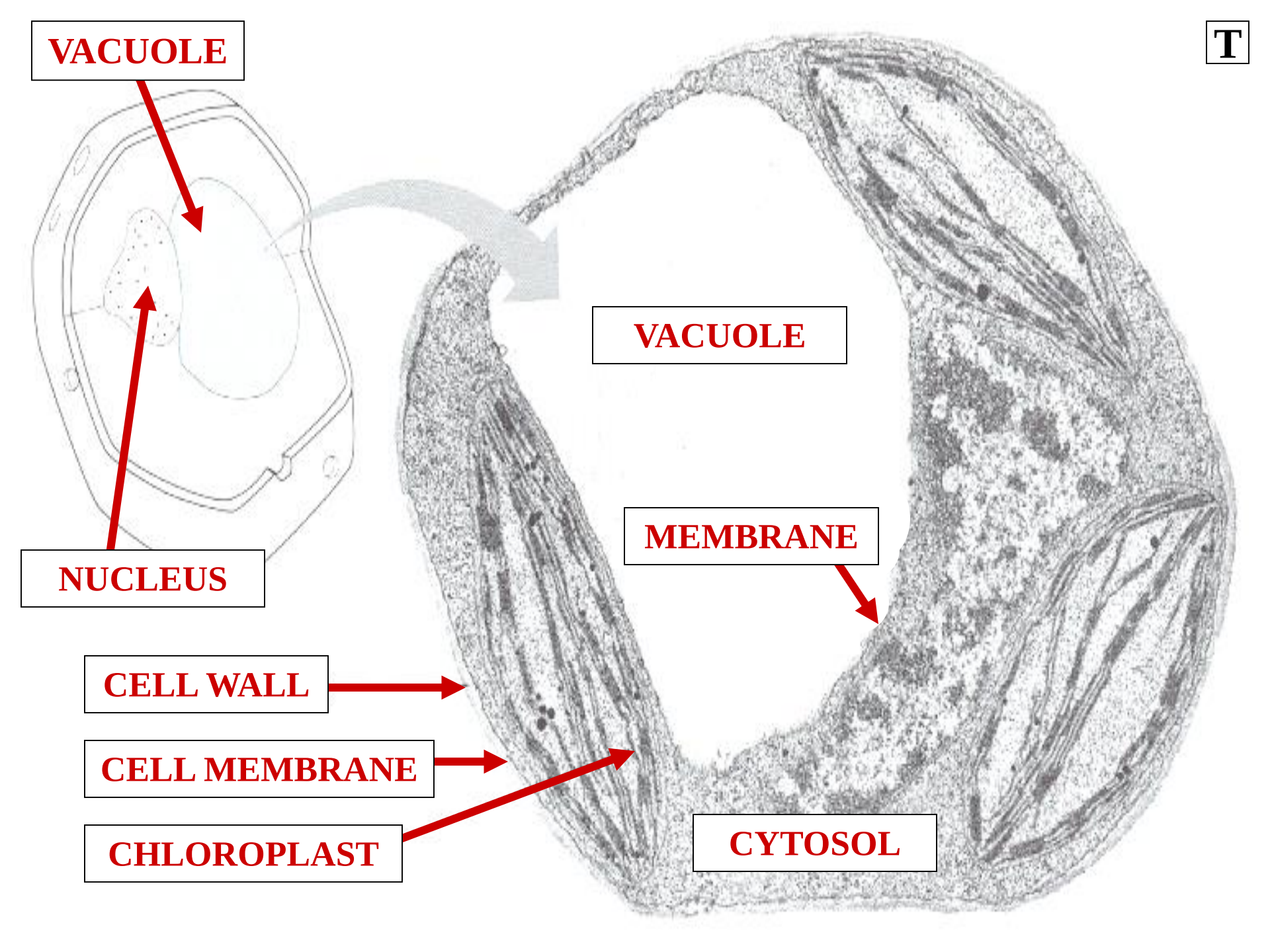
RIBOSOMES

ROUGH ER

SMOOTH ER

PIT FIELD

VACUOLE ULTRASTRUCTURE


VACUOLE
NUCLEUS
VACUOLE
MEMBRANE
CELL WALL
CELL MEMBRANE
CHLOROPLAST
CYTOSOL
T

TONOPLAST MEMBRANE

TONOPLAST

VACUOLE MEMBRANE

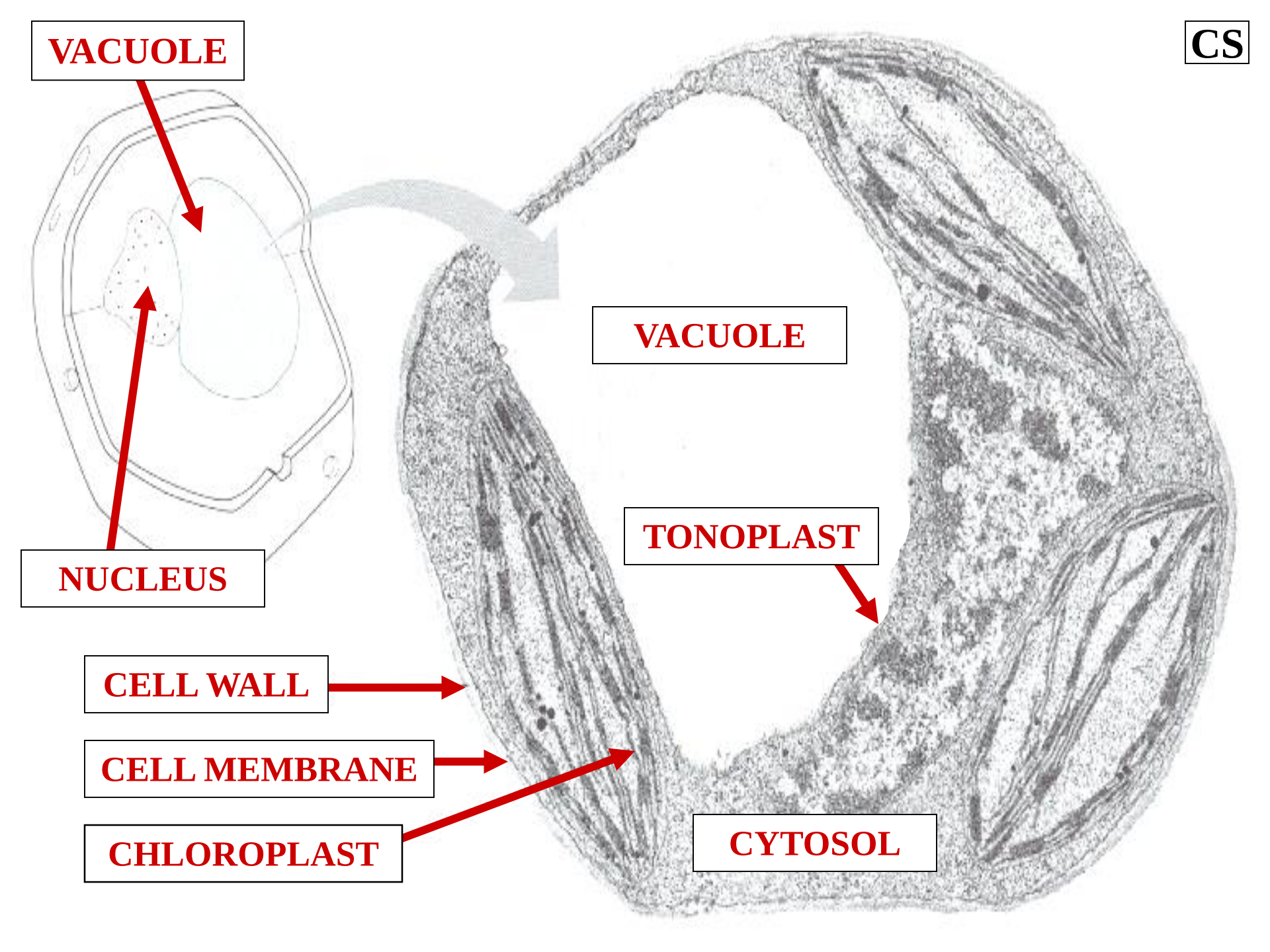
TONOPLAST

TONOPLAST

VACUOLE MEMBRANE

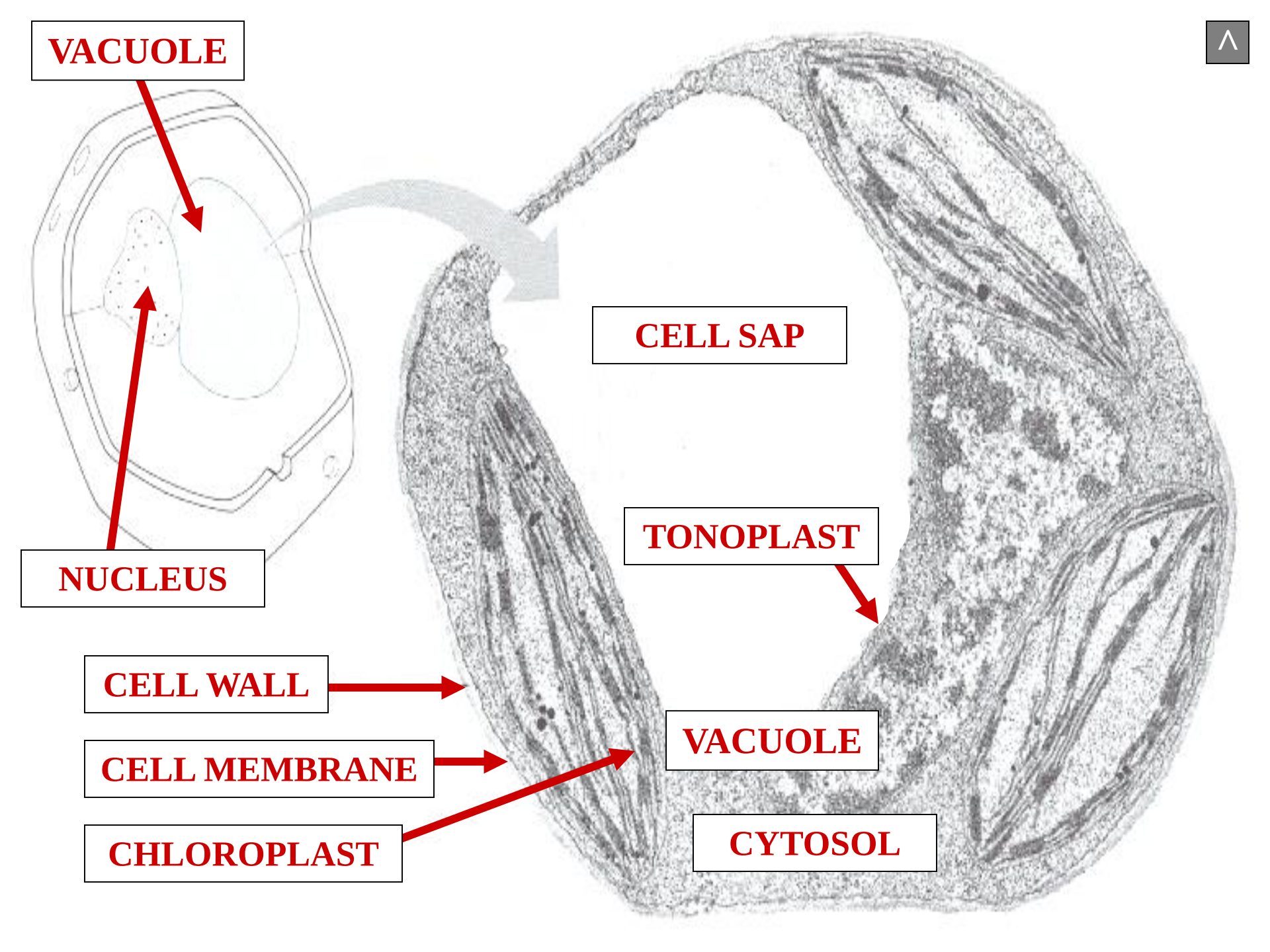
MEDIATES TRANSPORT INTO & OUT OF VACUOLE

TONOPLAST


VACUOLE
CS
VACUOLE
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
CYTOSOL

CELL SAP

VACUOLE CONTENT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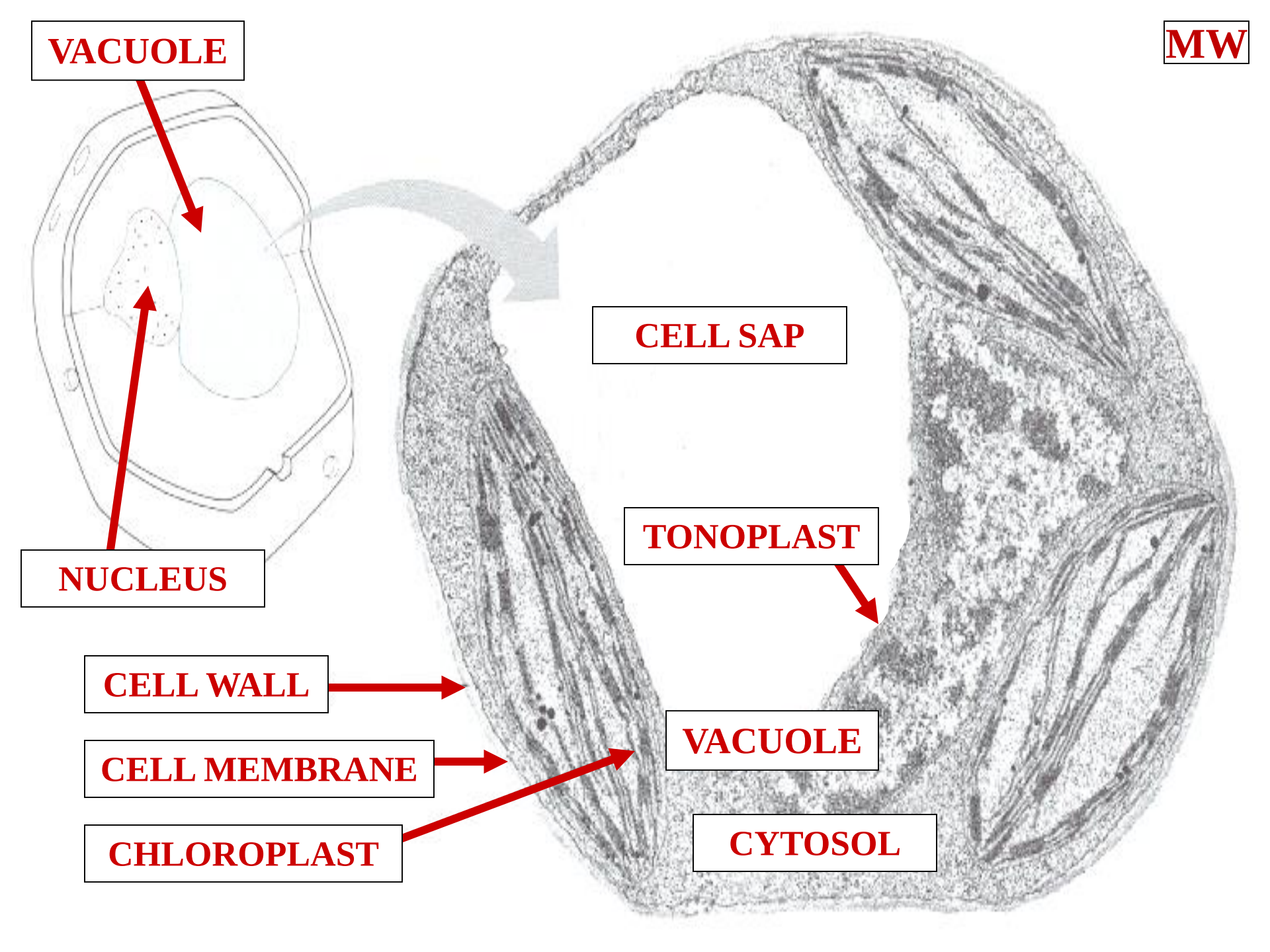
CELL SAP
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL

CELL SAP CONTENT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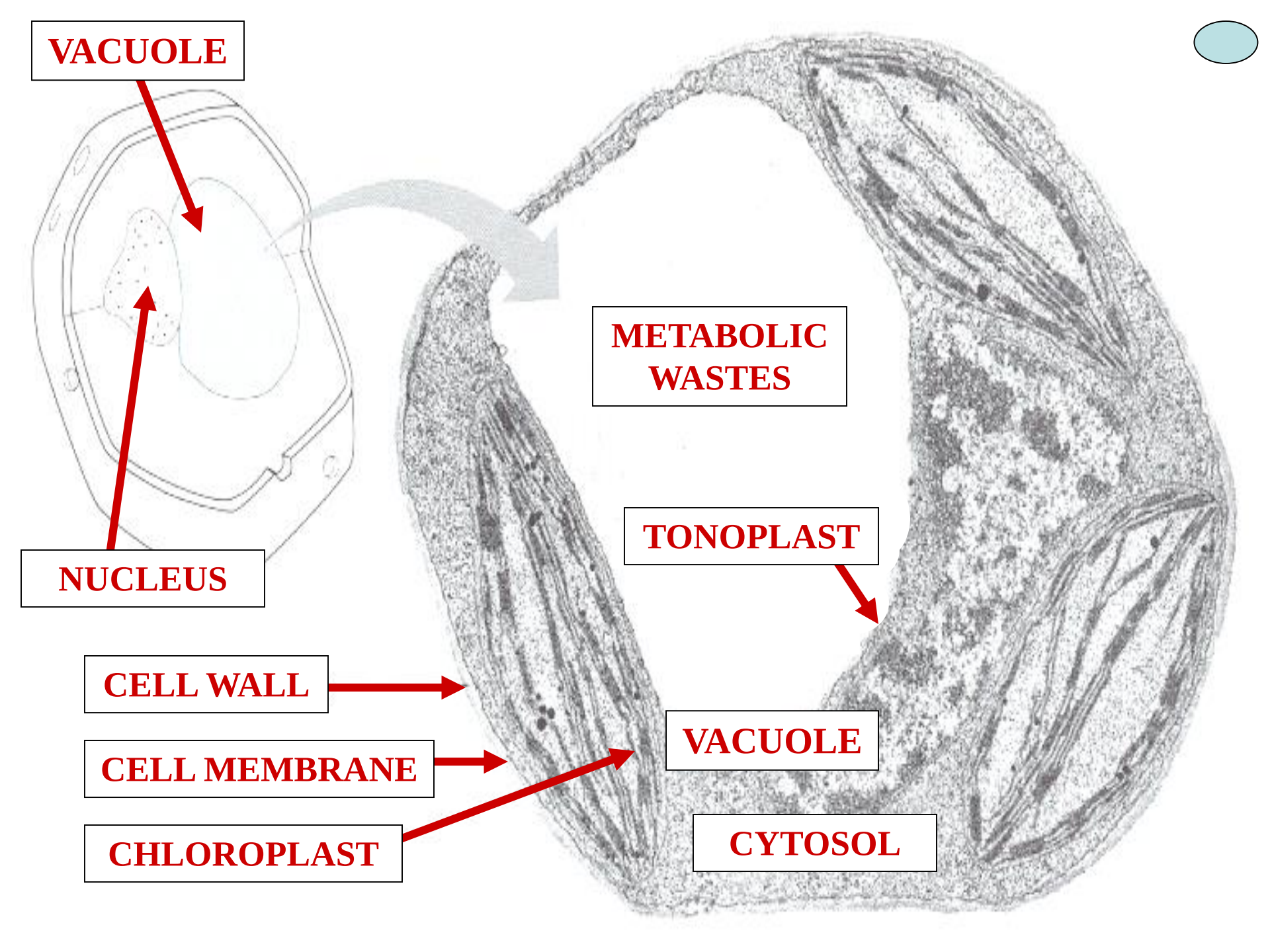
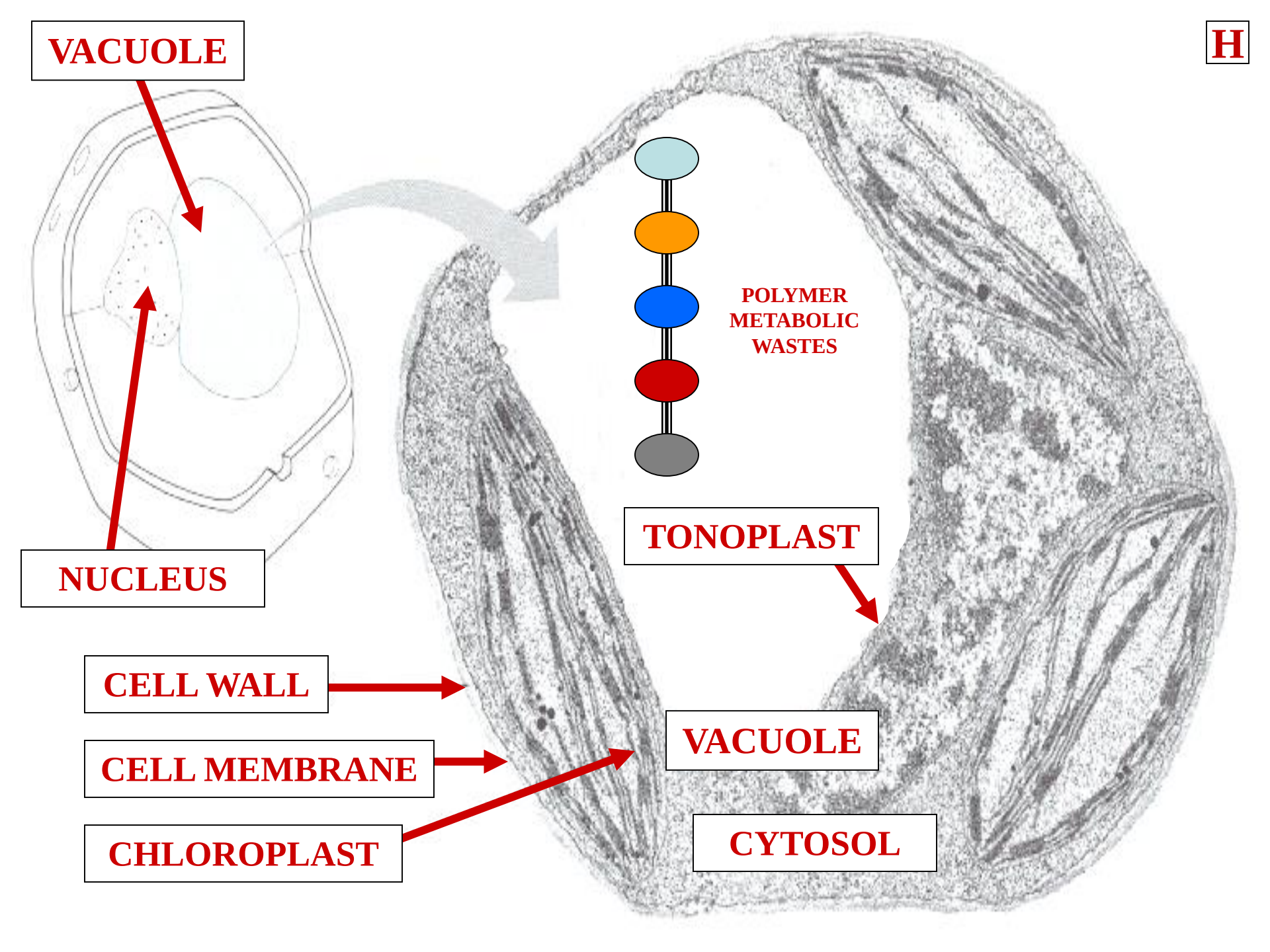
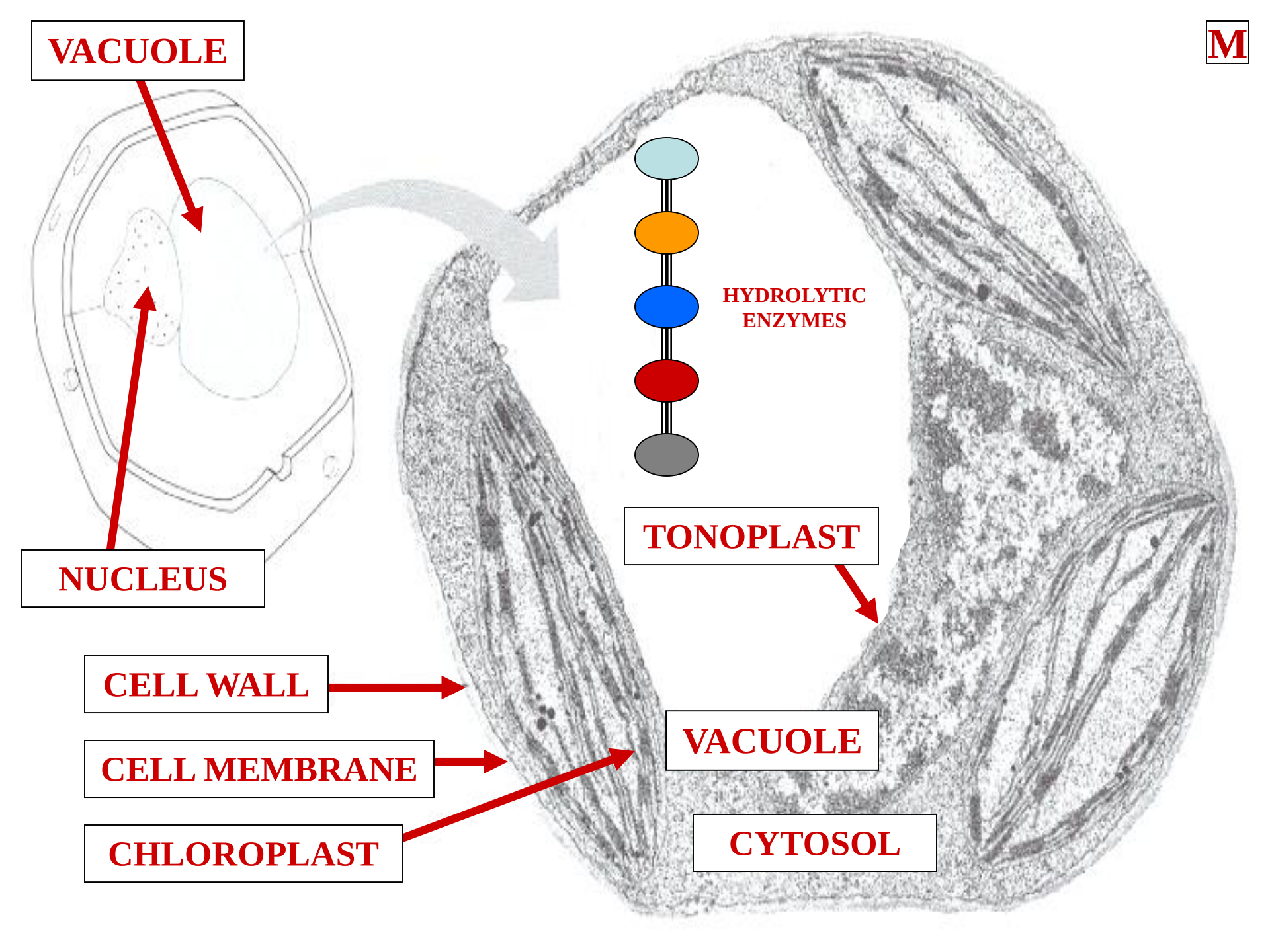
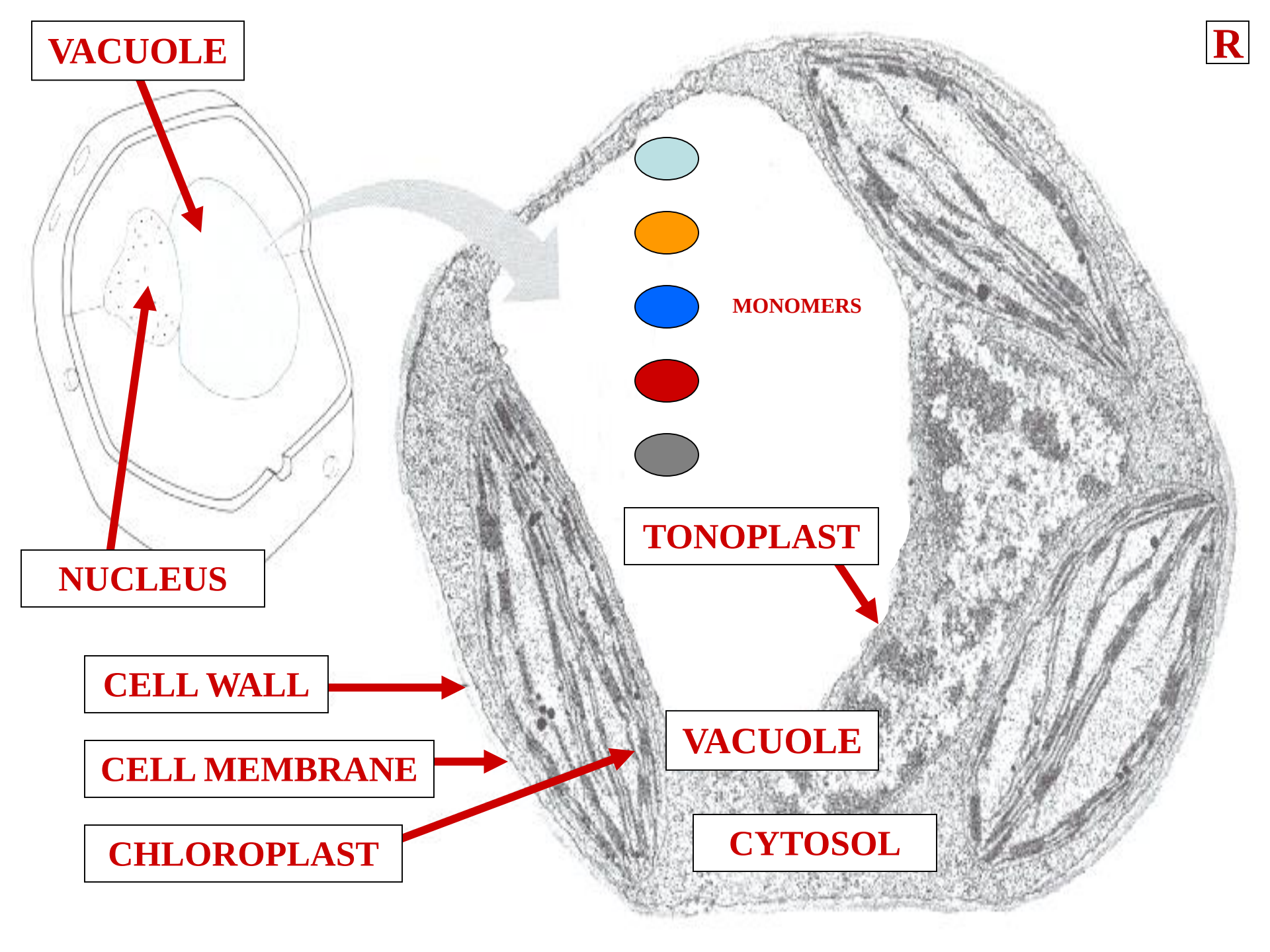
CELL SAP
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VACUOLE
NUCLEUS
METABOLIC WASTES
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VACUOLE
H
POLYMER
METABOLIC
WASTES
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VACUOLE
M
HYDROLYTIC
ENZYMES
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL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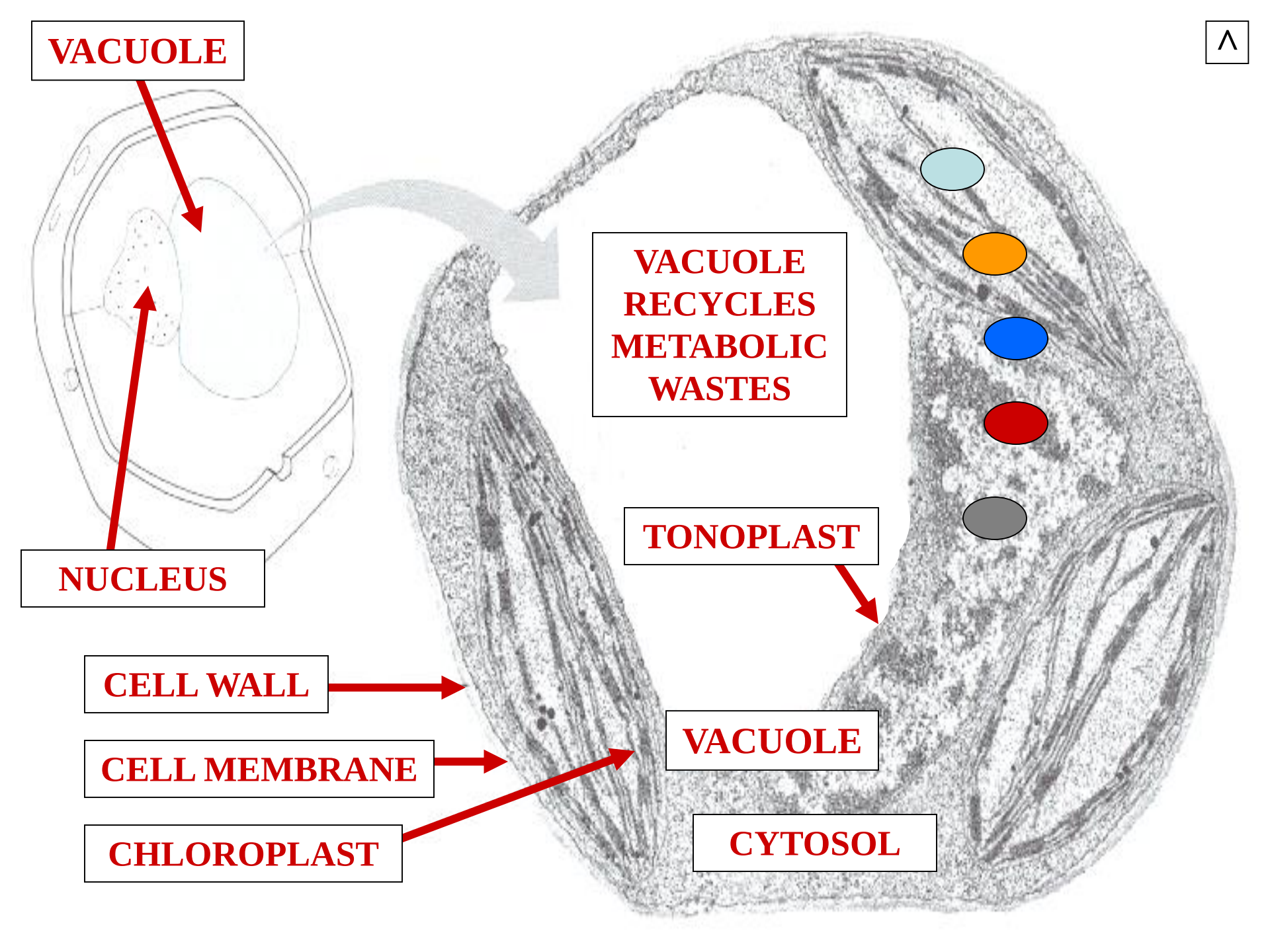
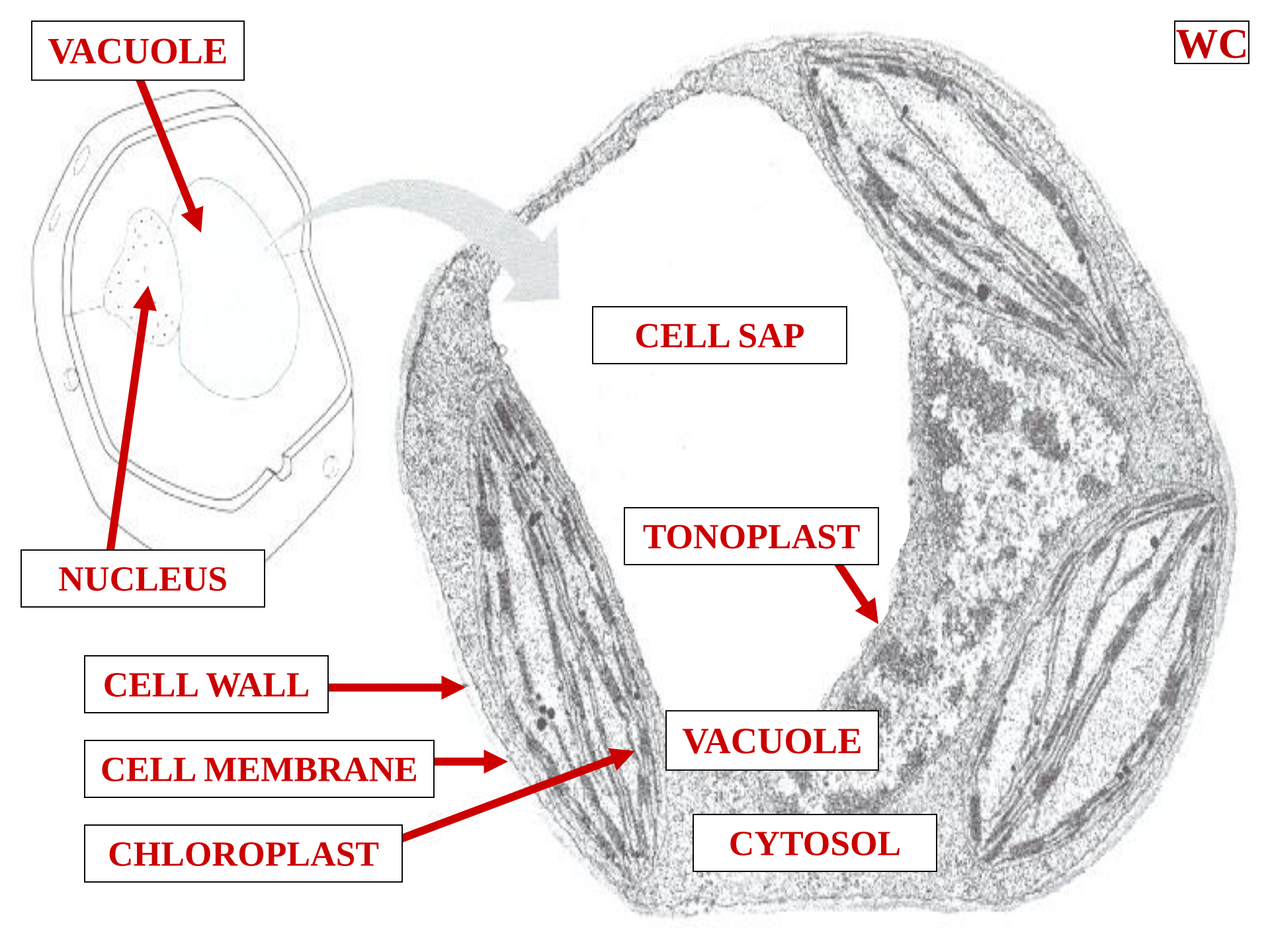
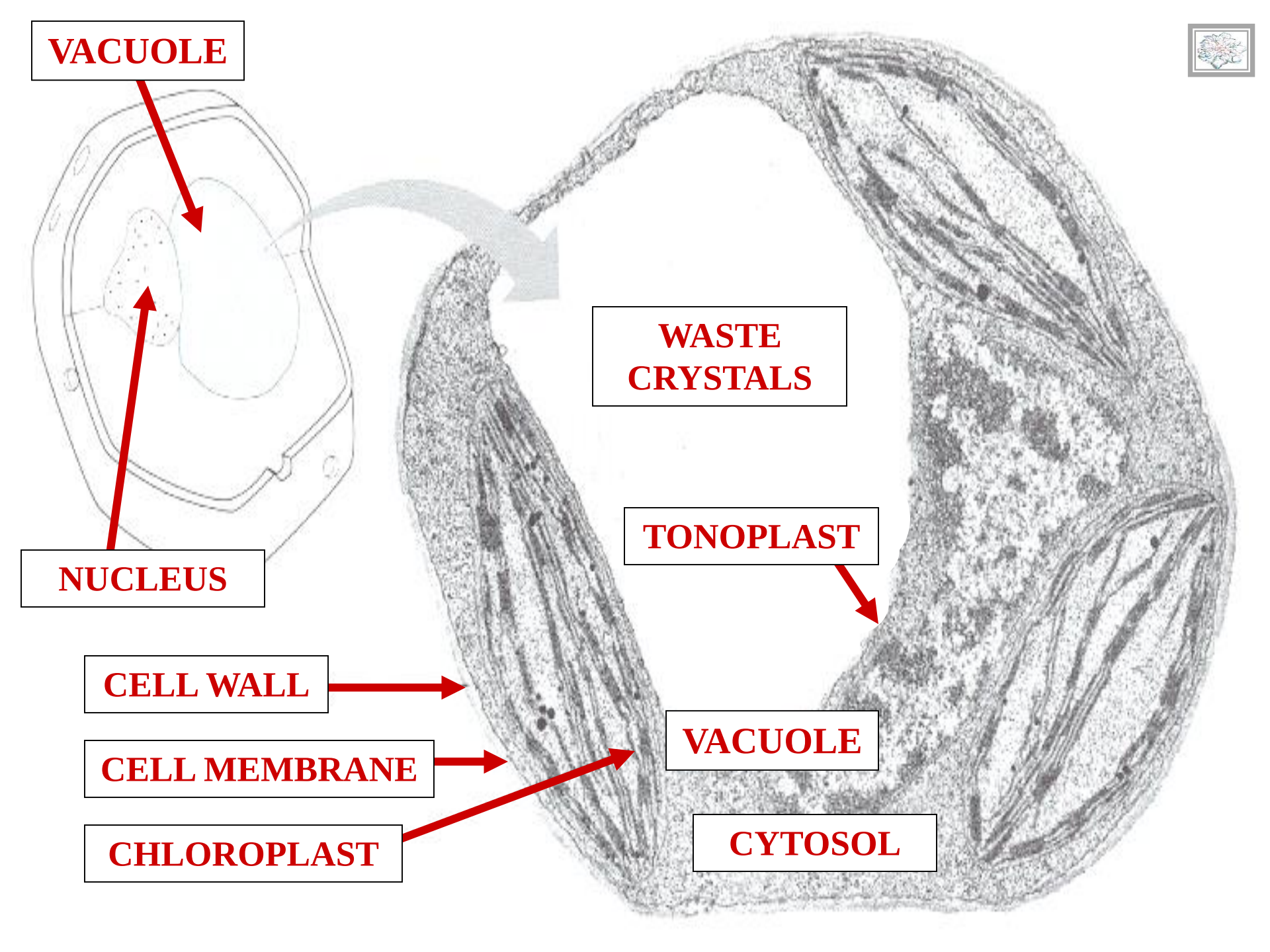
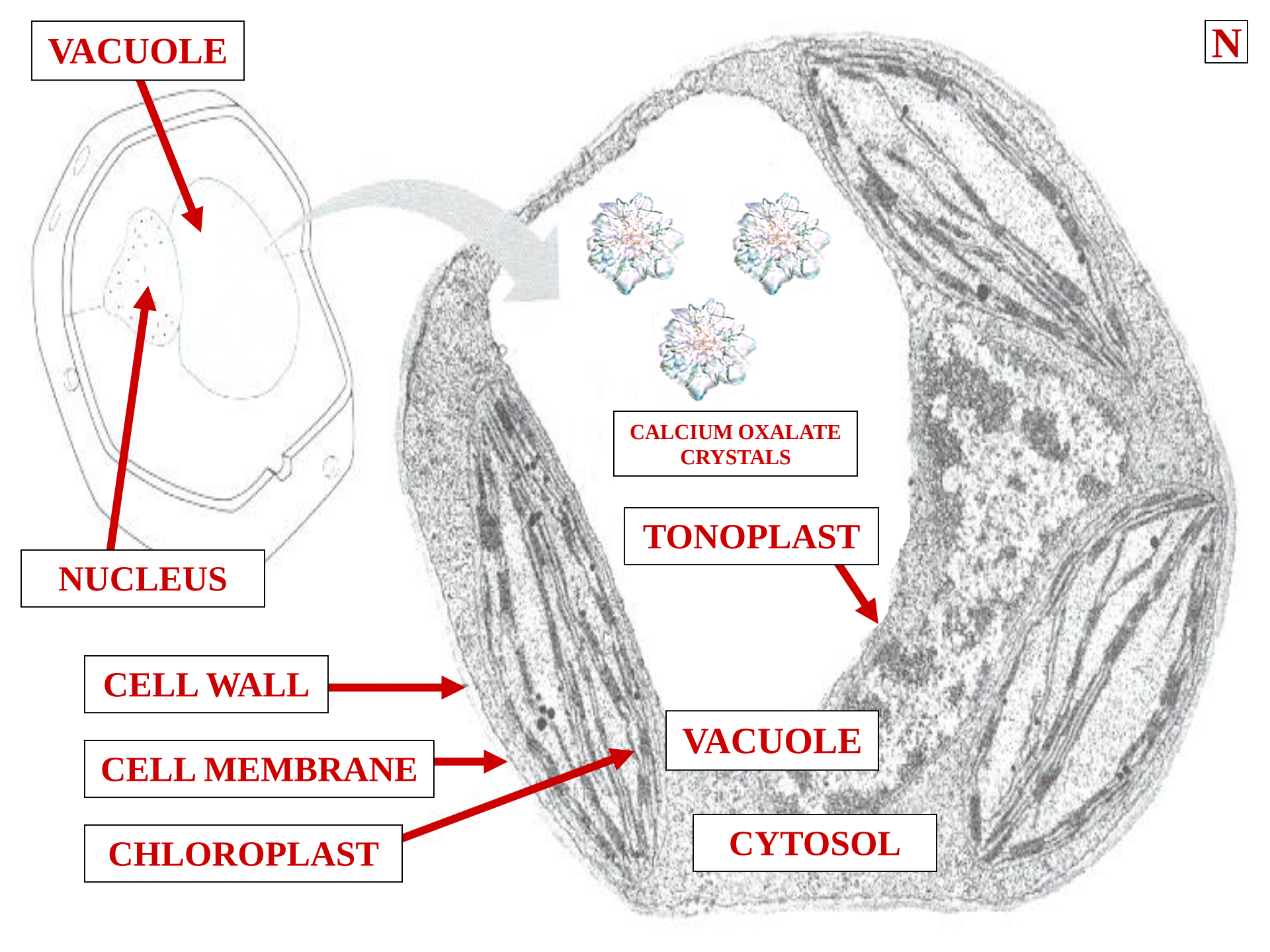
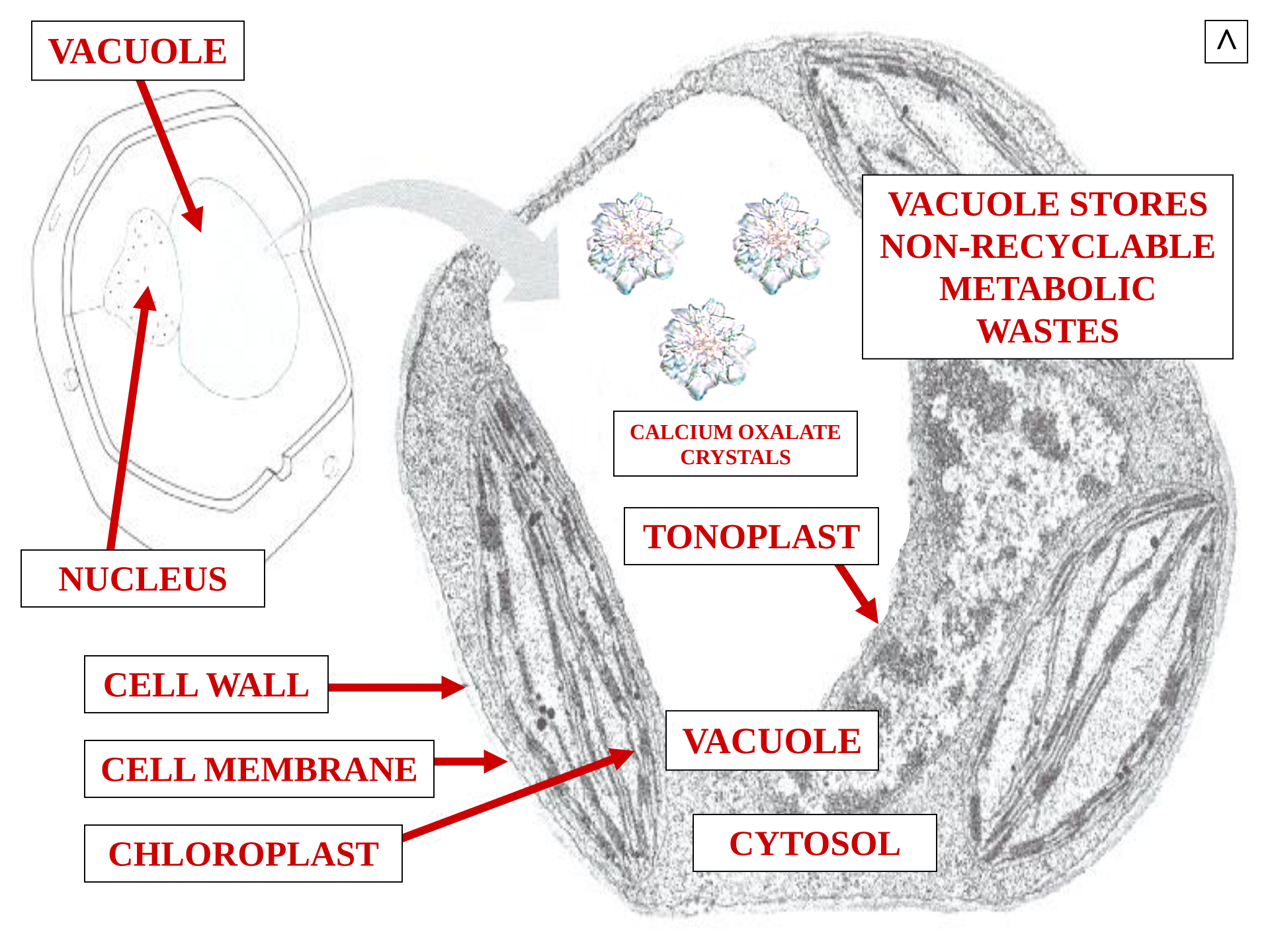
NUCLEUS
MONOMERS
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL
R

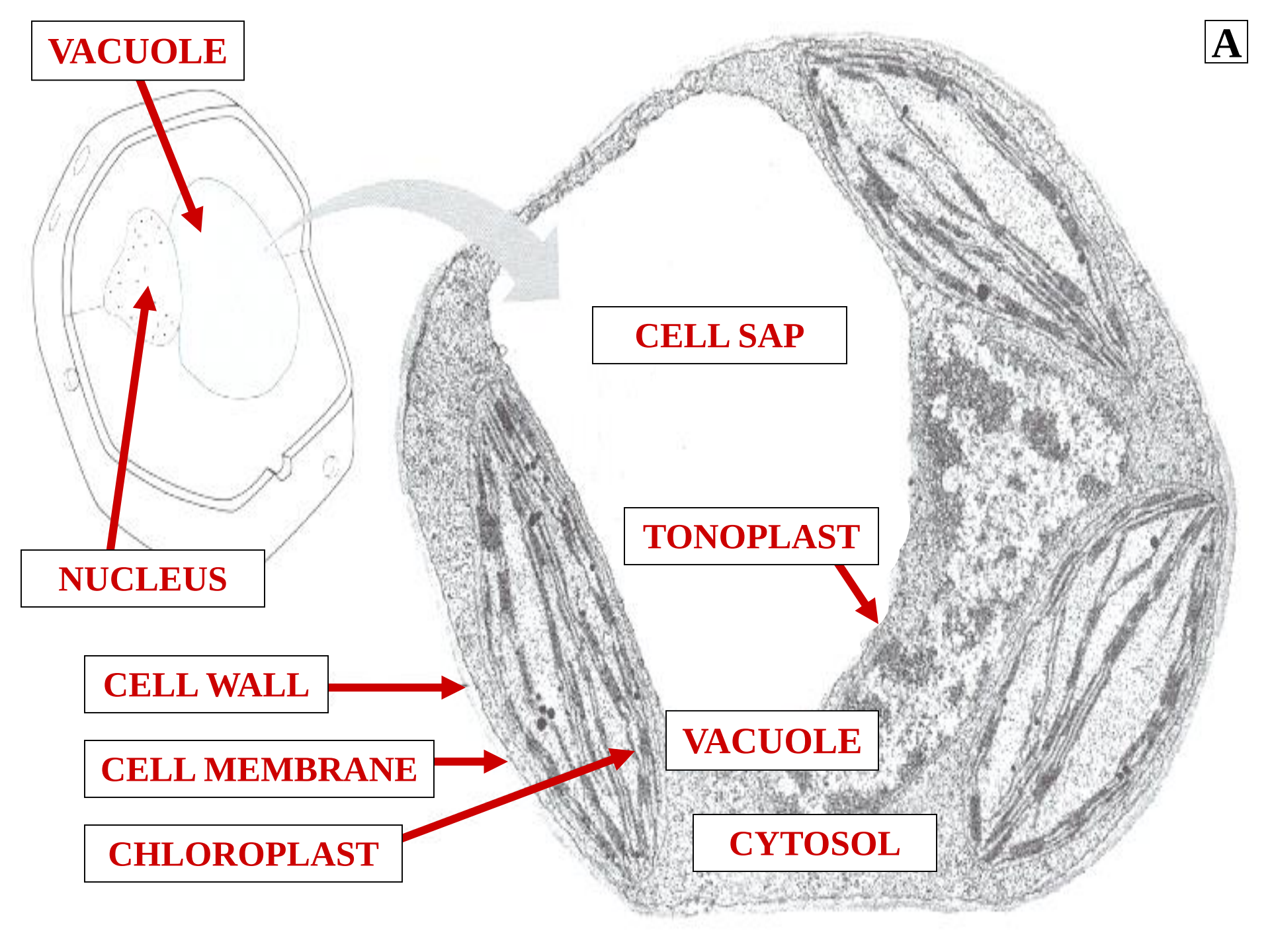

VACUOLE
VACUOLE RECYCLES METABOLIC WASTES
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VACUOLE
WC
CELL SAP
TONOPLAST
NUCLEUS
CELL WALL
VACUOLE
CELL MEMBRANE
CYTOSOL
CHLOROPLAST


VACUOLE
NUCLEUS
WASTE CRYSTALS
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VACUOLE
N
CALCIUM OXALATE CRYSTALS
TONOPLAST
NUCLEUS
CELL WALL
VACUOLE
CELL MEMBRANE
CYTOSOL
CHLOROPLAST


VACUOLE
VACUOLE STORES NON-RECYCLABLE METABOLIC WASTES
CALCIUM OXALATE CRYSTALS
TONOPLAST
NUCLEUS
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


A
VACUOLE
NUCLEUS
CELL SAP
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL

ANTHOCYANINS

ANTHOCYANINS

CELL SAP
BLUE & RED PIGMENTS

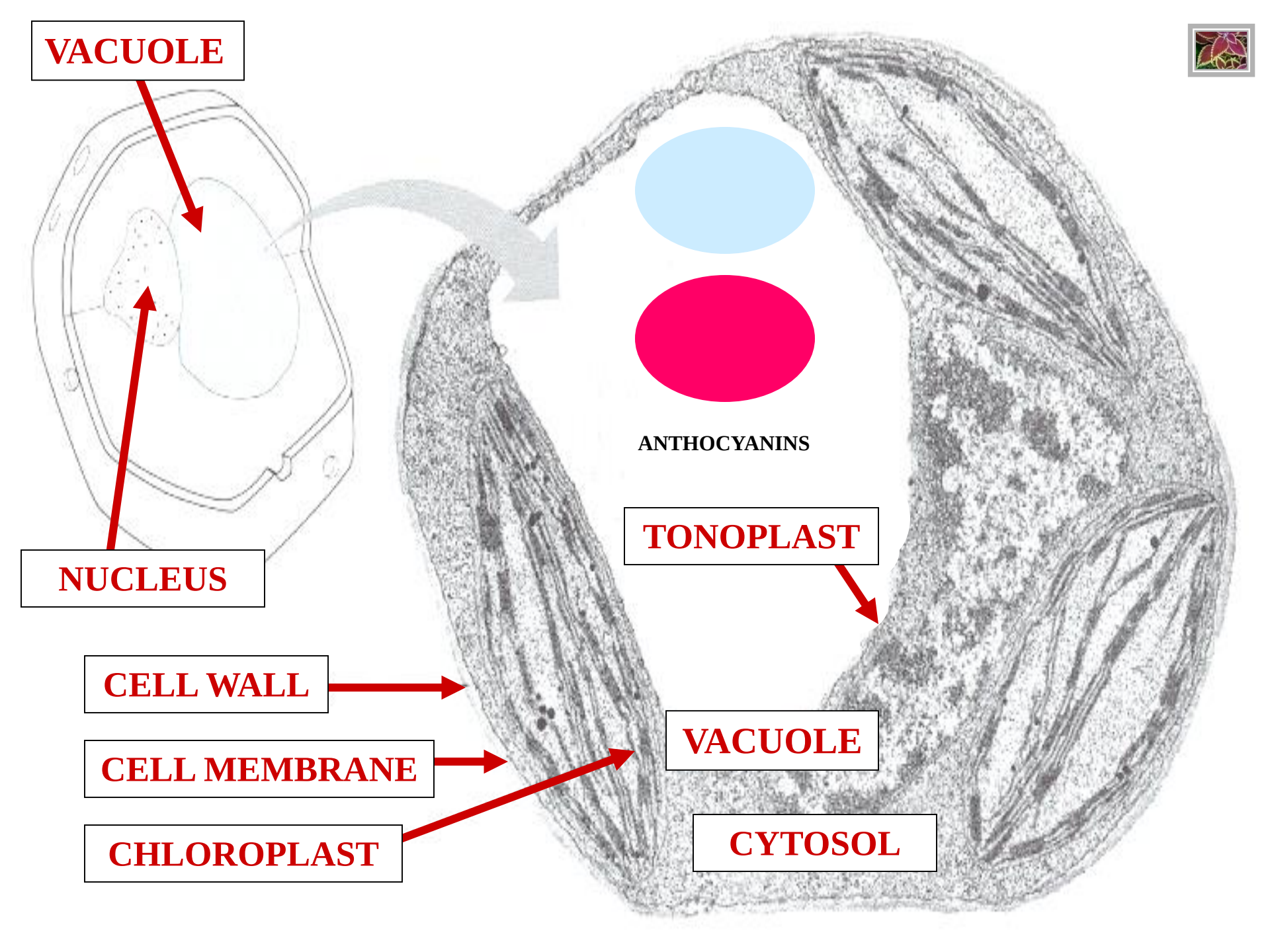
ANTHOCYANINS

ANTHOCYANINS

CELL SAP
BLUE & RED PIGMENTS

ATTRACT ANIMALS

ANTHOCYANINS


VACUOLE
NUCLEUS
ANTHOCYANINS
TONOPLAST
CELL WALL
CELL MEMBRANE
CHLOROPLAST
VACUOLE
CYTOSOL


VARIGATED LEAF
ANTHOCYANIN PIGMENTS

VARIGATED LEAF

ANTHOCYANIN PIGMENTS

P

PEROXISOME

PEROXISOME

PEROXISOME

PLANT CELLS ONLY

PEROXISOME

PEROXISOME

PLANT CELLS ONLY

PHOTOSYNTHESIS CELLS ONLY

PEROXISOME

PEROXISOME

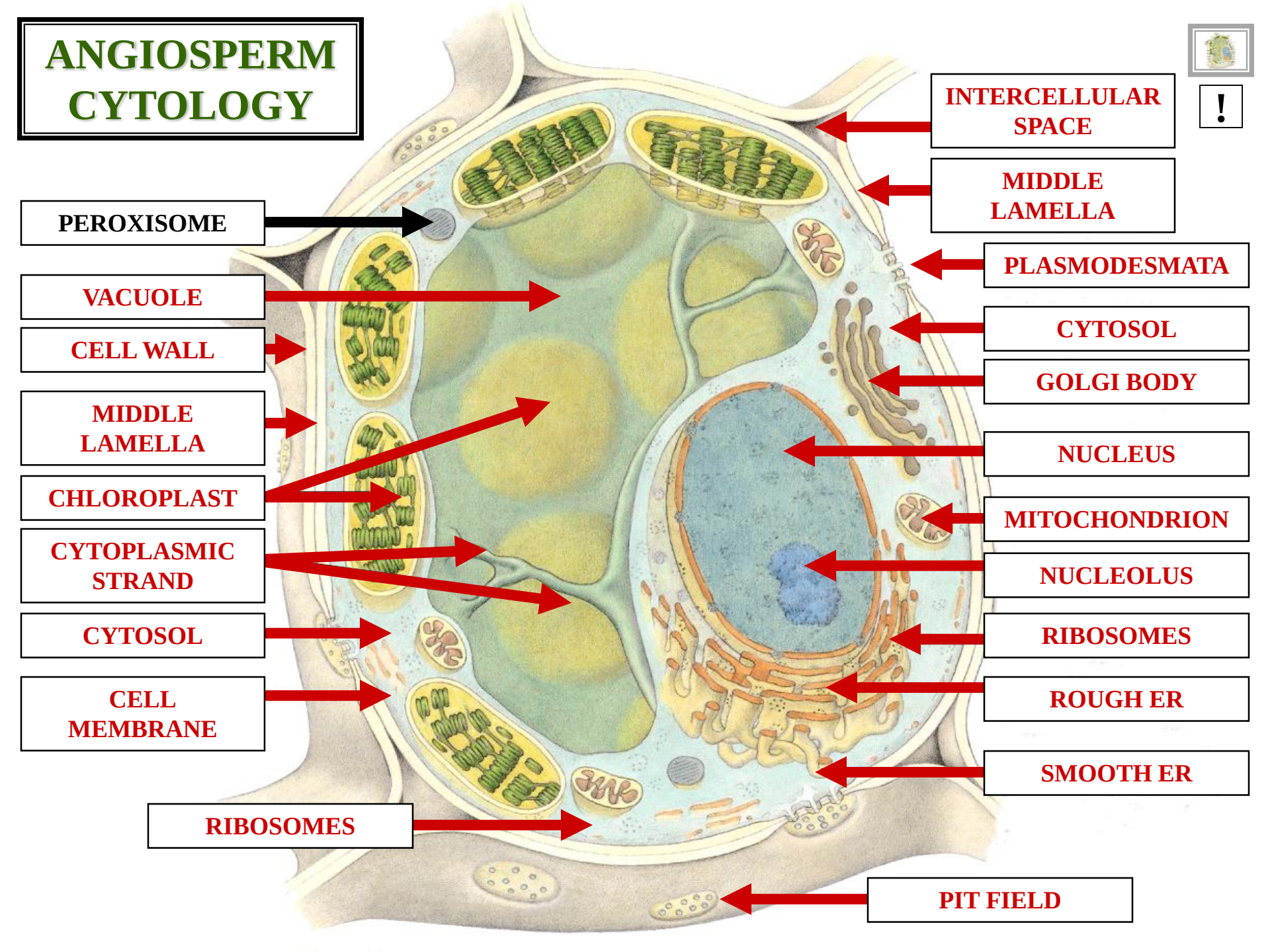
PLANT CELLS ONLY

PHOTOSYNTHESIS CELLS ONLY

SITE: PHOTO-RESPIRATION

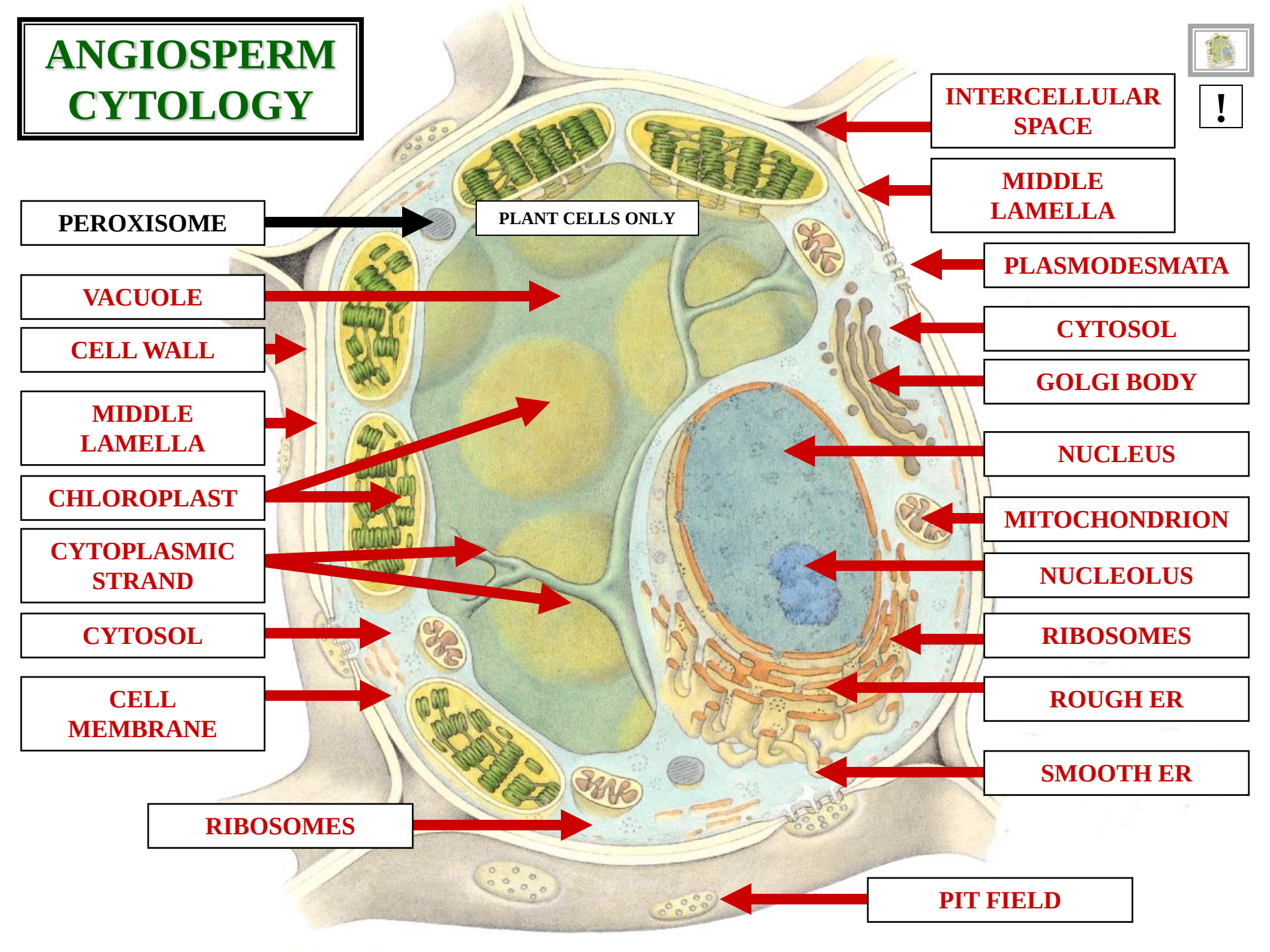
PEROXISOME

ANGIOSPERM CYTOLOGY

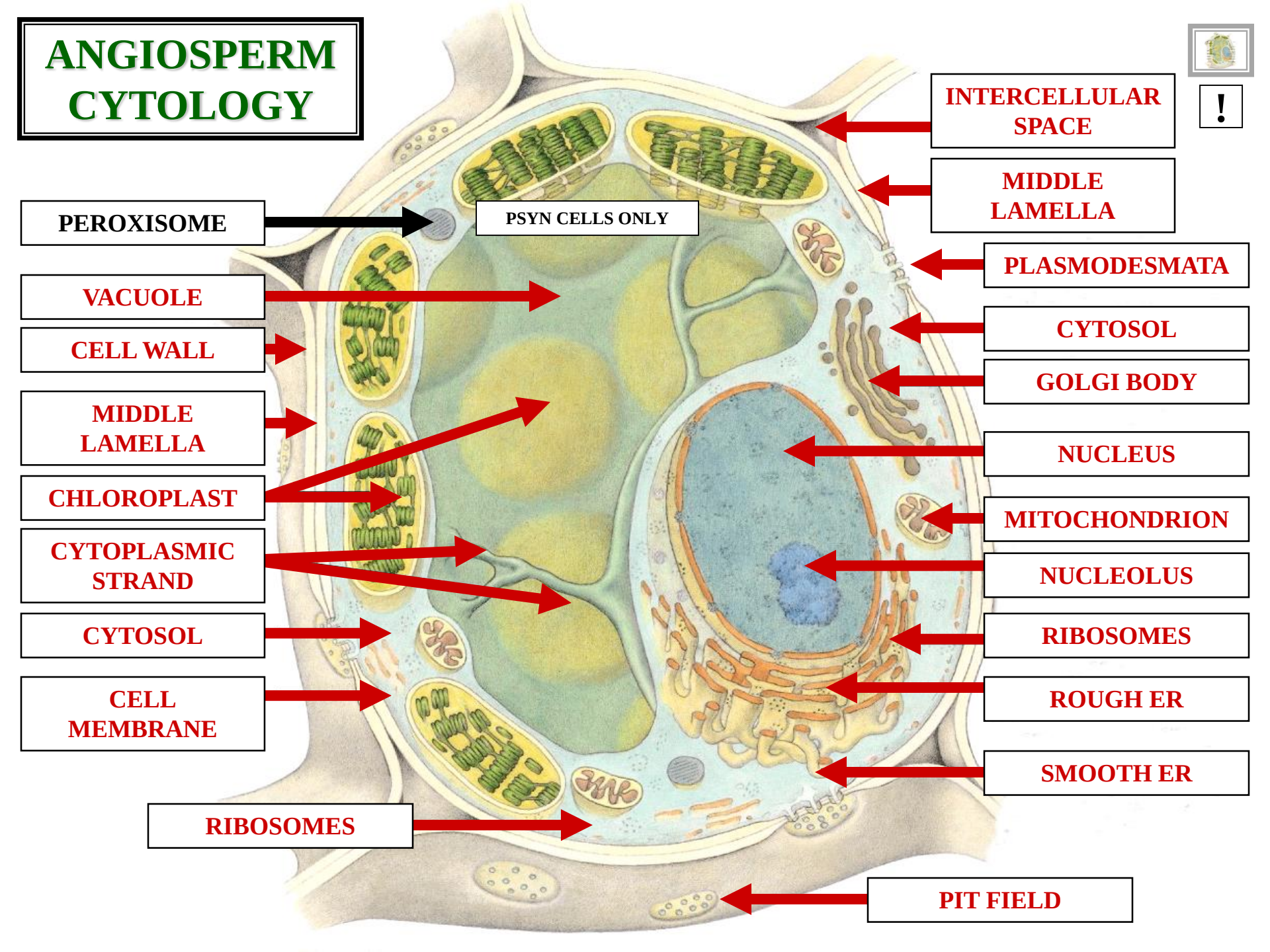


PEROXISOME
VACUOLE
CELL WALL
MIDDLE LAMELLA
CHLOROPLAST
CYTOPLASMIC STRAND
CYTOSOL
CELL MEMBRANE
RIBOSOMES
INTERCELLULAR SPACE
MIDDLE LAMELLA
PLASMODESMATA
CYTOSOL
GOLGI BODY
NUCLEUS
MITOCHONDRION
NUCLEOLUS
RIBOSOMES
ROUGH ER
SMOOTH ER
PIT FIELD

ANGIOSPERM CYTOLOGY

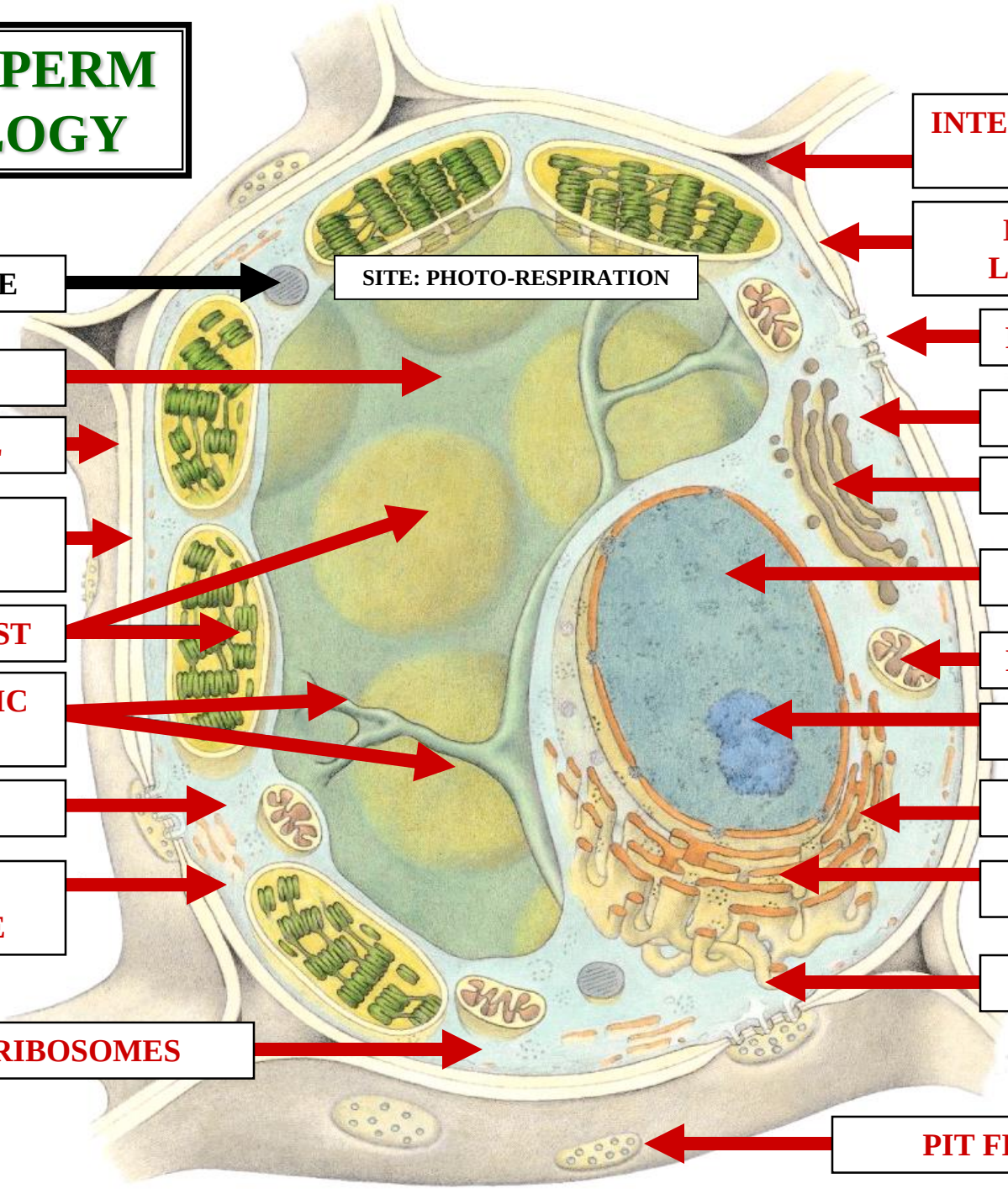


ANGIOSPERM CYTOLOGY



ANGIOSPERM CYTOLOGY

P-R



PEROXISOME

SITE: PHOTO-RESPIRATION

VACUOLE

CELL WALL

MIDDLE LAMELLA

CHLOROPLAST

CYTOPLASMIC STRAND

CYTOSOL

CELL MEMBRANE

RIBOSOMES

INTERCELLULAR SPACE

MIDDLE LAMELLA

PLASMODESMATA

CYTOSOL

GOLGI BODY

NUCLEUS

MITOCHONDRION

NUCLEOLUS

RIBOSOMES

ROUGH ER

SMOOTH ER

PIT FIELD

PHOTO-RESPIRATION