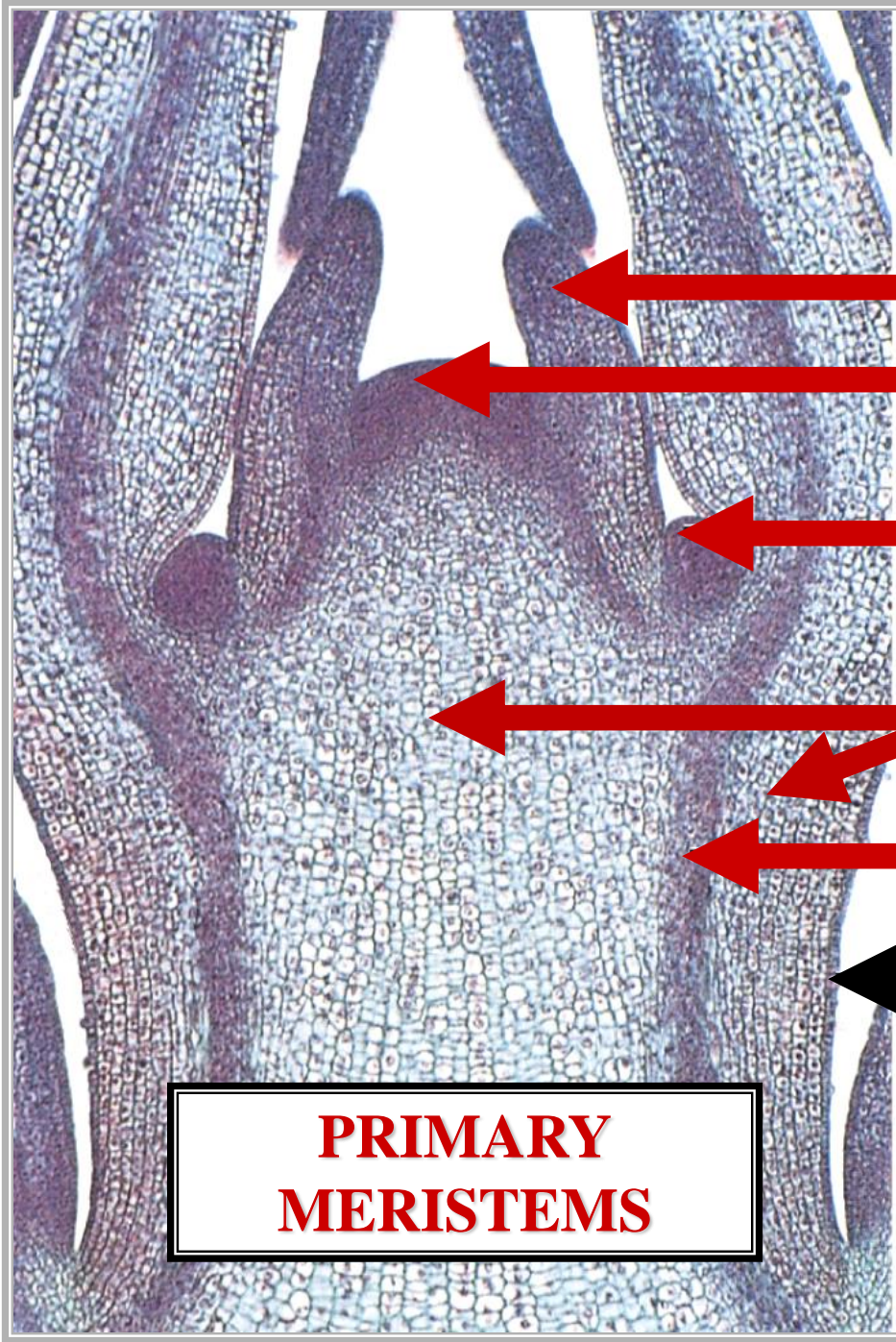


# ANGIOSPERM PT

## PRIMARY MERISTEMS



[ ]

**APICAL  
MERISTEM**

[ ]

**~1 GROUND TISSUE**

**~1 VASCULAR TISSUE**

**~1 DERMAL TISSUE**

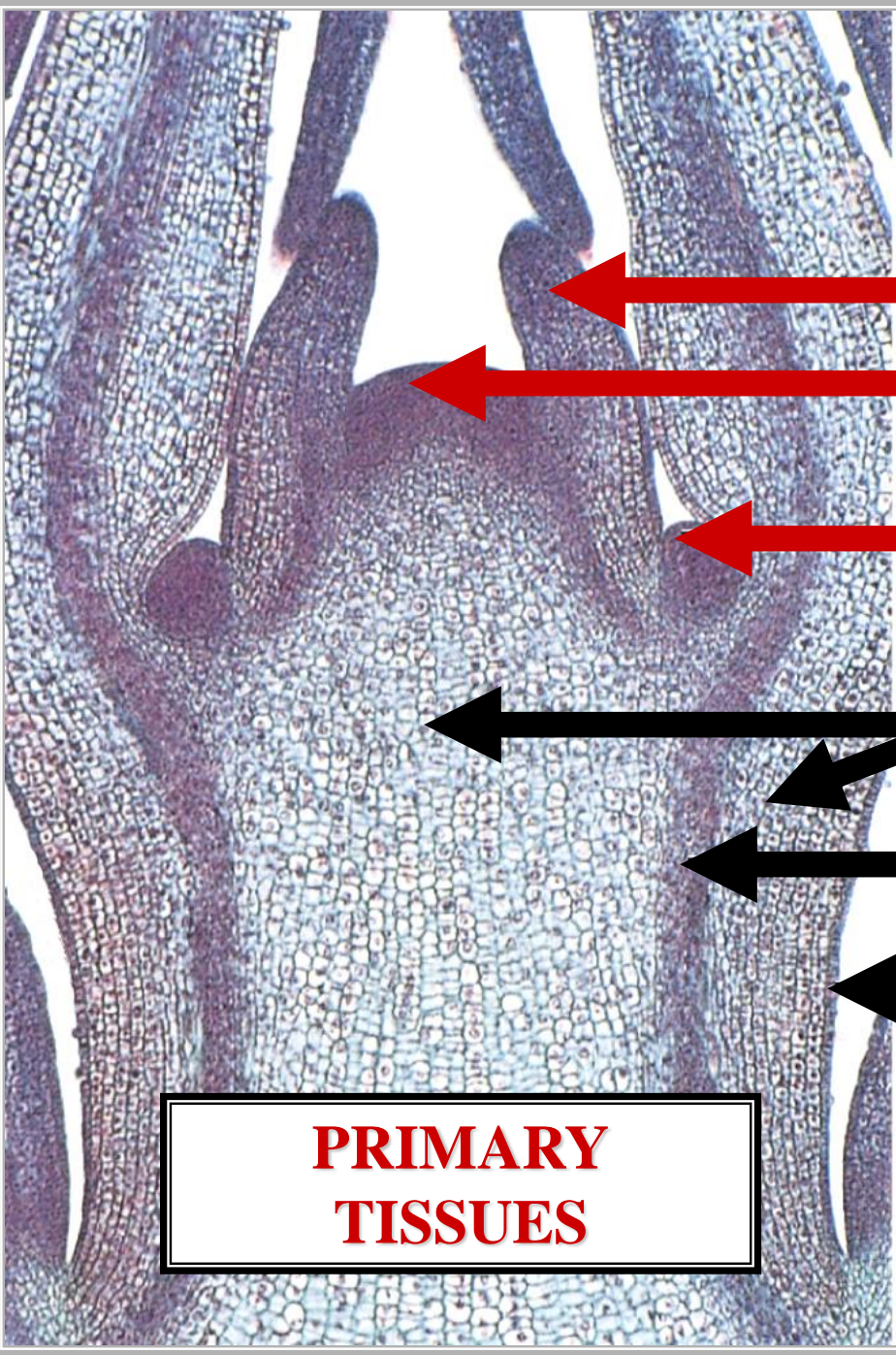
**PRIMARY  
MERISTEMS**

**STEM**

**L.S.**

# ANGIOSPERM PRIMARY TISSUES

PG



**APICAL  
MERISTEM**

**~1 TISSUES**

**~1 TISSUES**

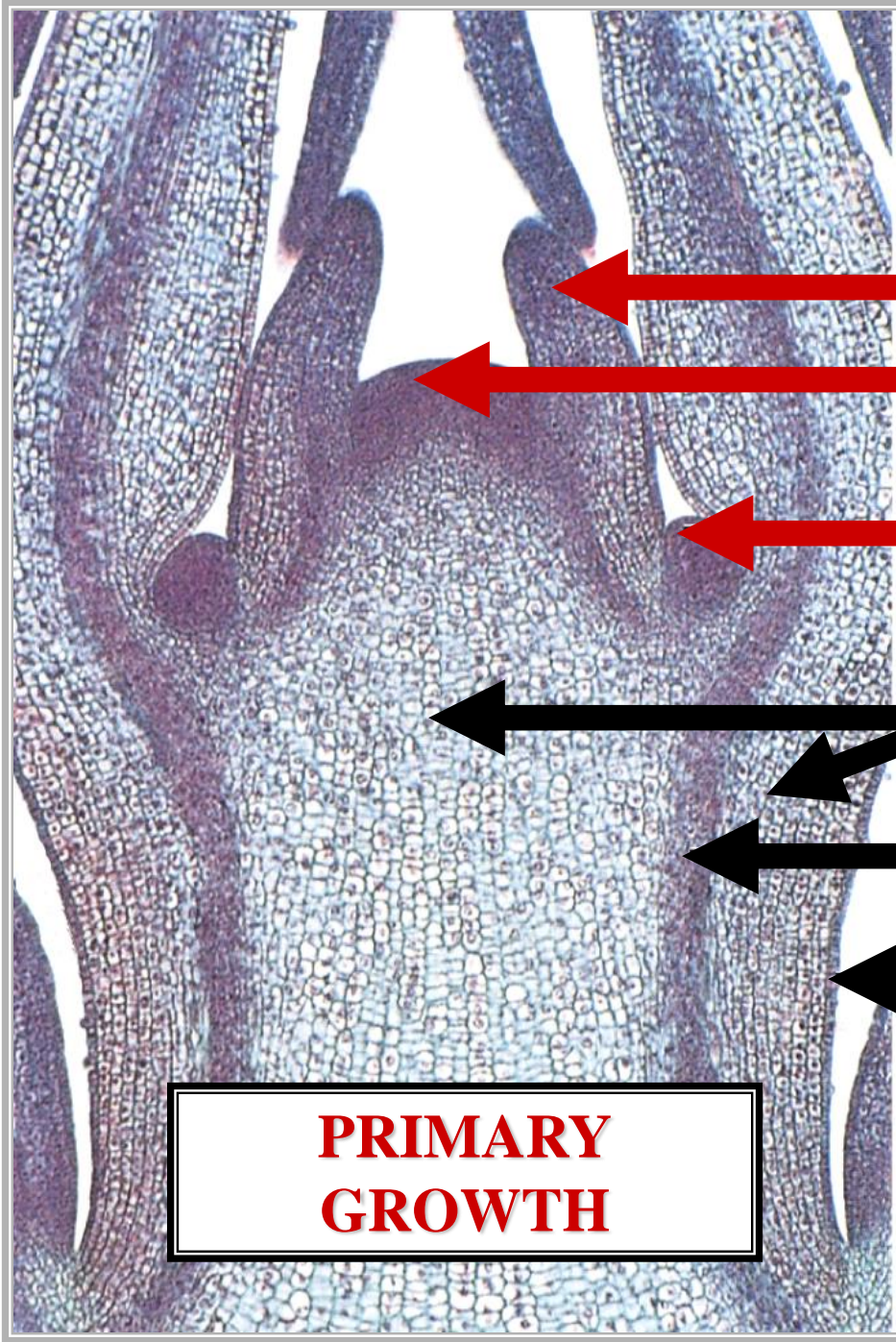
**~1 TISSUES**

**PRIMARY  
TISSUES**

**STEM**

**L.S.**

# ANGIOSPERM PRIMARY GROWTH



[Empty box]

**APICAL  
MERISTEM**

[Empty box]

**~1 PLANT GROWTH**

**~1 PLANT GROWTH**

**~1 PLANT GROWTH**

**PRIMARY  
GROWTH**

**STEM**

**L.S.**

# TYPICAL ANGIOSPERM

i

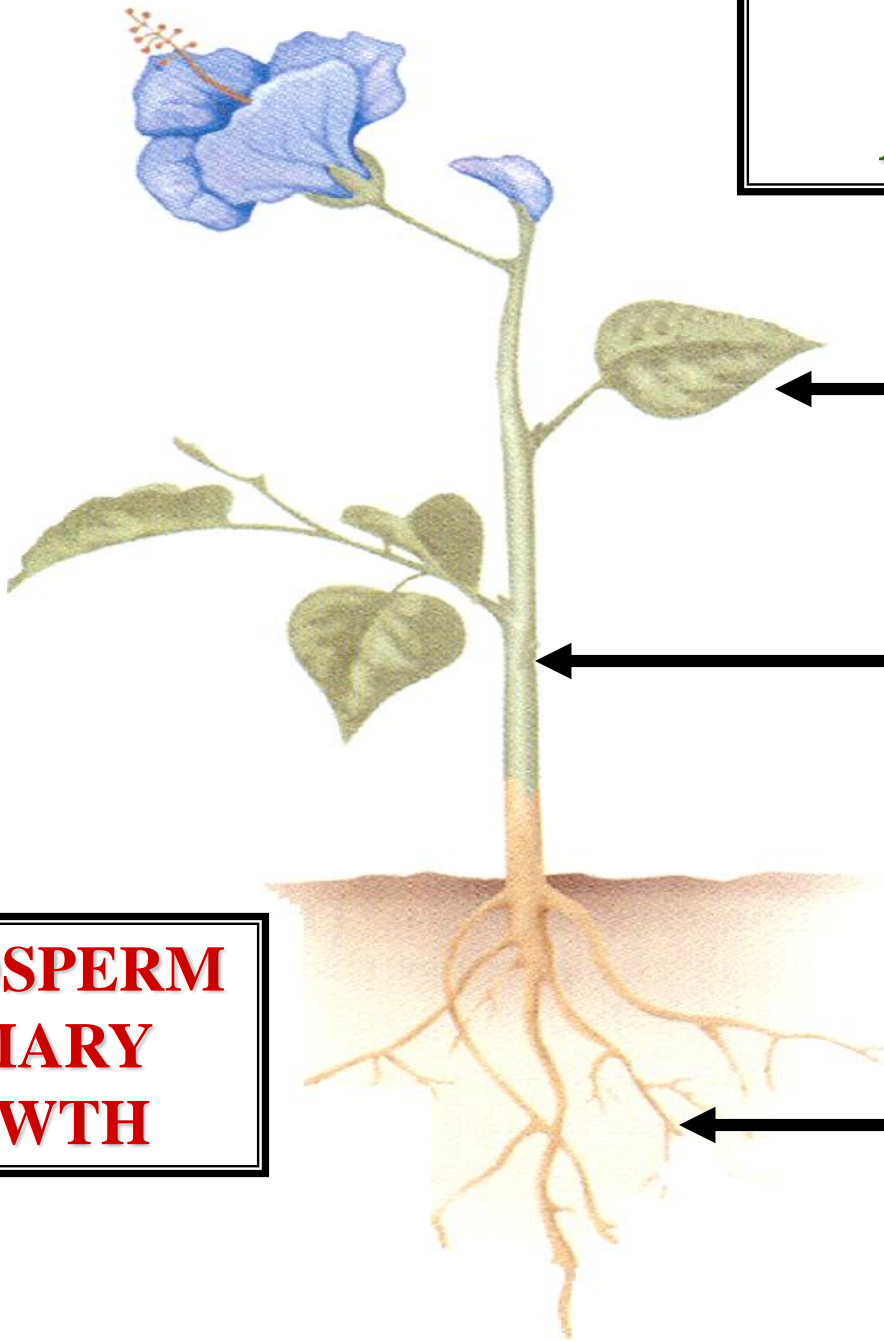
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**LEAF**

**STEM**

**ANGIOSPERM  
PRIMARY  
GROWTH**

**ROOT**





# ANGIOSPERM PLANT HISTOLOGY

# TYPICAL ANGIOSPERM



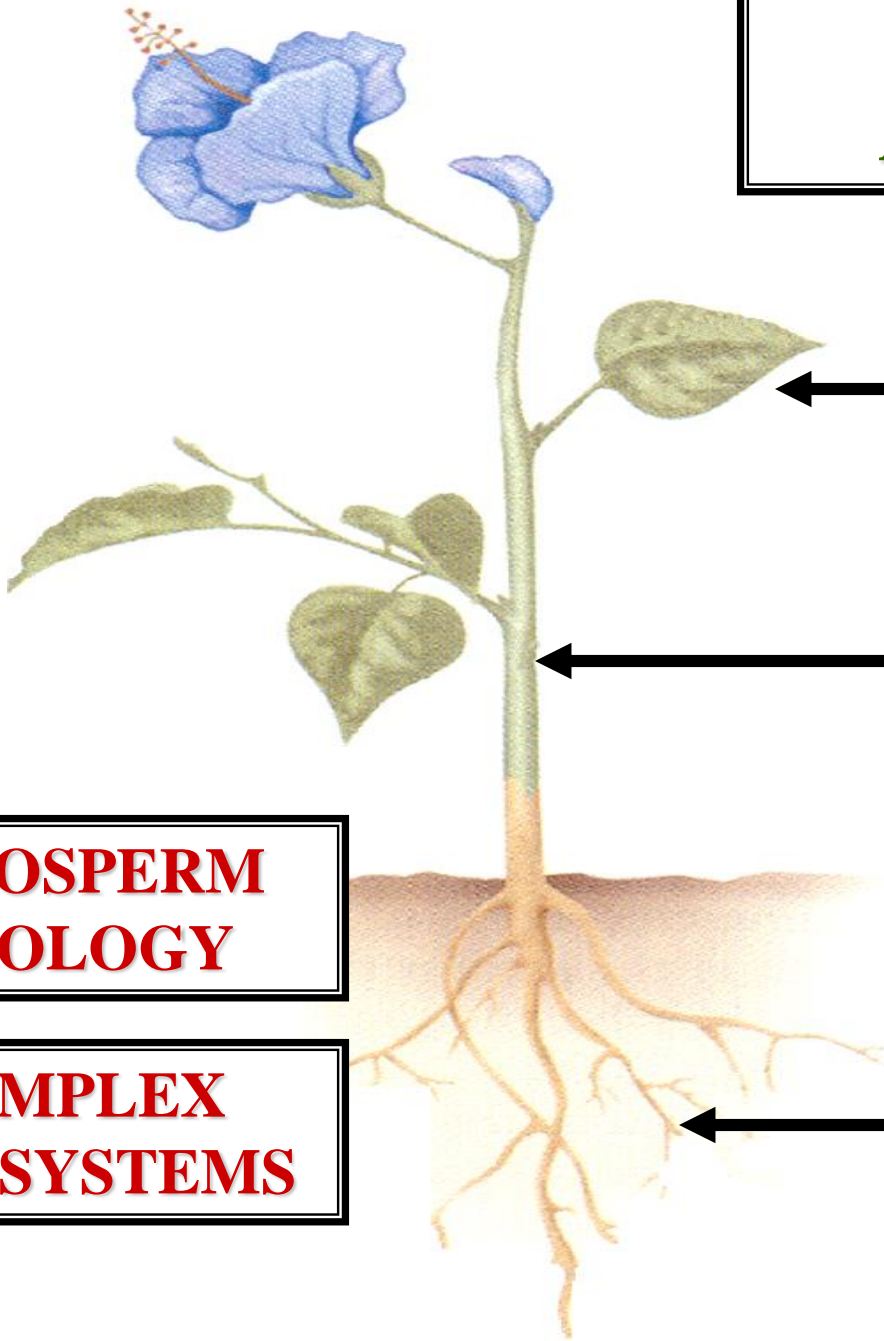
**LEAF**

**STEM**

**ANGIOSPERM  
HISTOLOGY**

**3 COMPLEX  
TISSUE SYSTEMS**

**ROOT**



# ANGIOSPERM COMPLEX TISSUES

**ANGIOSPERM  
COMPLEX TISSUES**

**GROUND TISSUE**

**ANGIOSPERM  
COMPLEX TISSUES**



**ANGIOSPERM  
COMPLEX TISSUES**

**GROUND TISSUE**

**VASCULAR TISSUE**

**ANGIOSPERM  
COMPLEX TISSUES**



# **ANGIOSPERM COMPLEX TISSUES**

**GROUND TISSUE**

**VASCULAR TISSUE**

**DERMAL TISSUE**

# **ANGIOSPERM COMPLEX TISSUES**



# GROUND TISSUE

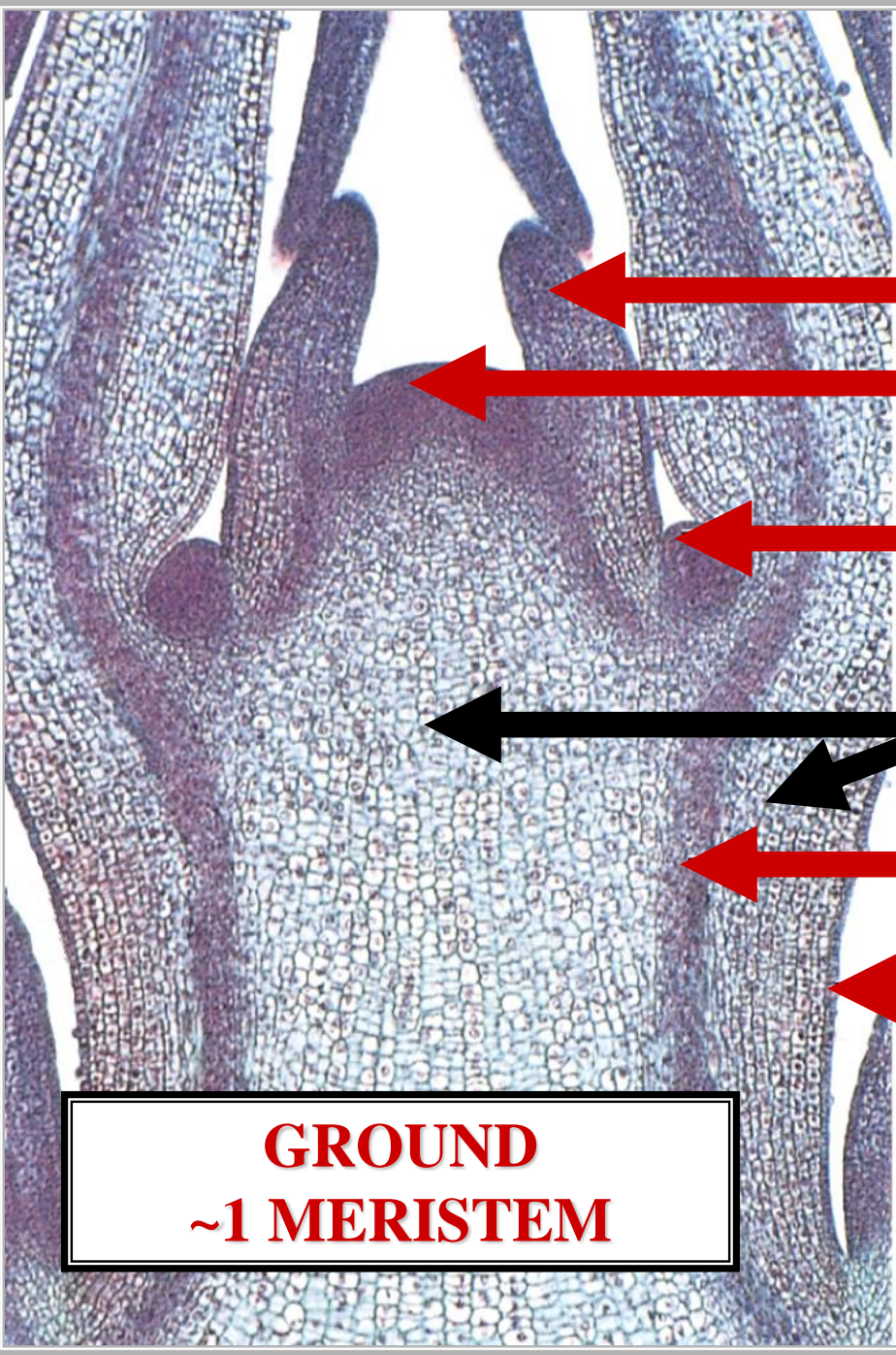


# GROUND TISSUE

## PRIMARY

## MERISTEM

# ANGIOSPERM PRIMARY MERISTEMS



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**APICAL  
MERISTEM**

[Empty box]

**GROUND ~1 MERISTEM**

[Empty box]

[Empty box]

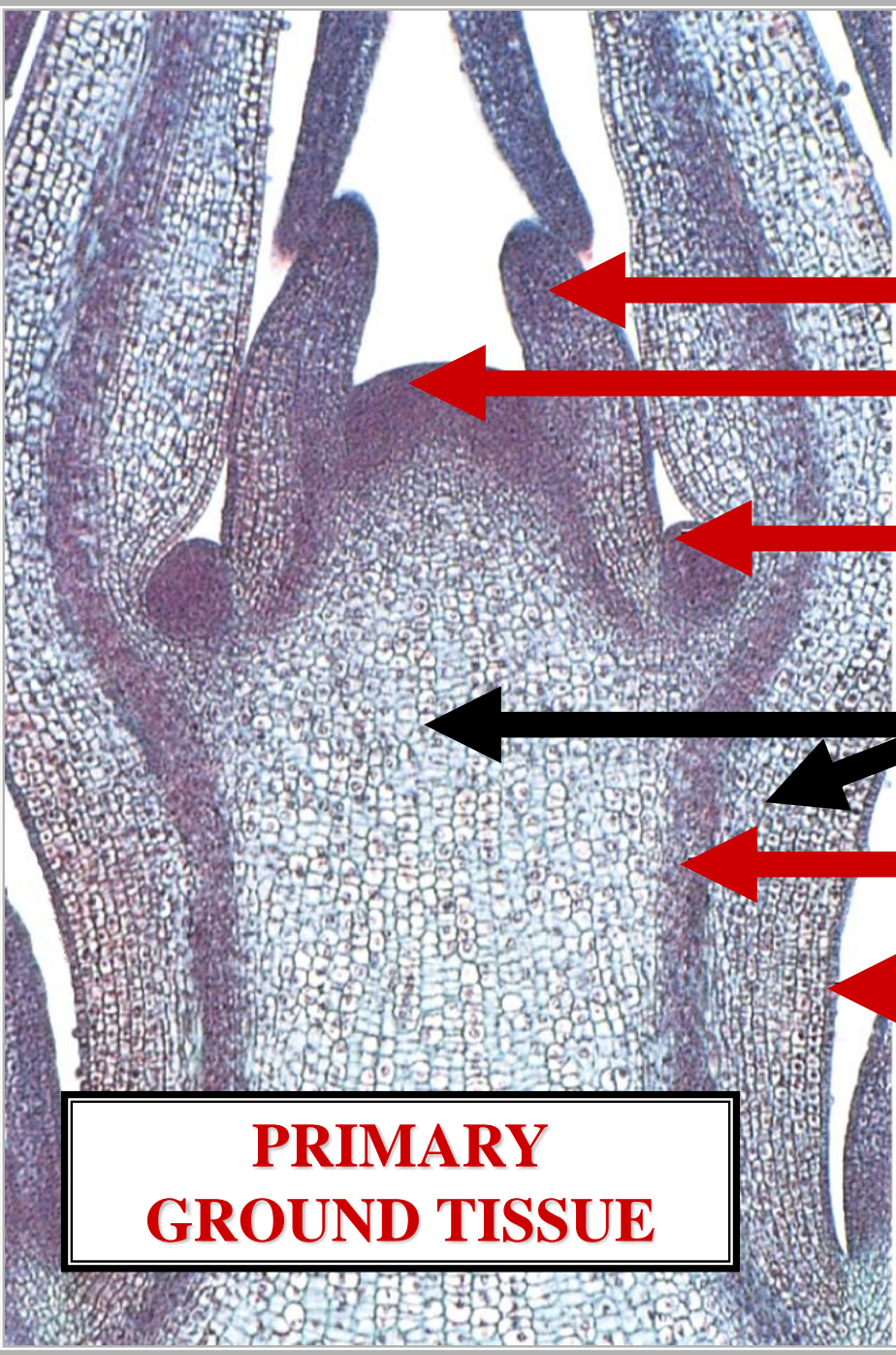
**GROUND  
~1 MERISTEM**

**STEM**

**L.S.**



# ANGIOSPERM PRIMARY MERISTEMS



[Empty box]

**APICAL  
MERISTEM**

[Empty box]

**~1 GROUND TISSUES**

[Empty box]

[Empty box]

**PRIMARY  
GROUND TISSUE**

**STEM**

**L.S.**

# GROUND TISSUE TYPES

# **GROUND TISSUE TYPES**

**PARENCHYMA TISSUE**

# **GROUND TISSUE TYPES**



# **GROUND TISSUE TYPES**

**PARENCHYMA TISSUE**

**COLLENCHYMA TISSUE**

# **GROUND TISSUE TYPES**

# **GROUND TISSUE TYPES**



**PARENCHYMA TISSUE**  
**COLLENCHYMA TISSUE**  
**SCLERENCHYMA TISSUE**

**GROUND TISSUE  
TYPES**



# **PARENCHYMA TISSUE**

# PARENCHYMA CELLS

# **PARENCHYMA CELL**

# **PARENCHYMA CELL**



**BASIC PLANT CELL**

**PARENCHYMA  
CELL**

# **PARENCHYMA CELL**



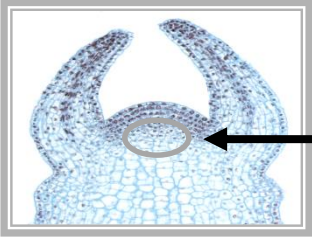
**BASIC PLANT CELL**

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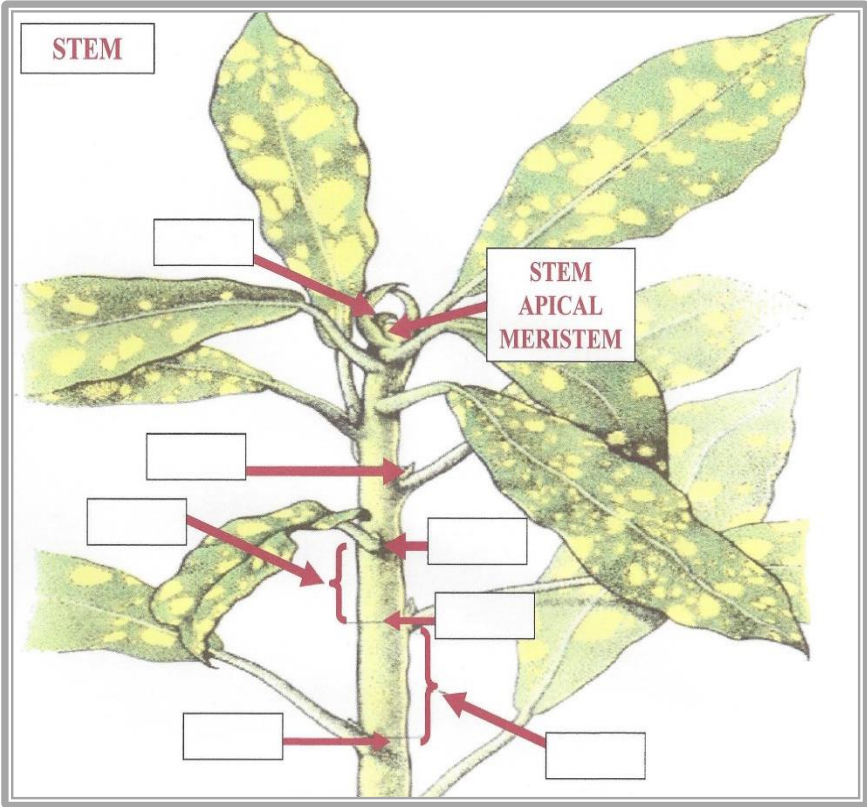
**ALL PLANT CELLS INITIALLY  
PARENCHYMA CELLS**

# **PARENCHYMA CELL**

# STEM APICAL MERISTEM

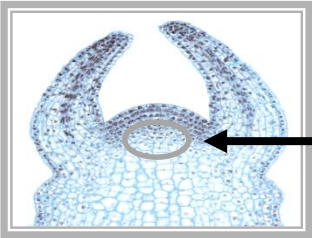


STEM APICAL MERISTEM

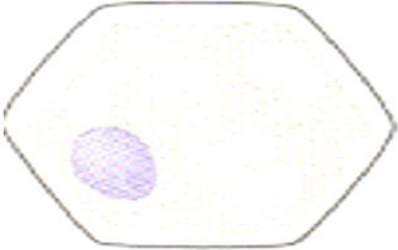




# STEM APICAL MERISTEM

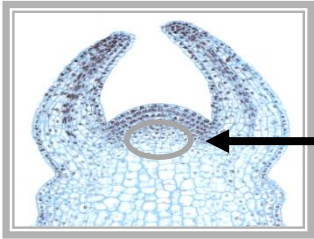


STEM APICAL MERISTEM

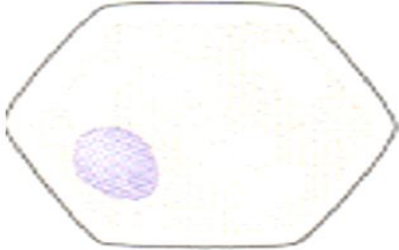


MERISTEM CELL INITIAL

**STEM APICAL  
MERISTEM**



**STEM APICAL MERISTEM**

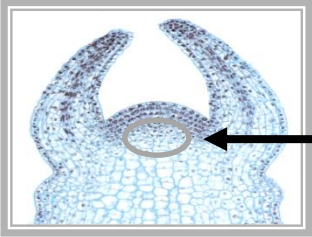


**MERISTEM CELL INITIAL**

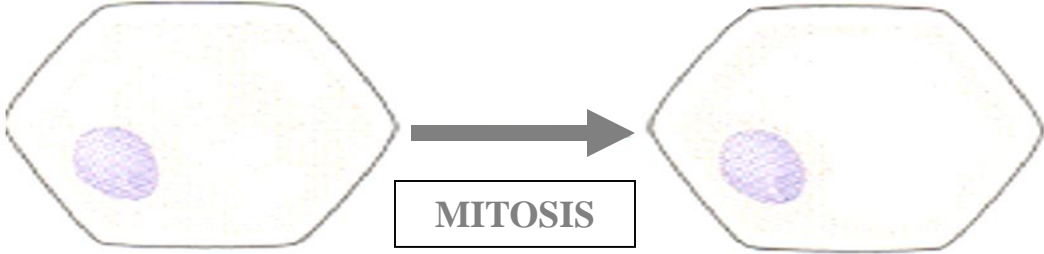
**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**

**STEM APICAL  
MERISTEM**



**STEM APICAL MERISTEM**



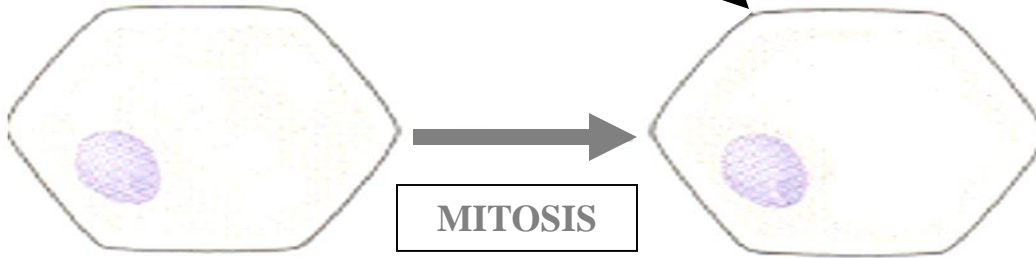
**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**

**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**



**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

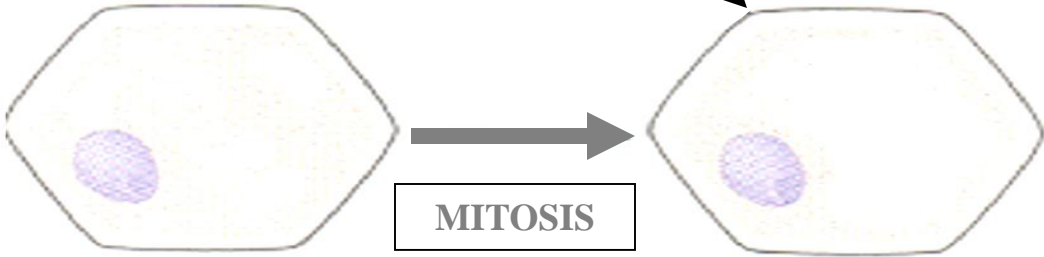
**PARENCHYMA  
BASIC  
PLANT CELL**



**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**

**PARENCHYMA CELL**



**MITOSIS**

**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**



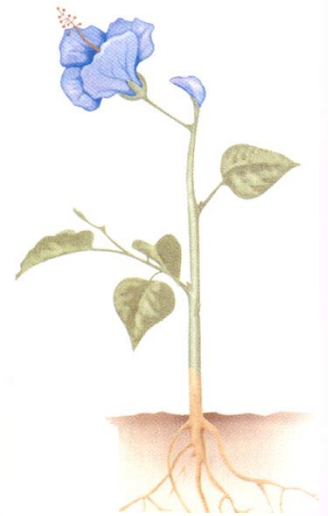
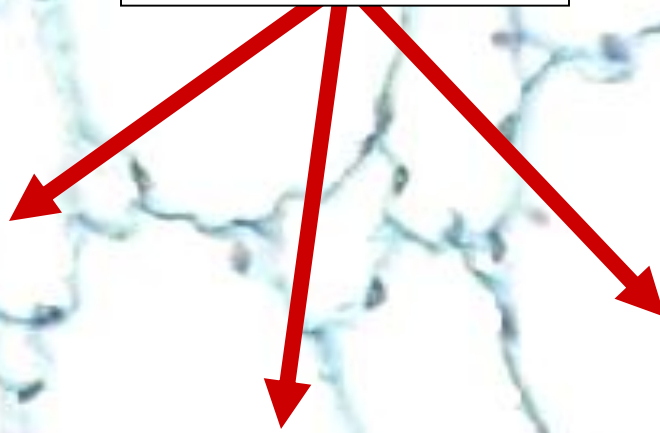
# PARENCHYMA CELL CHARACTERS

**C.S.**

**STEM**

**L**

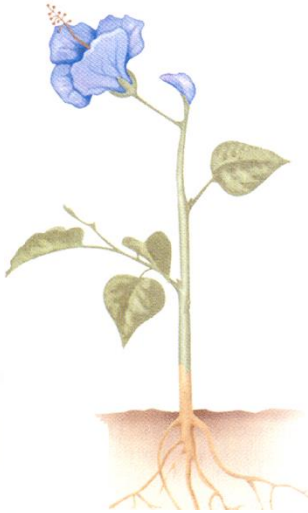
**PARENCHYMA  
CELLS**



C.S.

STEM

PARENCHYMA  
LIVING  
FUNCTIONAL  
CELL



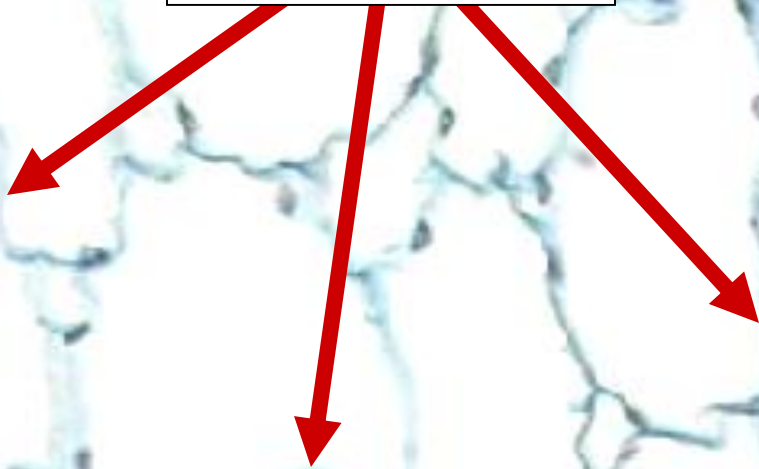


**T**

**C.S.**

**STEM**

**PARENCHYMA  
~1 CELL WALL  
ONLY**

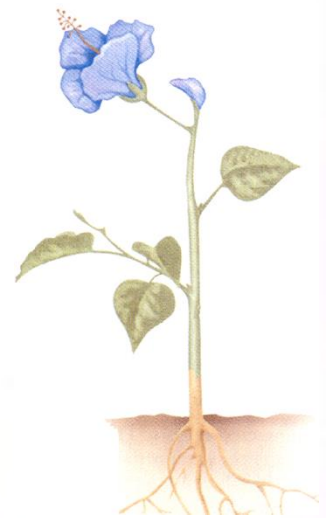
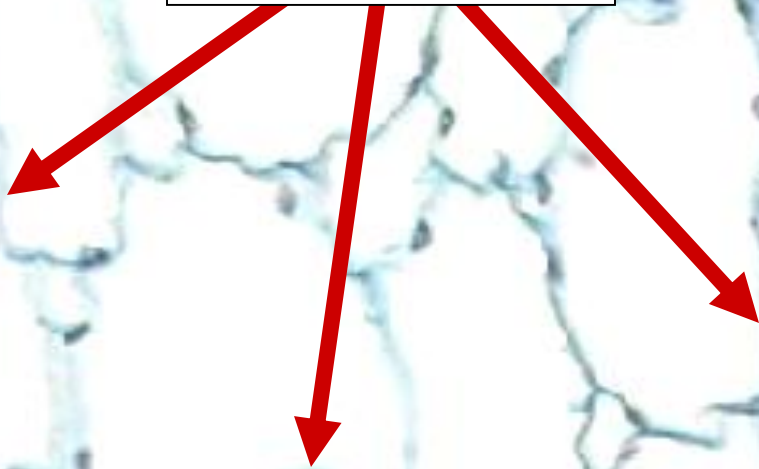


**C.S.**

**STEM**

**L**

**PARENCHYMA  
~1 CELL WALL  
THIN**

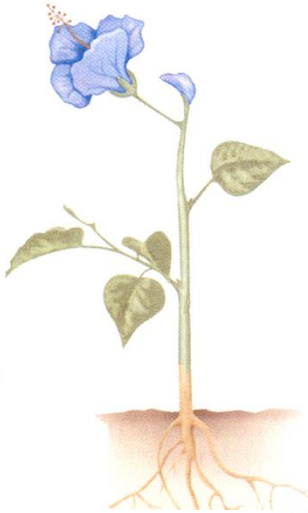
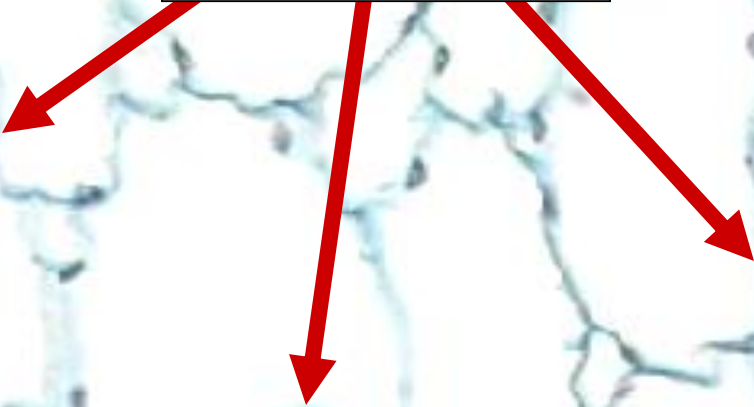




**C.S.**

**STEM**

**PARENCHYMA  
~1 CELL WALL  
LOW PECTIN  
CONTENT**



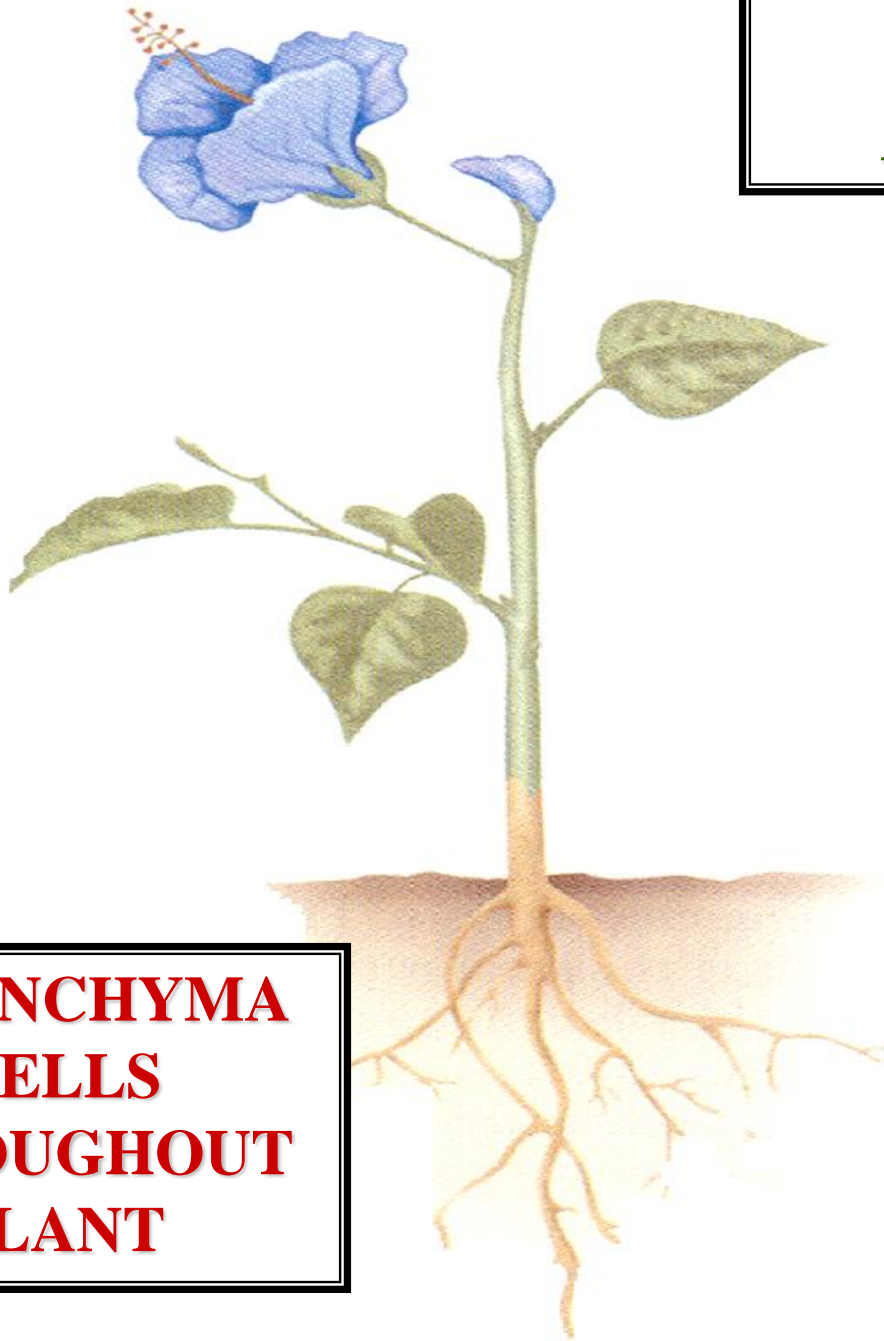


# **PARENCHYMA CELL DISTRIBUTION**

# TYPICAL ANGIOSPERM

L

**PARENCHYMA  
CELLS  
THROUGHOUT  
PLANT**

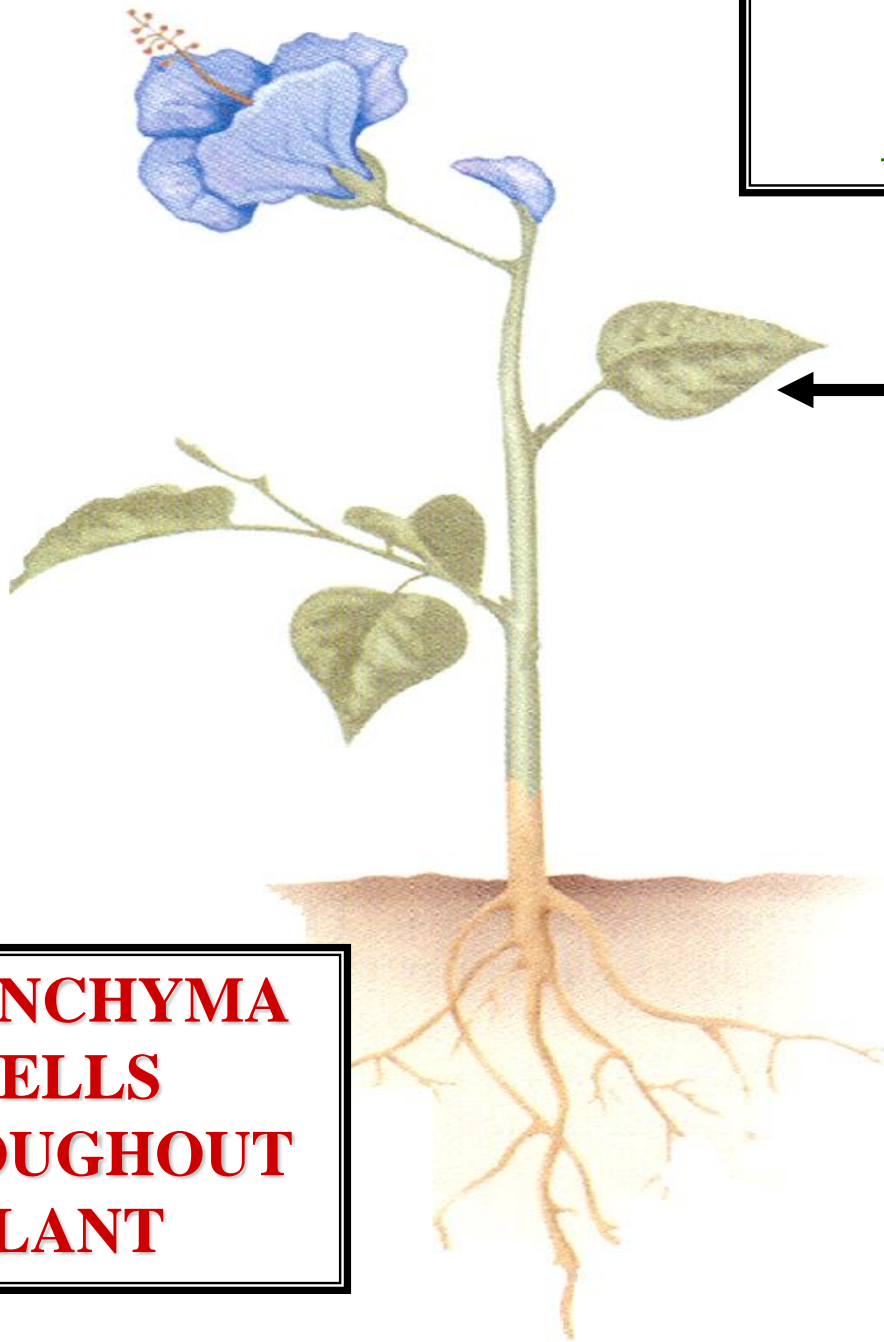


**TYPICAL  
ANGIOSPERM**

**S**

**LEAF**

**PARENCHYMA  
CELLS  
THROUGHOUT  
PLANT**



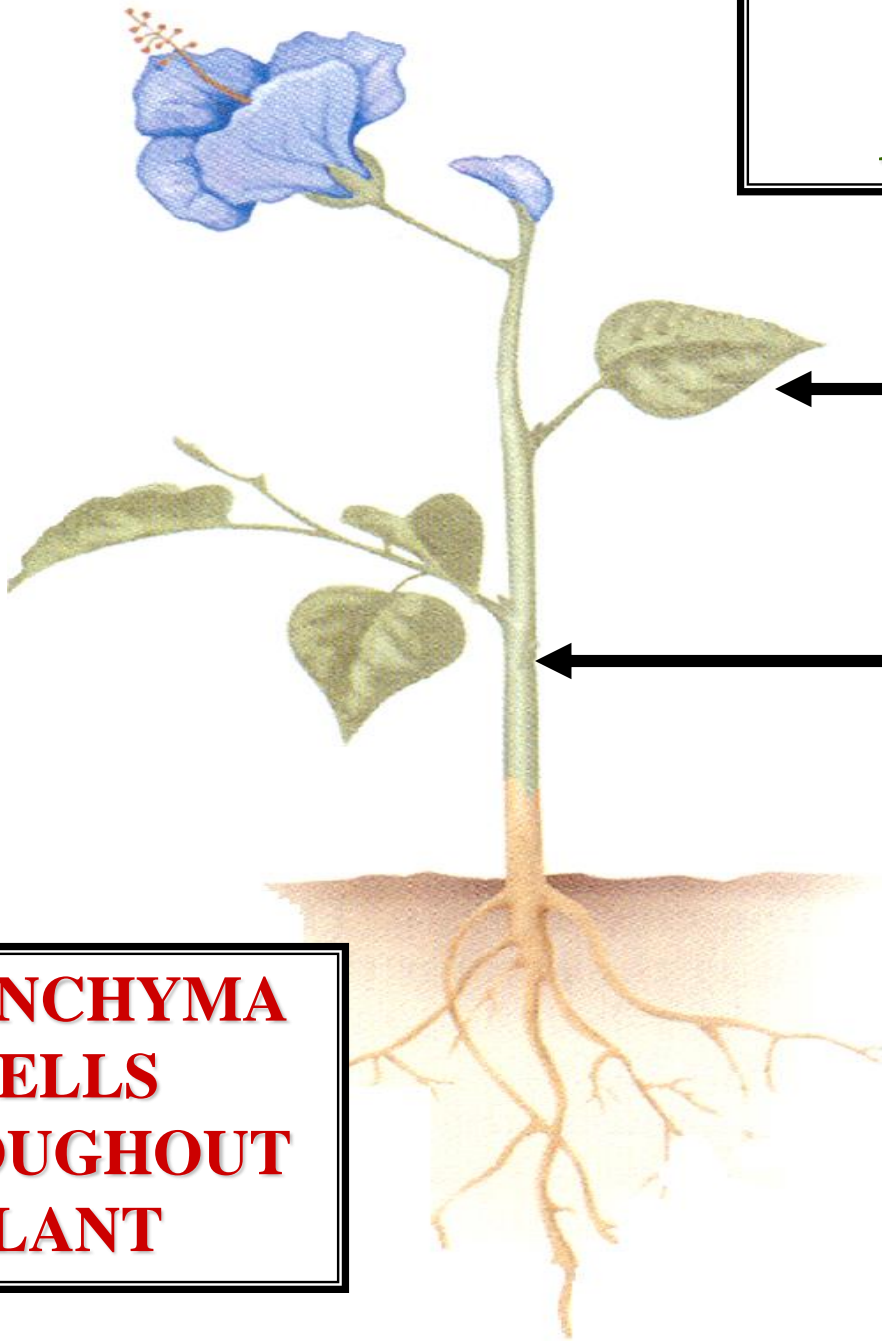
# TYPICAL ANGIOSPERM

R

← **LEAF**

← **STEM**

**PARENCHYMA  
CELLS  
THROUGHOUT  
PLANT**



# TYPICAL ANGIOSPERM

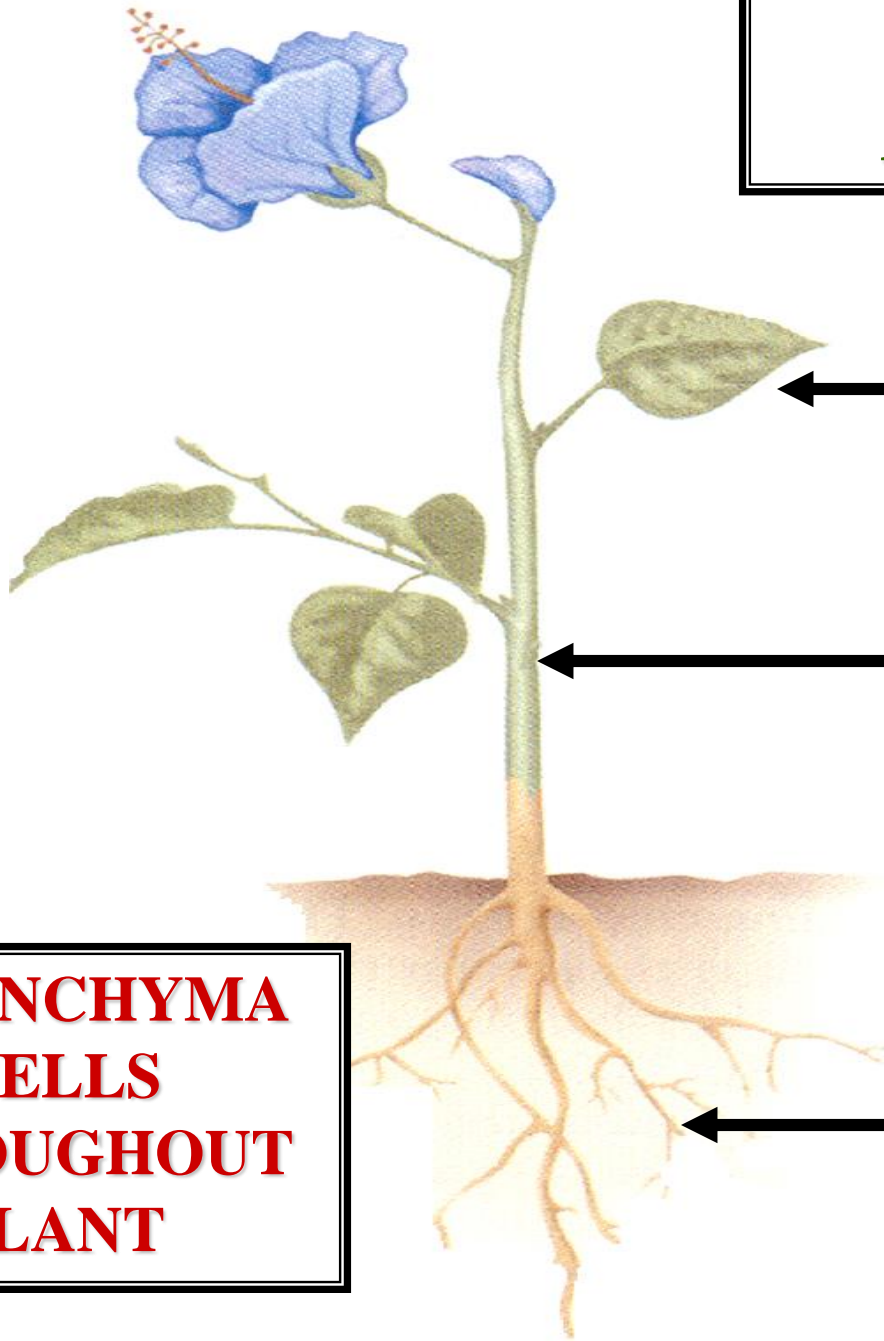


**LEAF**

**STEM**

**ROOT**

**PARENCHYMA  
CELLS  
THROUGHOUT  
PLANT**





# PARENCHYMA CELL FUNCTION



# **PARENCHYMA CELLS**

# **PHOTOSYNTHESIS**

# MAPLE LEAF



**PHOTOSYNTHESIS  
TISSUE**

**CHLOROPLASTS**

**PHOTOSYNTHESIS**

**LEAF**

**C.S.**



**PC**

**MESOPHYLL  
TISSUE**

**CHLOROPLASTS**

**PHOTOSYNTHESIS**

**LEAF**

**C.S.**



^

P

**MESOPHYLL  
PARENCHYMA  
CELLS**

**CHLOROPLASTS**

**PHOTOSYNTHESIS**

**LEAF**

**C.S.**





# **PARENCHYMA CELLS STORAGE**

# MAPLE LEAF





# PHOTOSYNTHESIS

G



WATER

CO<sub>2</sub>

**LIGHT ENERGY**

**PHOTO**

ATMOSPHERE

E-

PHOTOLYSIS



LT RXT

THYLAKOID

CHEMICAL ENERGY

DK RXT

STROMA

CHLOROPLAST

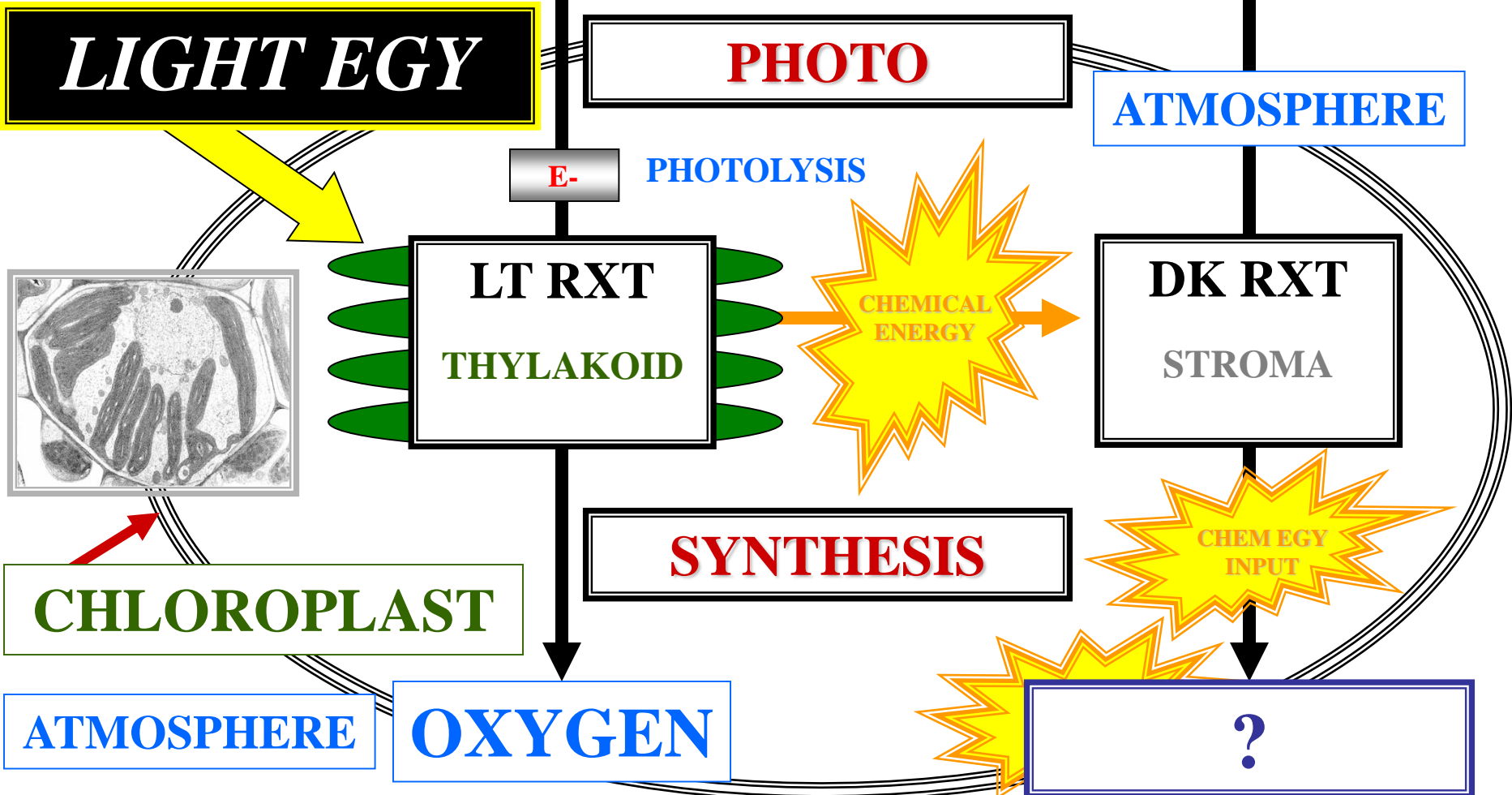
**SYNTHESIS**

CHEMICAL ENERGY INPUT

ATMOSPHERE

OXYGEN

?



# PHOTOSYNTHESIS

S



WATER

CO<sub>2</sub>

**LIGHT ENERGY**

**PHOTO**

ATMOSPHERE

E-

PHOTOLYSIS



LT RXT

THYLAKOID

CHEMICAL ENERGY

DK RXT

STROMA

CHLOROPLAST

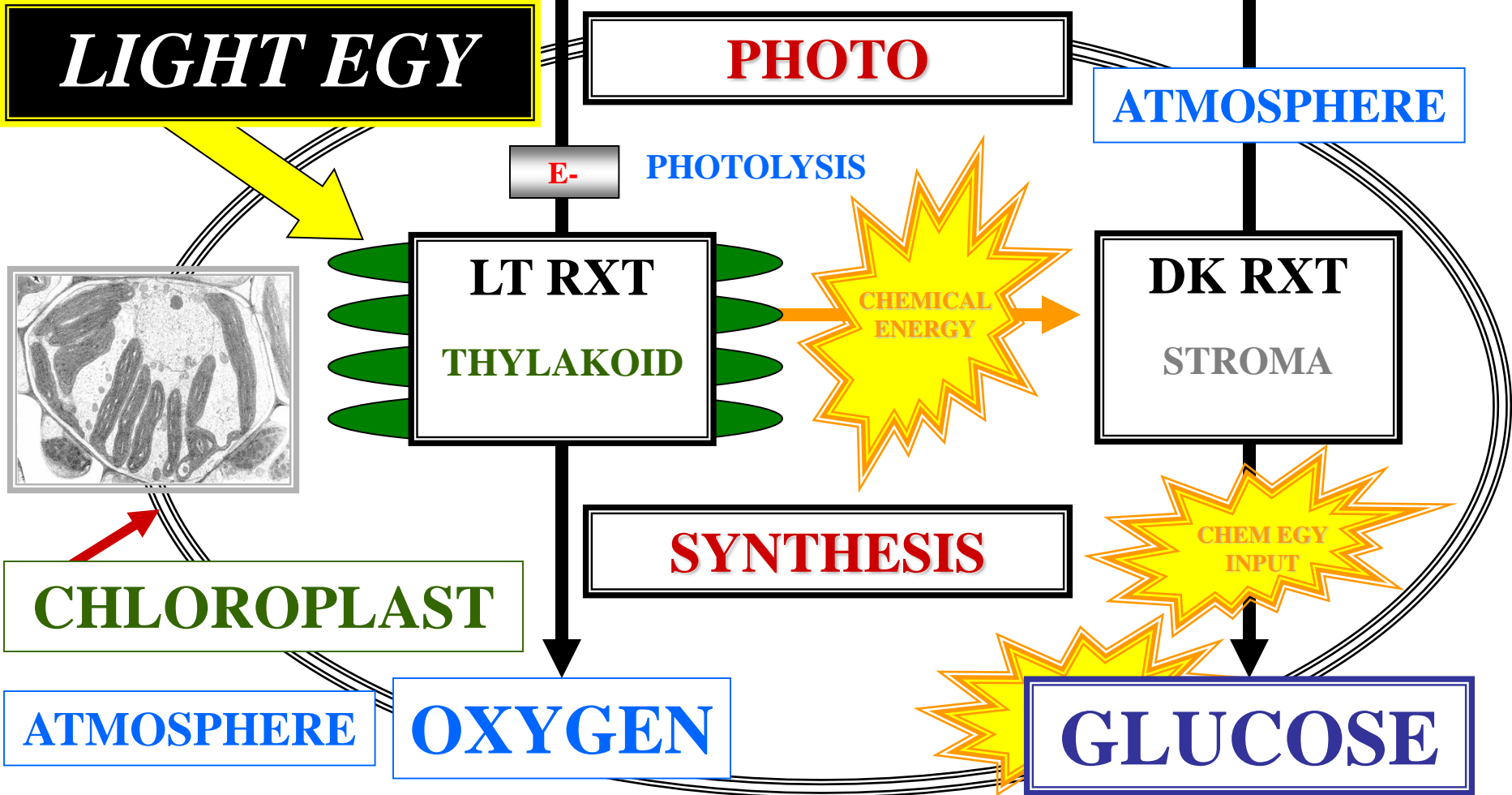
**SYNTHESIS**

CHEMICAL ENERGY INPUT

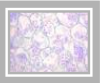
ATMOSPHERE

OXYGEN

GLUCOSE



# PHOTOSYNTHESIS



PC

WATER

CO<sub>2</sub>

**LIGHT ENERGY**

**PHOTO**

ATMOSPHERE

E-

PHOTOLYSIS



LT RXT  
THYLAKOID

CHEMICAL ENERGY

DK RXT  
STROMA

CHLOROPLAST

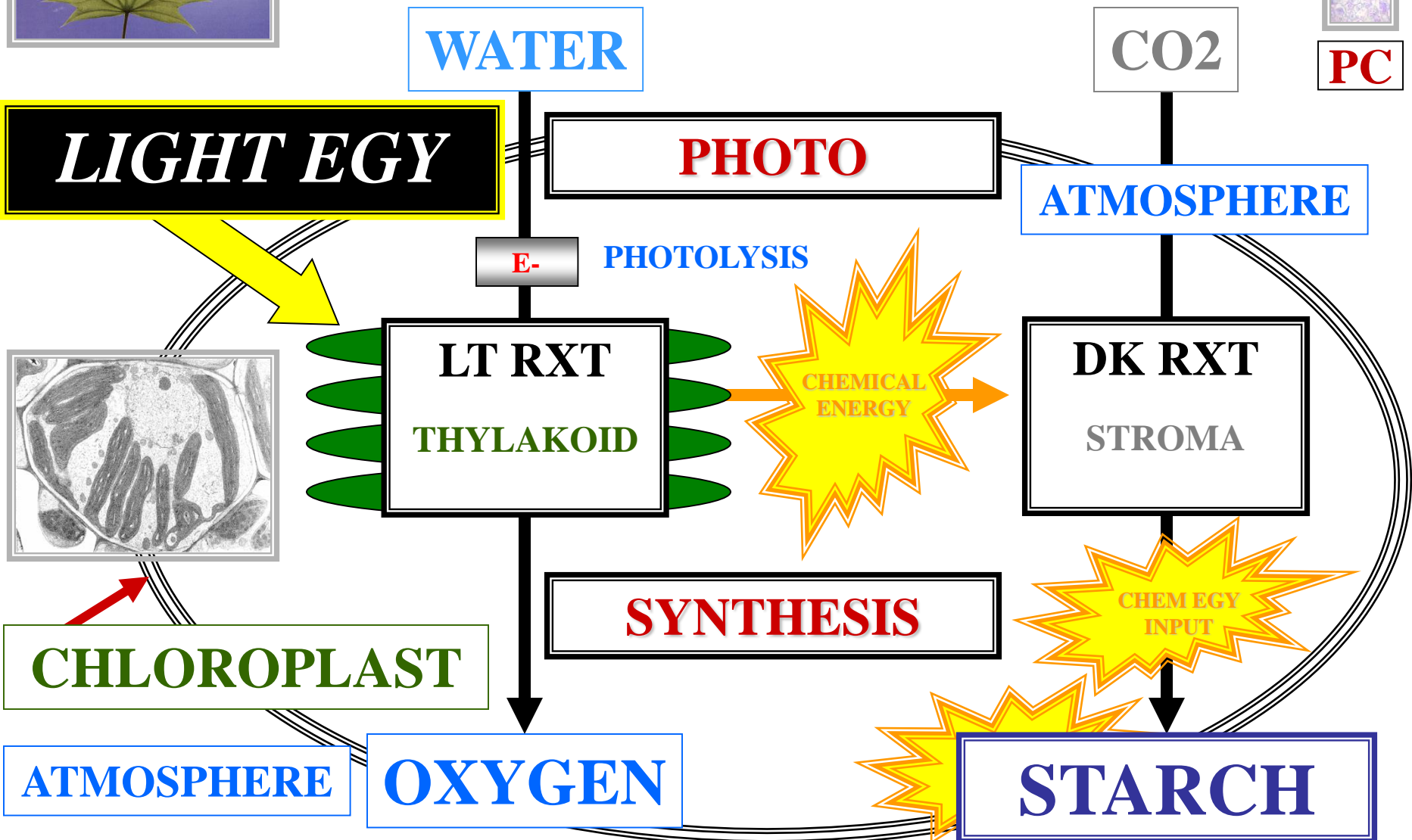
**SYNTHESIS**

CHEMICAL ENERGY INPUT

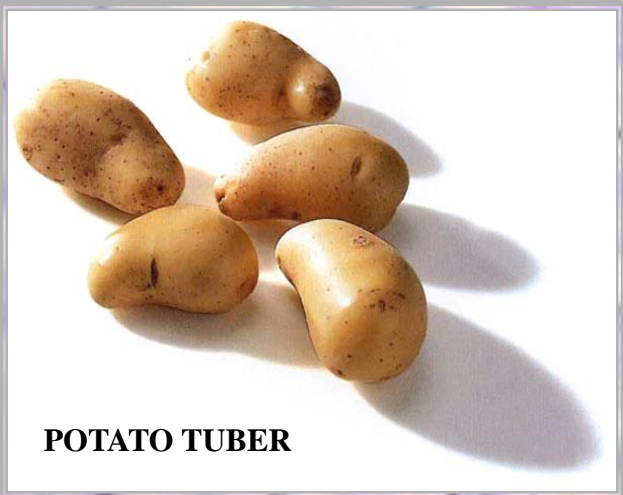
ATMOSPHERE

OXYGEN

STARCH

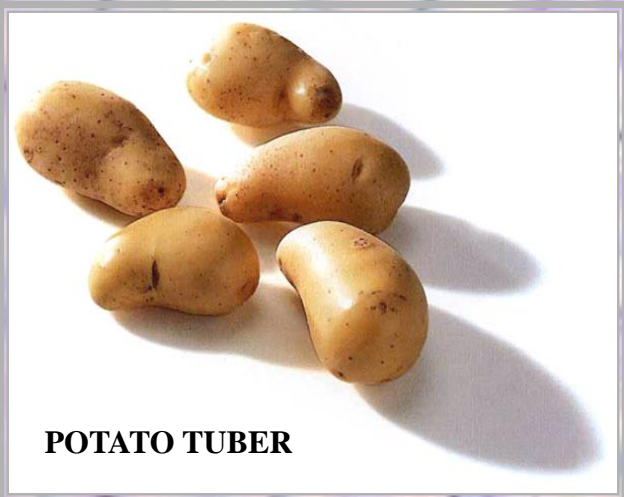


**PARENCHYMA  
CELLS**



**C.S.**

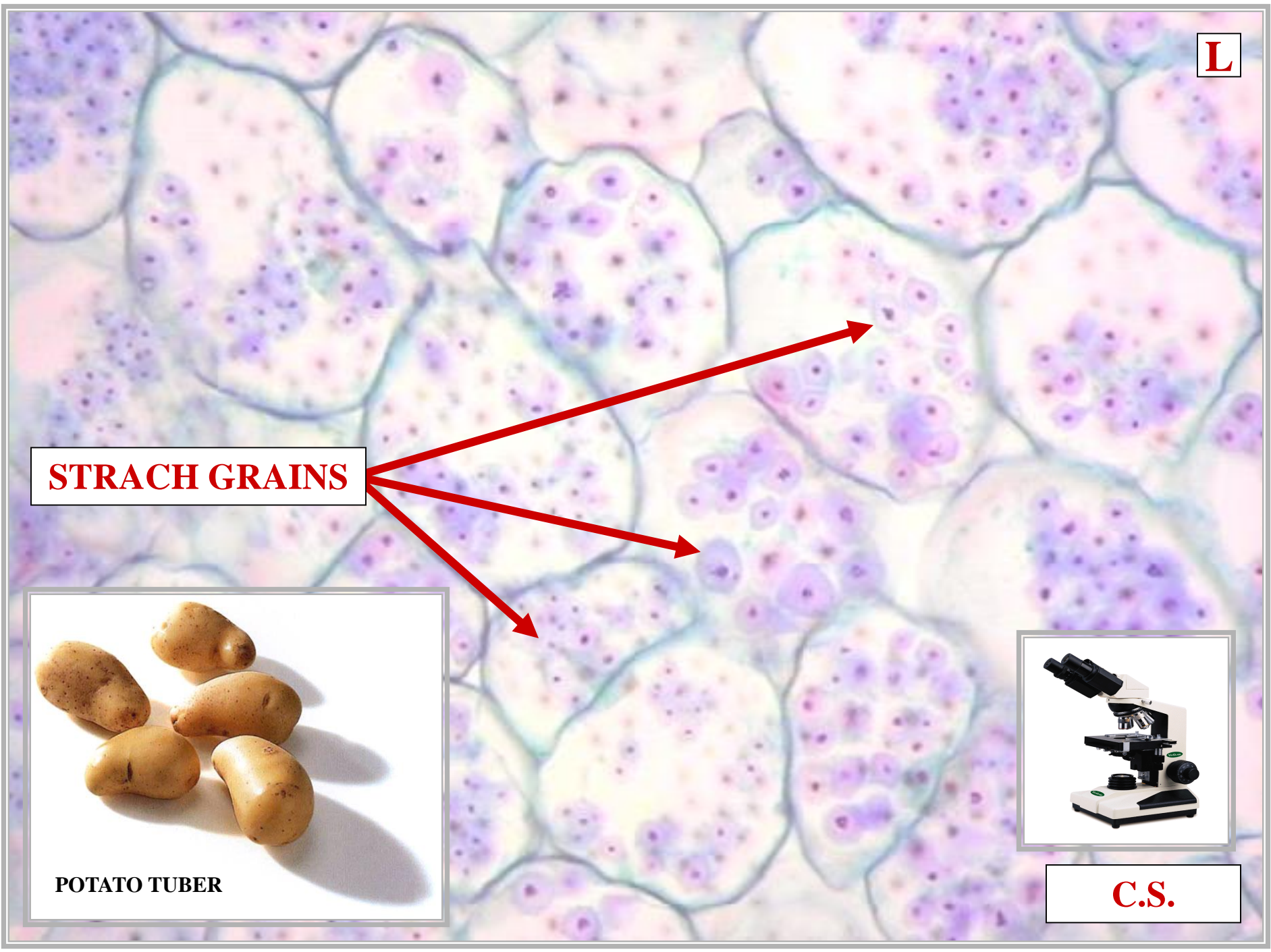
**STRACH GRAINS**



**POTATO TUBER**

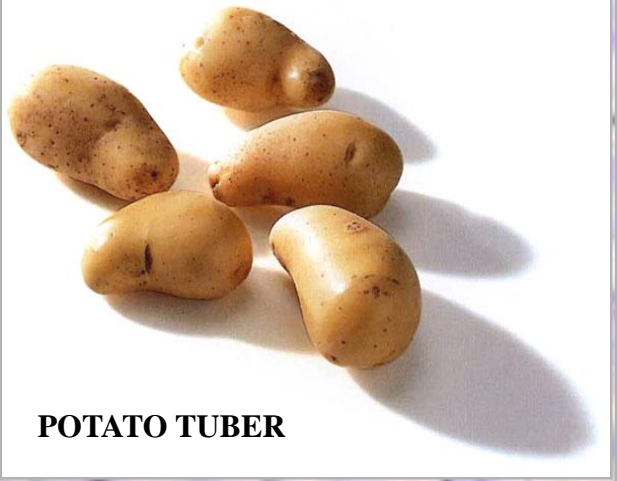


**C.S.**



**SS**

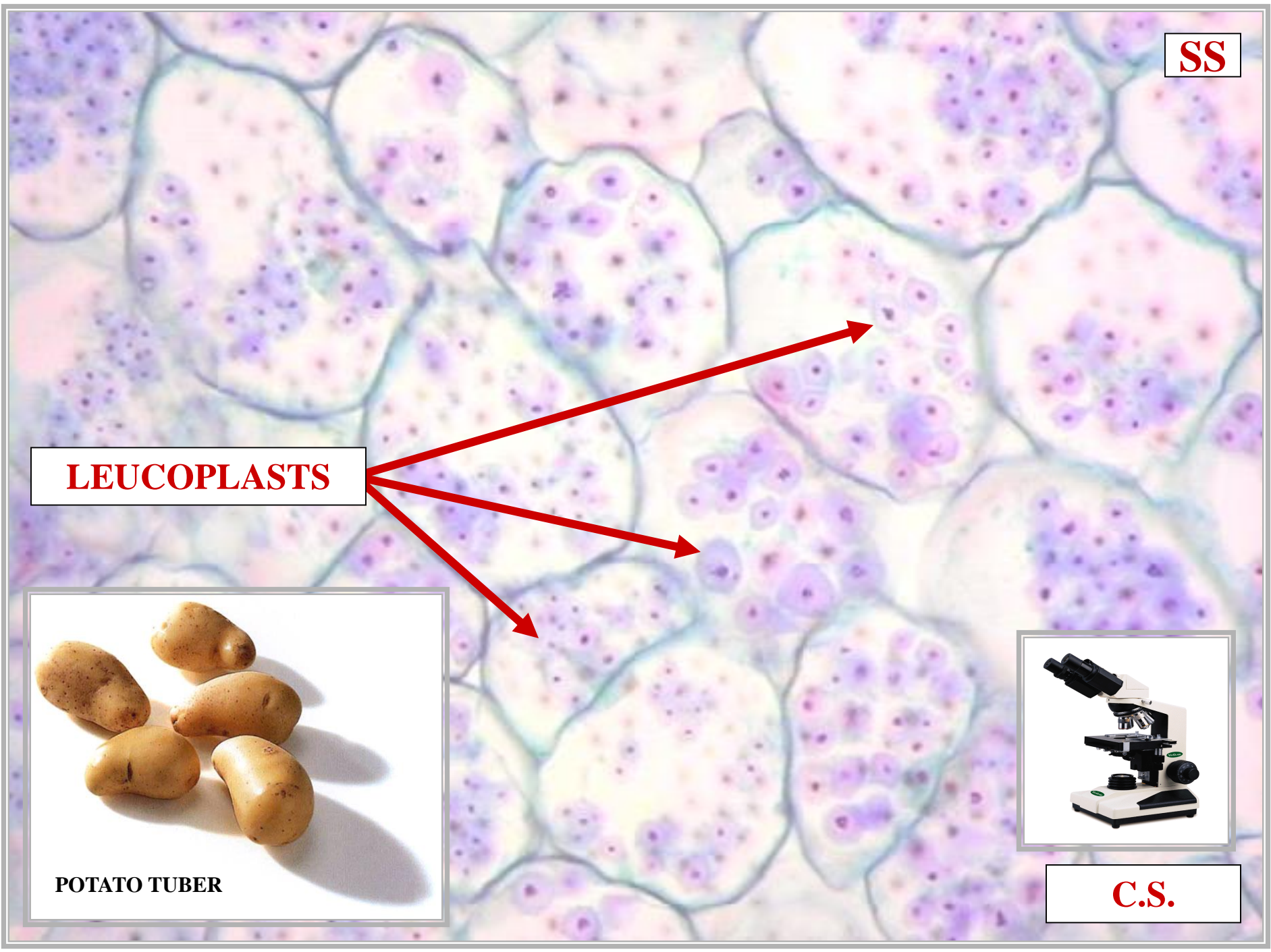
**LEUCOPLASTS**



**POTATO TUBER**

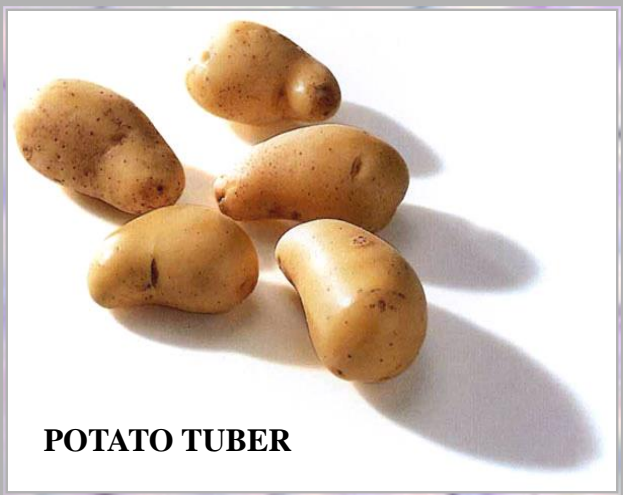


**C.S.**



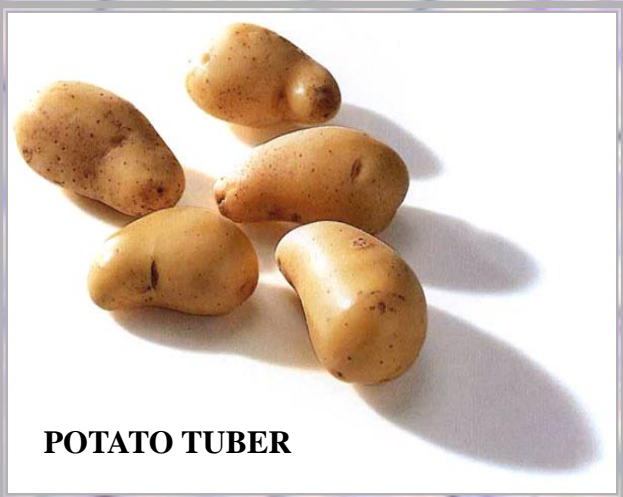
**PC**

**LEUCOPLASTS  
STORE STARCH**



**C.S.**

**PARENCHYMA  
CELLS  
STORE STARCH**



**C.S.**

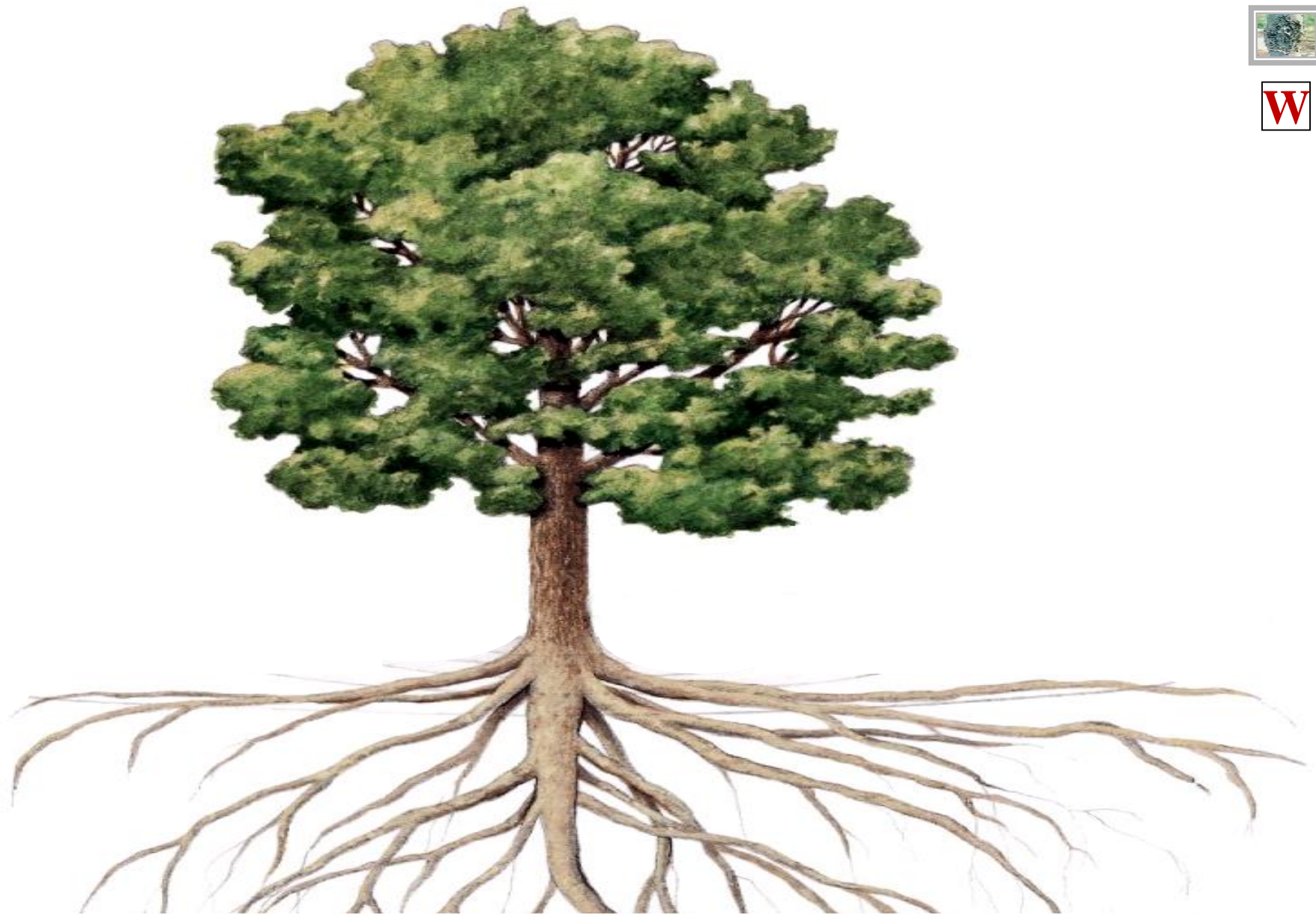




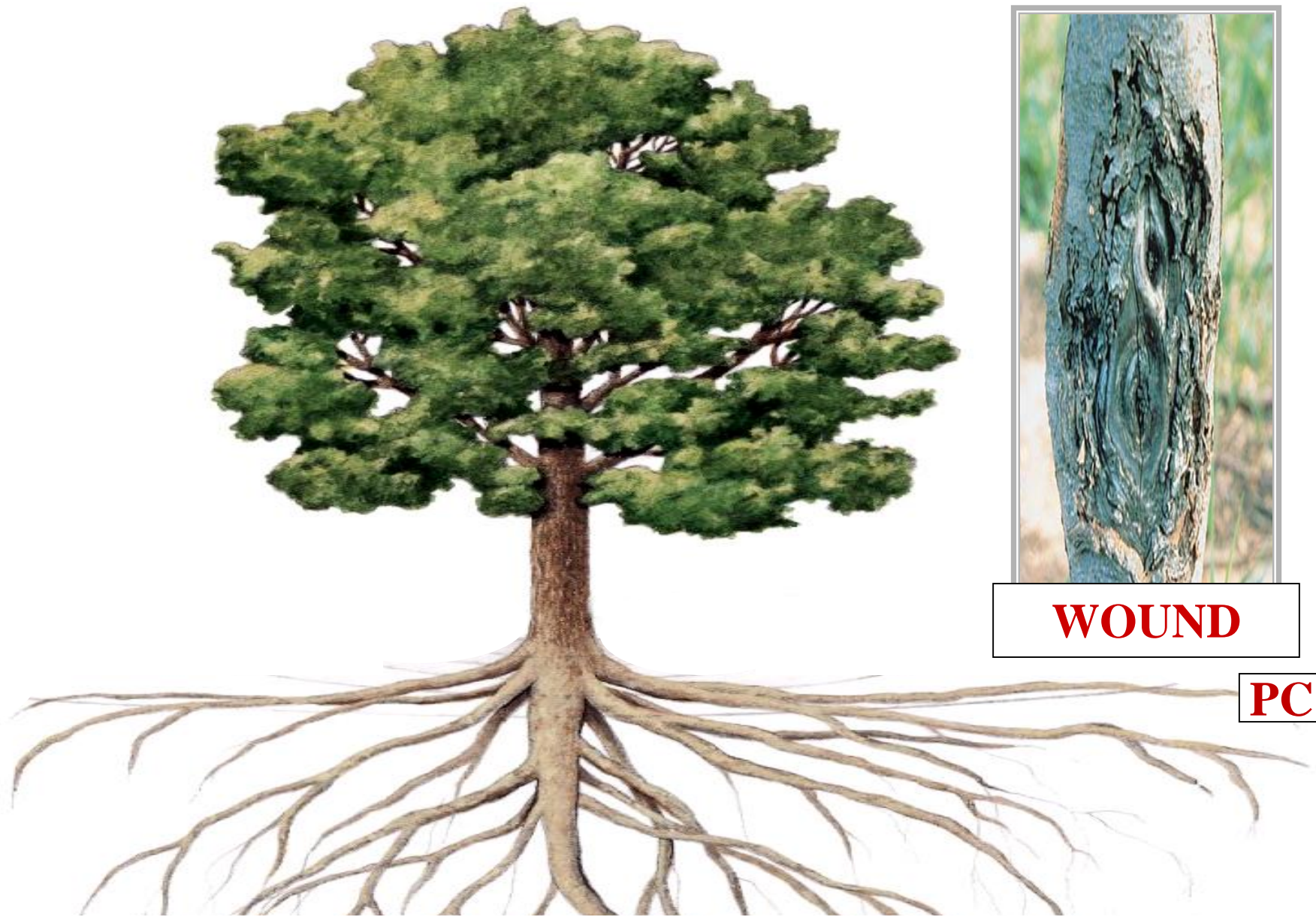
# **PARENCHYMA CELLS HEAL WOUNDS**



W



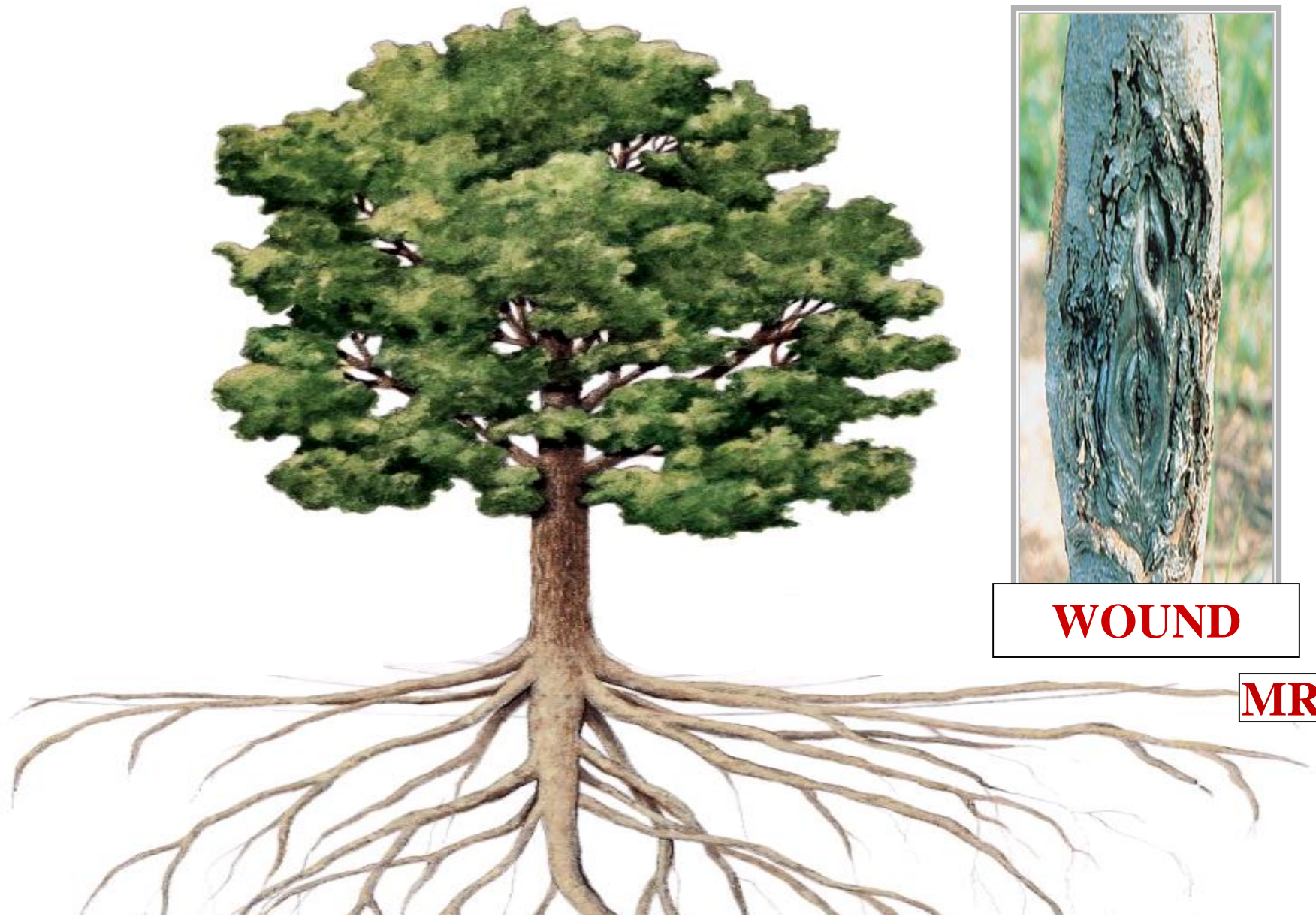
**WOODY PLANT**



**WOUND**

**PC**

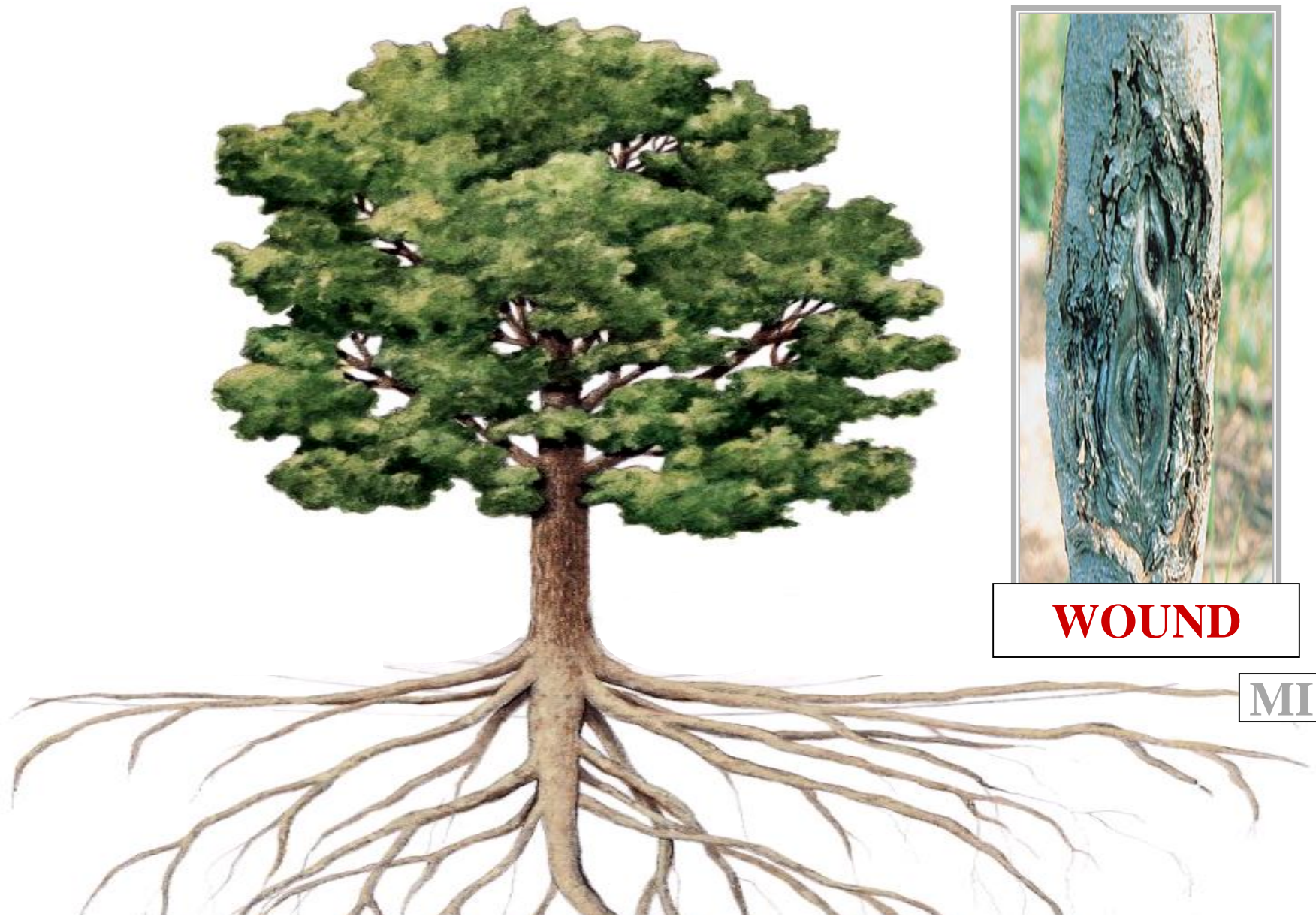
**WOODY PLANT**



**WOUND**

**MR**

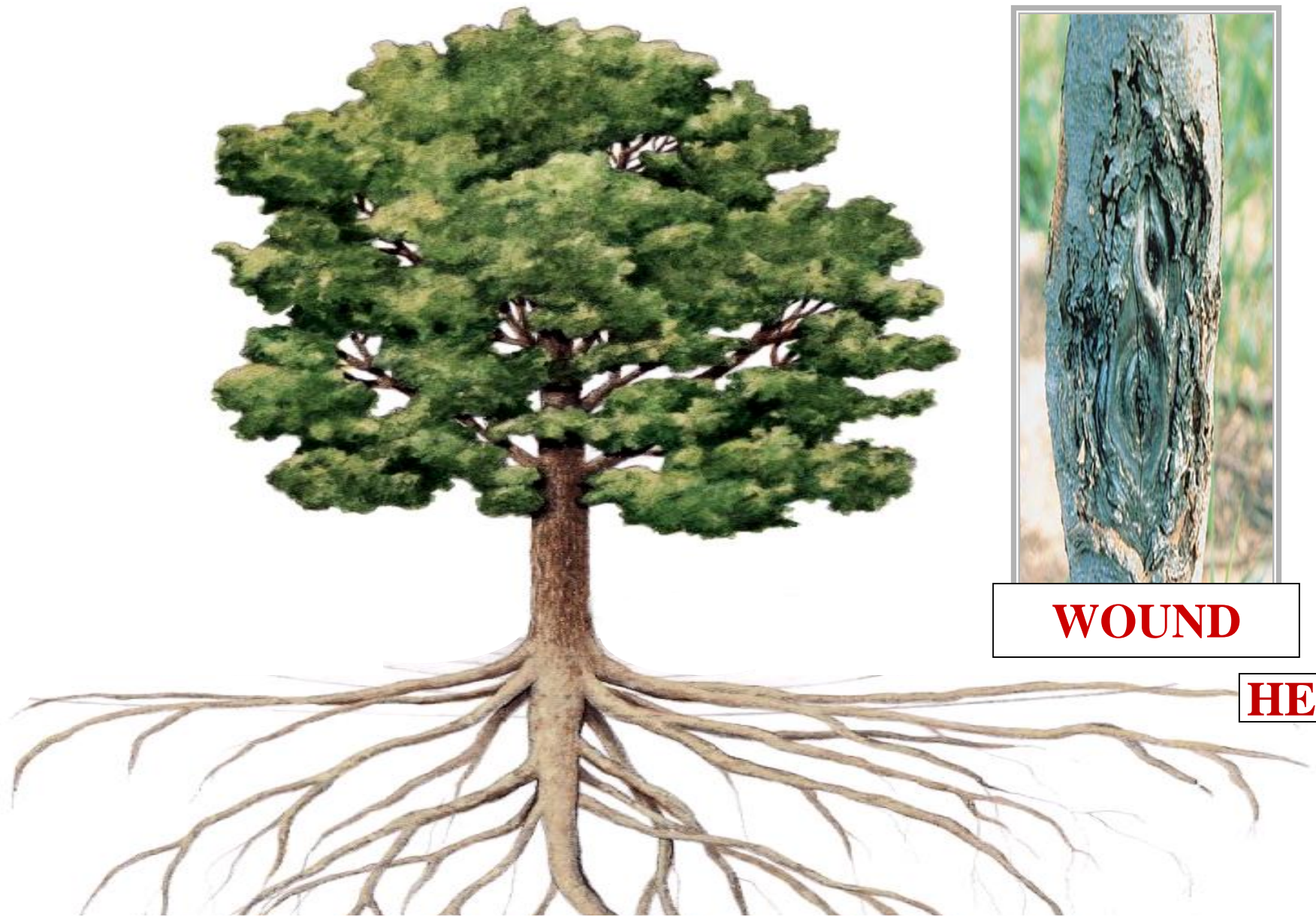
**PARENCHYMA CELLS DISTRIBUTED THROUGHOUT PLANT**



**WOUND**

MI

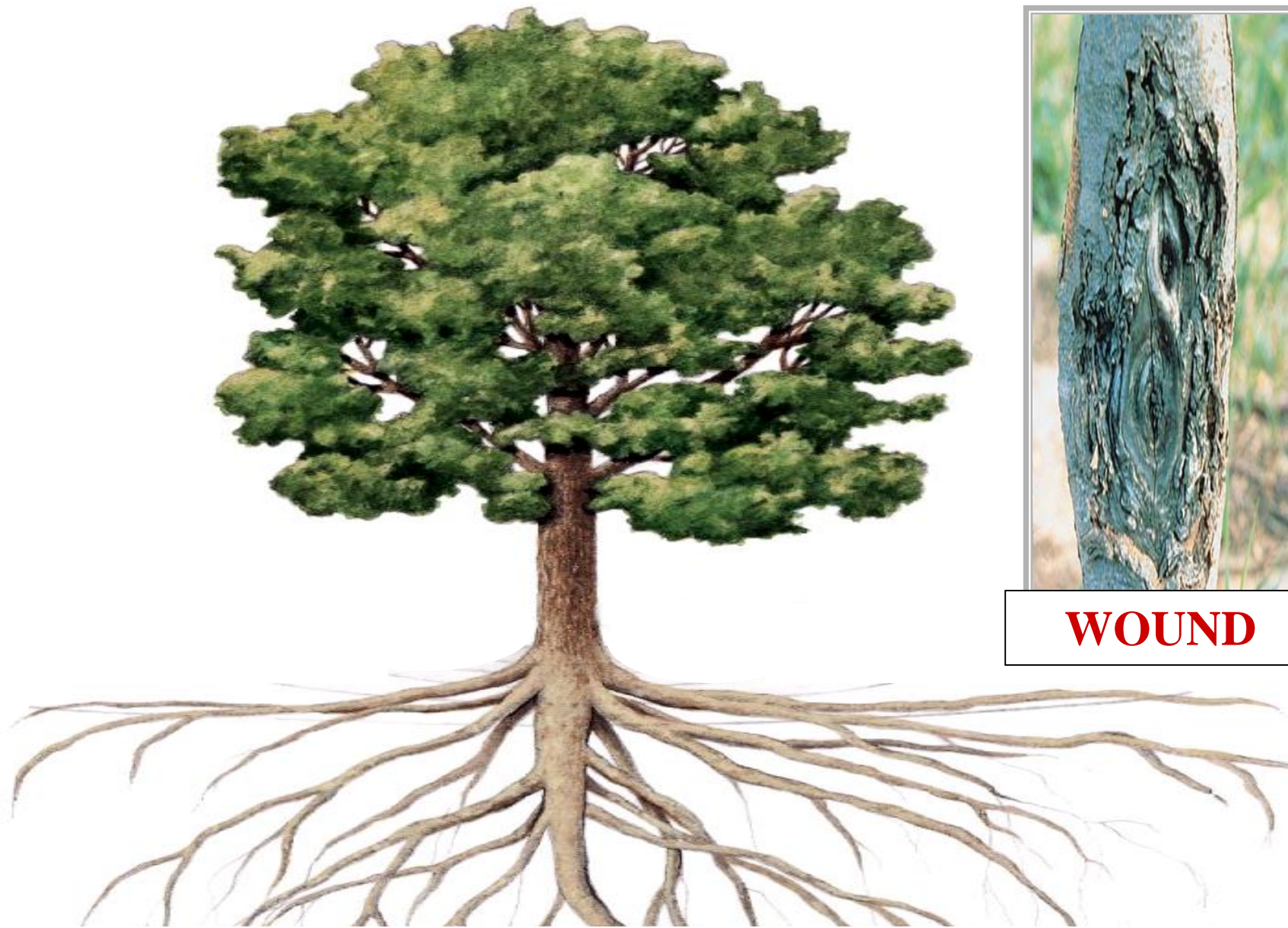
**PARENCHYMA CELLS POTENTIALLY MERISTEMATIC**



**WOUND**

**HE**

**PARENCHYMA CELLS DIVIDE VIA MITOSIS**



**WOUND**

^

T

**PARENCHYMA CELLS HEAL PLANT WOUNDS**



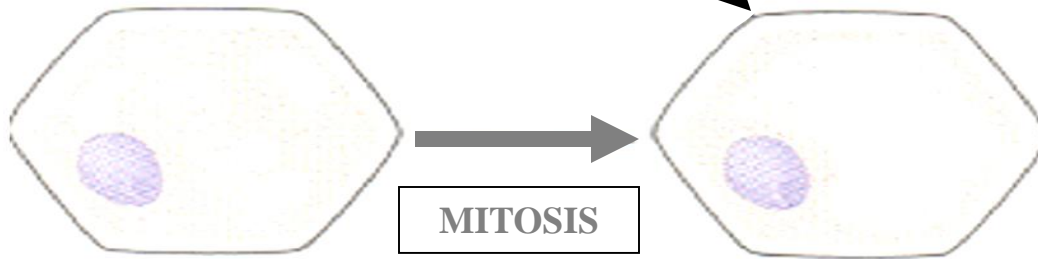
**PARENCHYMA**  
**CELLS**  
**TOTIPO TENT**



**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**

**PARENCHYMA CELL**



**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

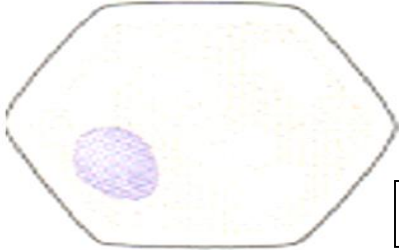
**PARENCHYMA  
CELL  
TOTIPOTENT**



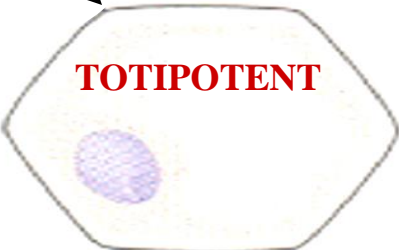
**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**

**PARENCHYMA CELL**



**MITOSIS**

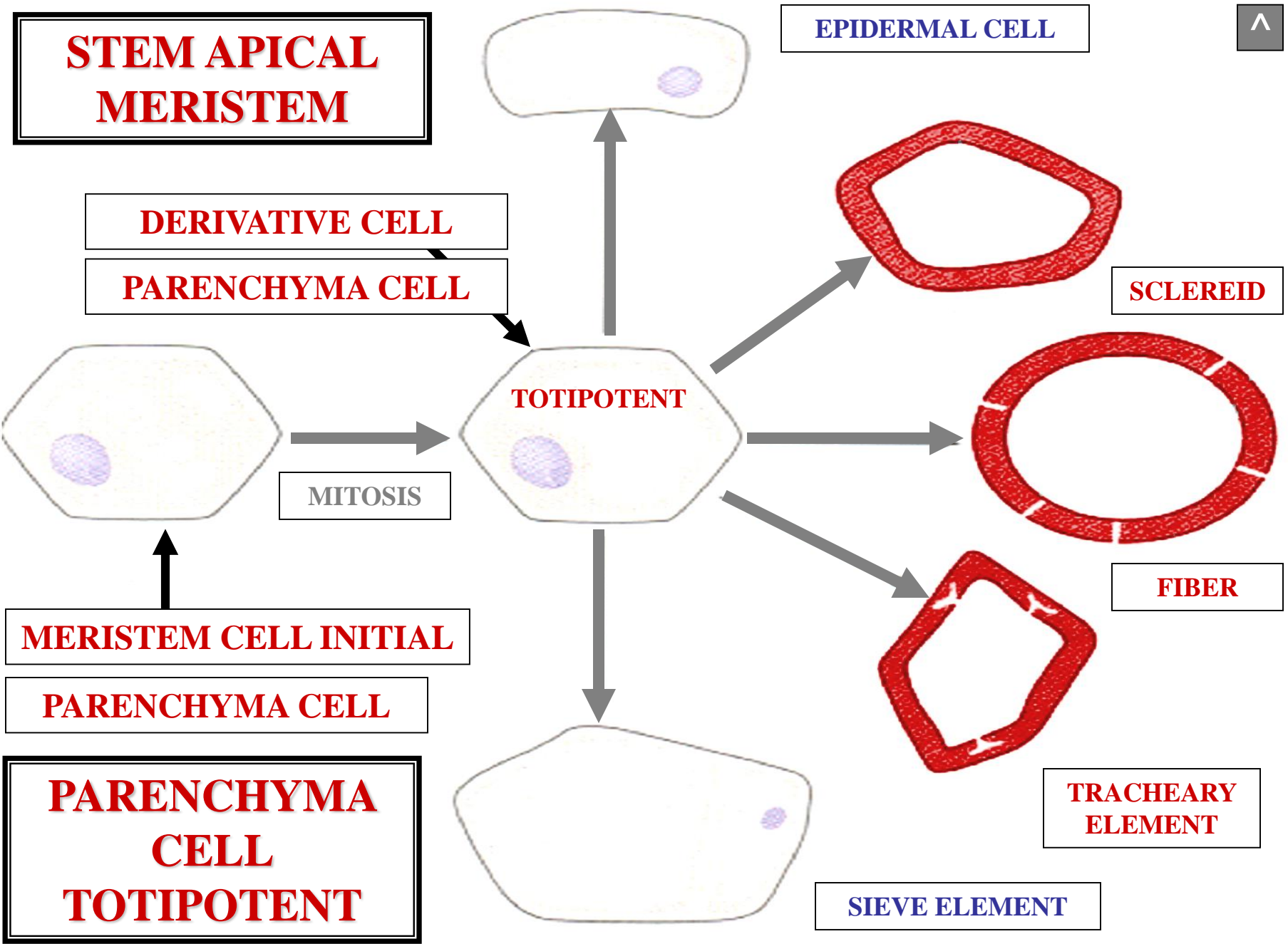


**PARENCHYMA CELL  
CAN POTENTIALLY  
DIFFERENTIATE  
INTO ANY PLANT CELL TYPE**

**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

**PARENCHYMA  
CELL  
TOTIPOTENT**



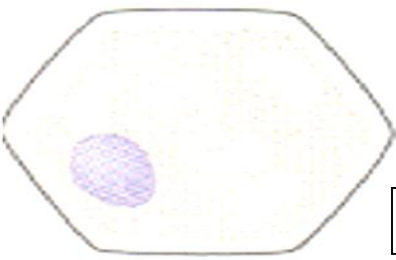
**STEM APICAL MERISTEM**

**EPIDERMAL CELL**

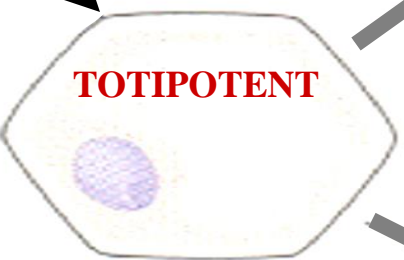


**DERIVATIVE CELL**

**PARENCHYMA CELL**



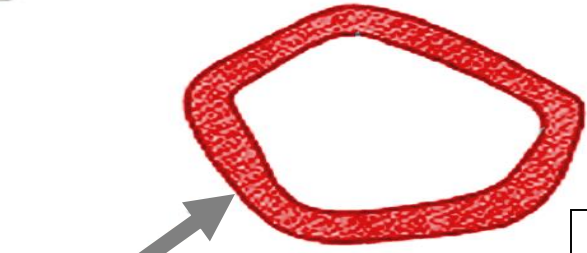
**MITOSIS**



**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

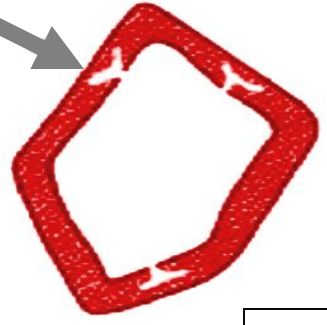
**PARENCHYMA CELL TOTIPOTENT**



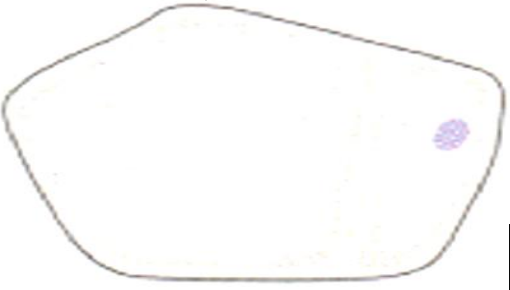
**SCLEREID**



**FIBER**



**TRACHEARY ELEMENT**



**SIEVE ELEMENT**

# PARENCHYMA TISSUE

# **PARENCHYMA TISSUE**

# **PARENCHYMA TISSUE**



**PARENCHYMA CELL  
AGGREGATE**

**PARENCHYMA  
TISSUE**

# PARENCHYMA TISSUE TYPES

# **PARENCHYMA TISSUE TYPES**

**CORTEX**

# **PARENCHYMA TISSUE TYPES**



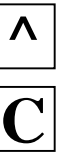
# **PARENCHYMA TISSUE TYPES**

**CORTEX**

**PITH**

# **PARENCHYMA TISSUE TYPES**

# PARENCHYMA TISSUE TYPES



CORTEX

PITH

MESOPHYLL

# PARENCHYMA TISSUE TYPES

CORTEX

**PARENCHYMA**

**TISSUE**

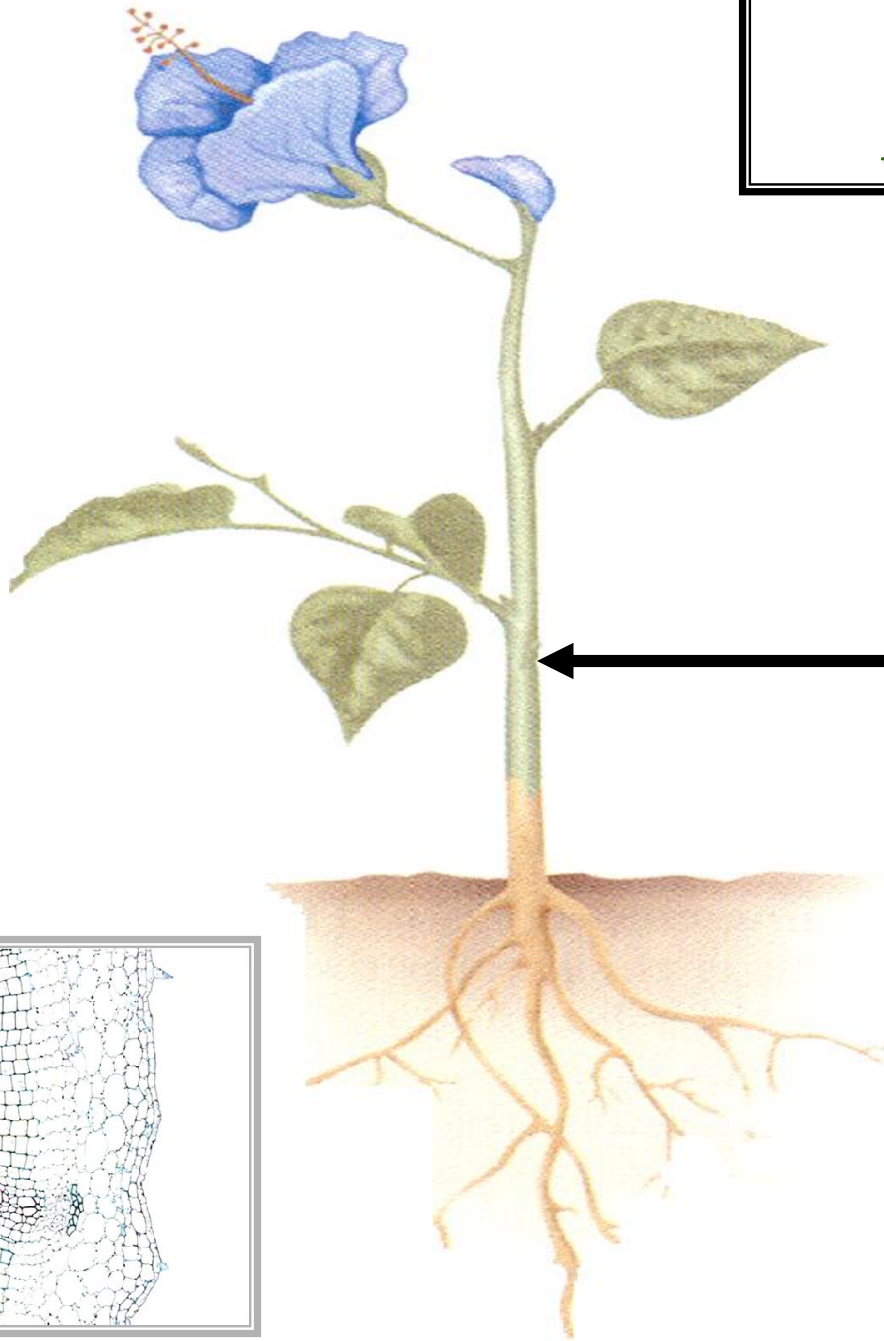
# **PARENCHYMA TISSUE CORTEX**



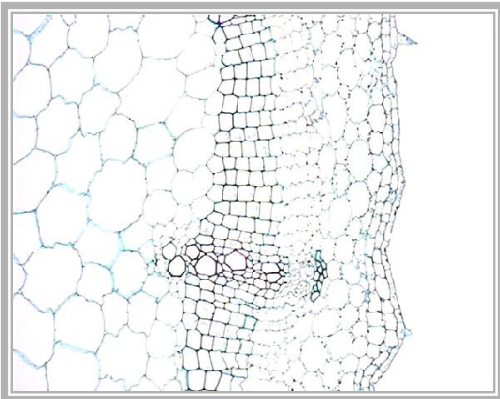
**TISSUE BETWEEN EPIDERMIS  
AND VASCULAR TISSUE**

**PARENCHYMA TISSUE  
CORTEX**

# TYPICAL ANGIOSPERM



**STEM**



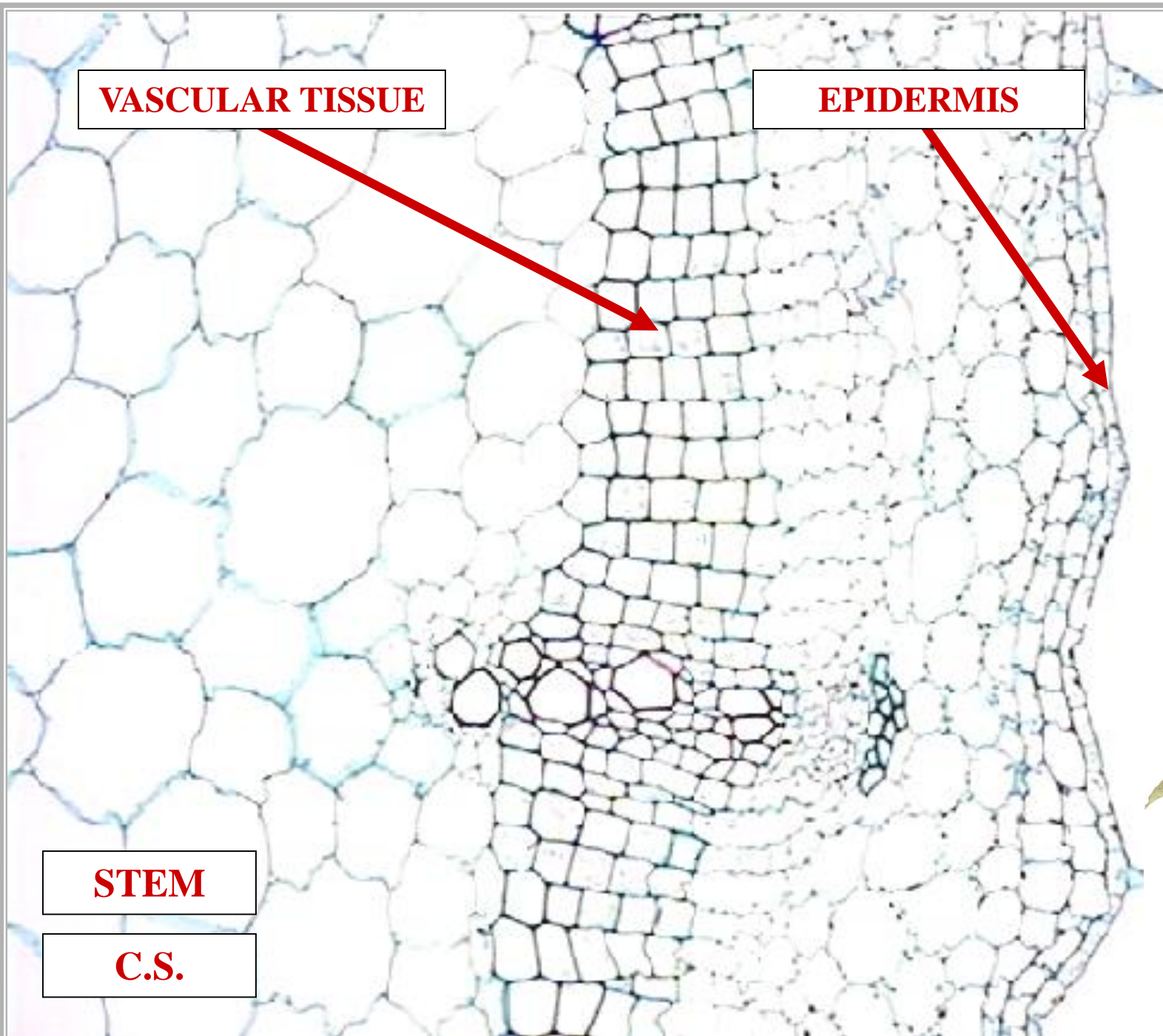
**C**

**VASCULAR TISSUE**

**EPIDERMIS**

**STEM**

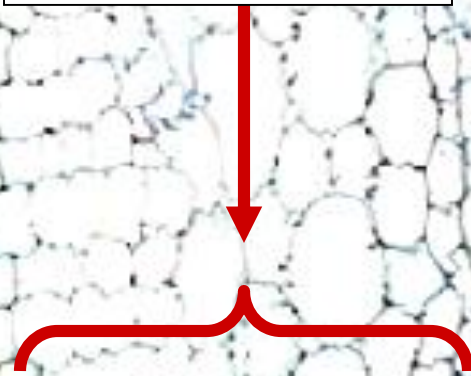
**C.S.**



^

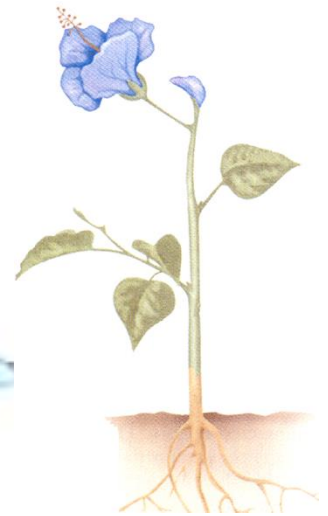
P

**CORTEX  
PARENCHYMA  
TISSUE**



**STEM**

**C.S.**



PITH  
**PARENCHYMA**  
**TISSUE**



**PARENCHYMA TISSUE**



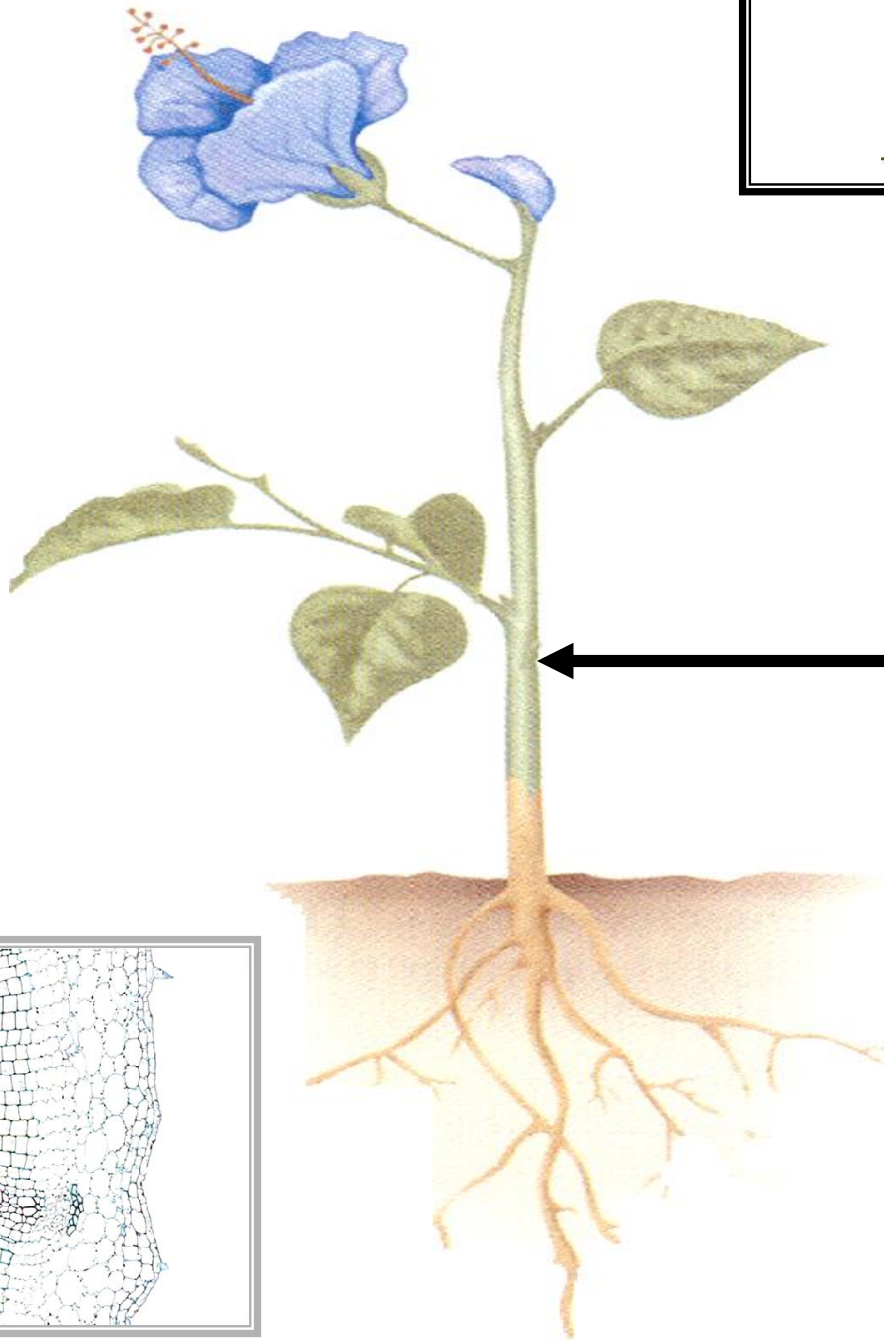
**PITH**

**TISSUE INWARD OF  
VASCULAR TISSUE**

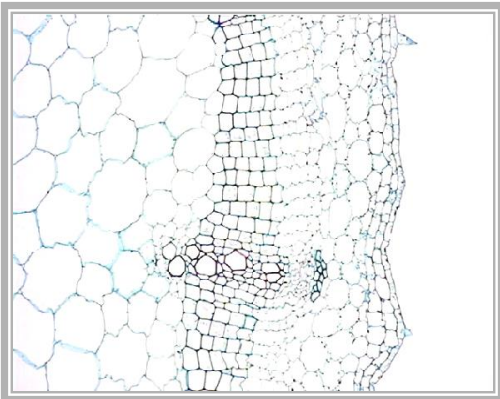
**PARENCHYMA TISSUE**

**PITH**

# TYPICAL ANGIOSPERM



**STEM**

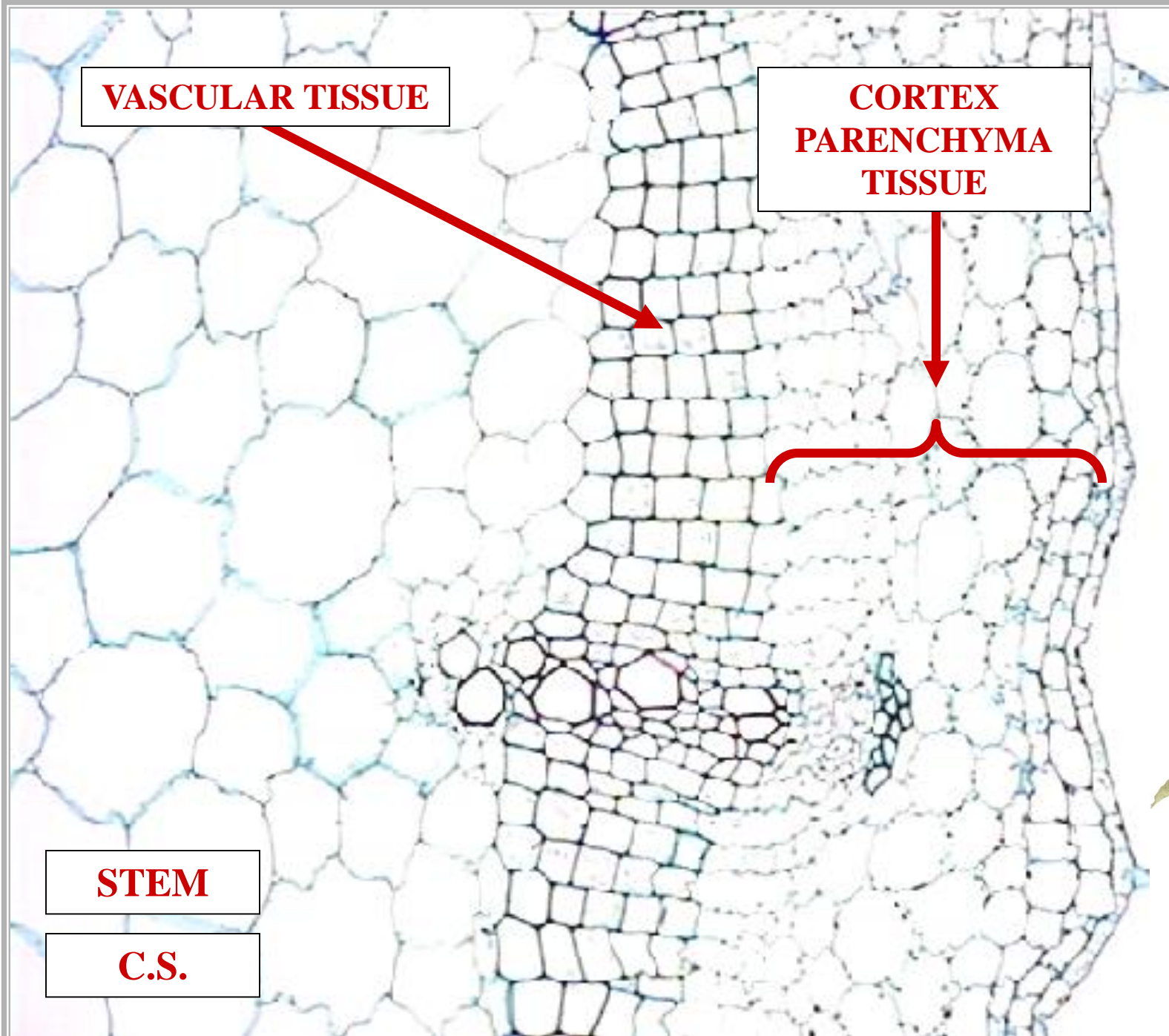
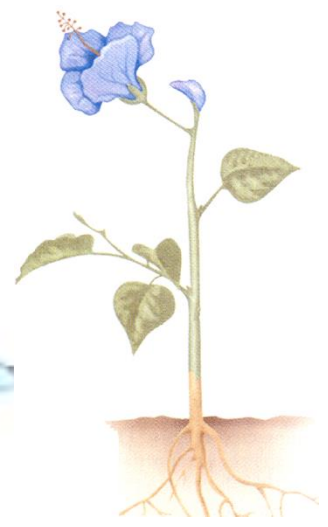


VASCULAR TISSUE

CORTEX  
PARENCHYMA  
TISSUE

STEM

C.S.



**PITH  
PARENCHYMA  
TISSUE**

**CORTEX  
PARENCHYMA  
TISSUE**

**VASCULAR TISSUE**

**STEM**

**C.S.**



MESOPHYLL  
**PARENCHYMA**  
**TISSUE**

**PARENCHYMA TISSUE**



**MESOPHYLL**

**LEAF**

**PHOTOSYNTHETIC**

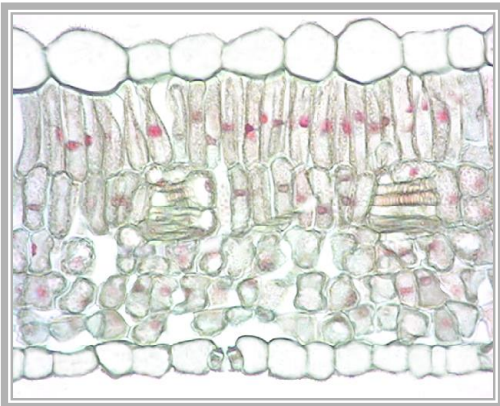
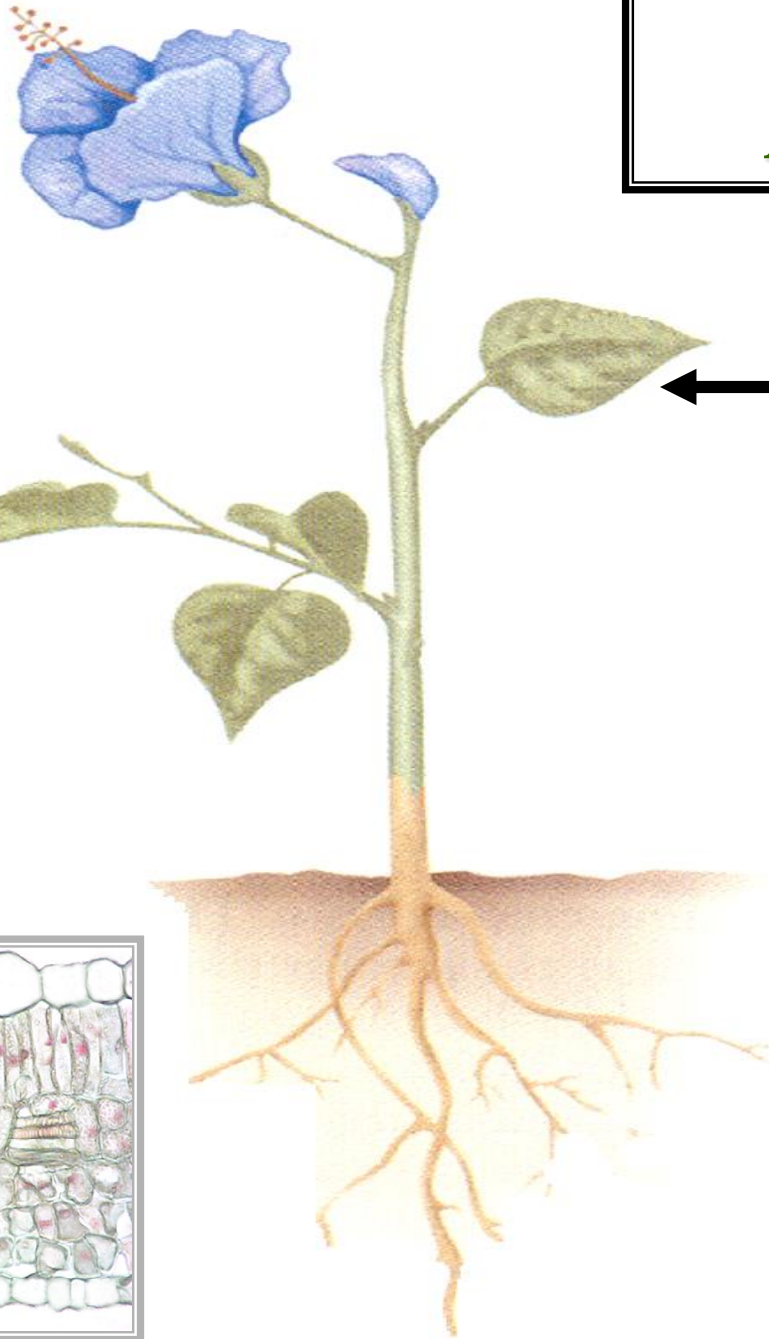
**TISSUE**

**PARENCHYMA TISSUE**

**MESOPHYLL**

# TYPICAL ANGIOSPERM

**LEAF**



**PC**

**MESOPHYLL**

**CHLOROPLASTS**

**PHOTOSYNTHESIS**

**LEAF**

**C.S.**







**MESOPHYLL  
PHOTOSYNTHETIC  
PARENCHYMA  
TISSUE**

**CHLOROPLASTS**

**PHOTOSYNTHESIS**

**LEAF**

**C.S.**





# COLLENCHYMA TISSUE

# COLLENCHYMA CELLS

# **COLLENCHYMA CELL**

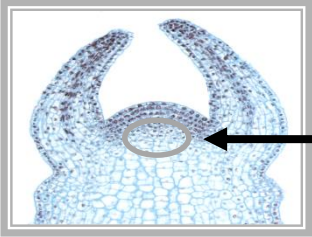
# COLLENCHYMA CELL



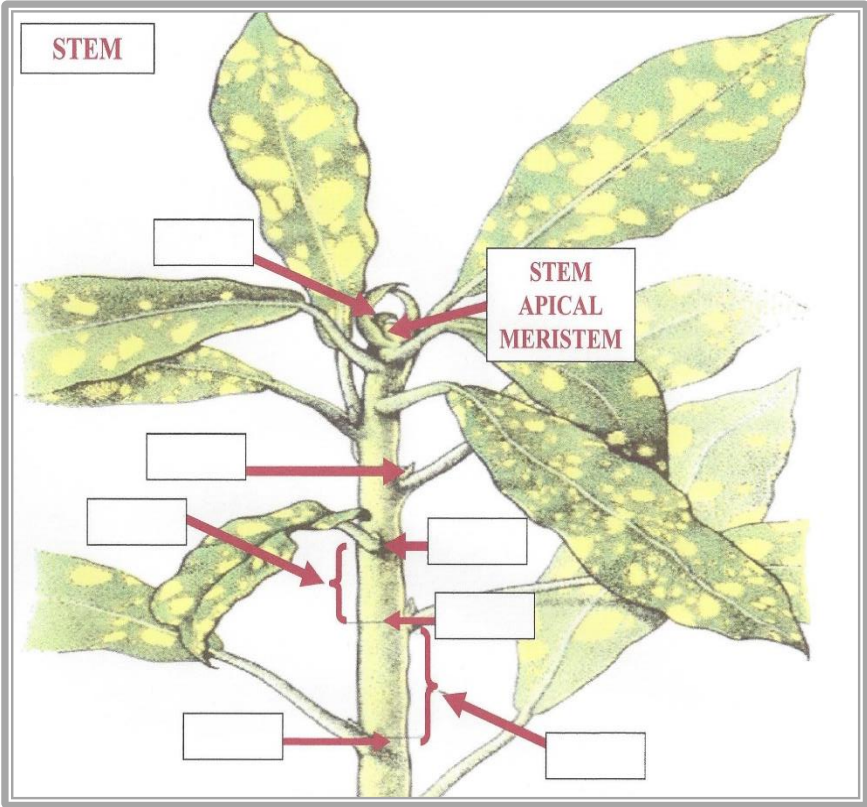
PARENCHYMA DERIVED

# COLLENCHYMA CELL

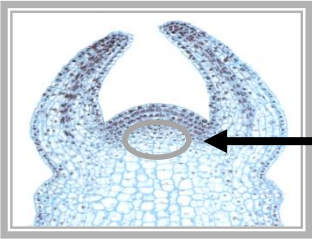
# STEM APICAL MERISTEM



STEM APICAL MERISTEM



# STEM APICAL MERISTEM

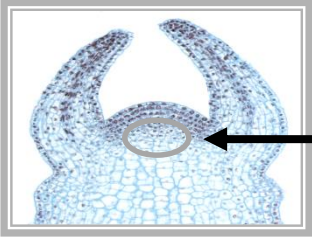


STEM APICAL MERISTEM

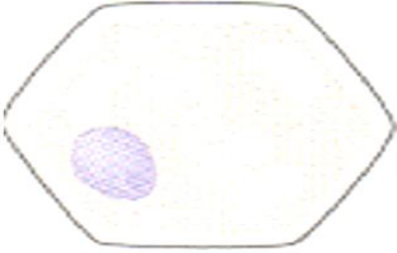


MERISTEM CELL INITIAL

**STEM APICAL  
MERISTEM**



**STEM APICAL MERISTEM**



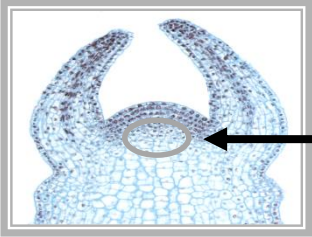
**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

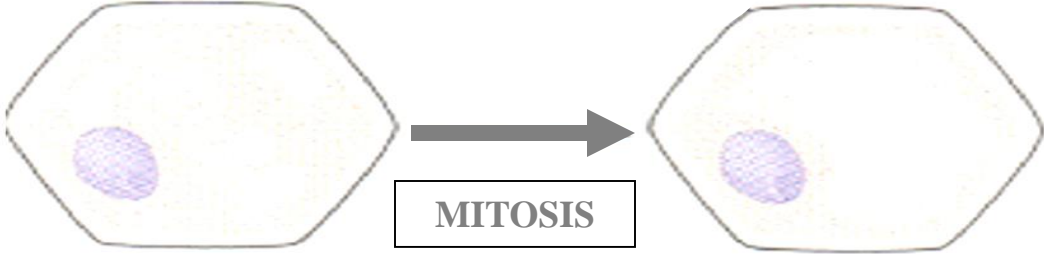
**PARENCHYMA  
BASIC  
PLANT CELL**



**STEM APICAL  
MERISTEM**



**STEM APICAL MERISTEM**



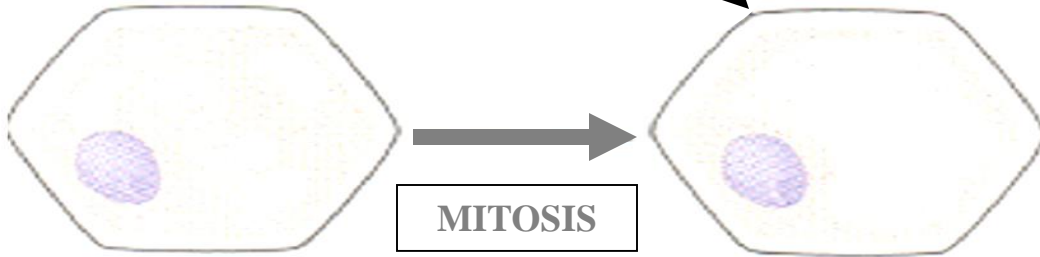
**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**

**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**



**MERISTEM CELL INITIAL**

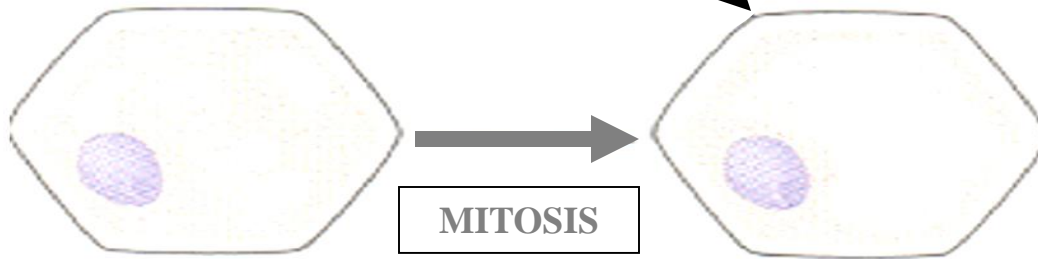
**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**

**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**

**PARENCHYMA CELL**



**MITOSIS**

**MERISTEM CELL INITIAL**

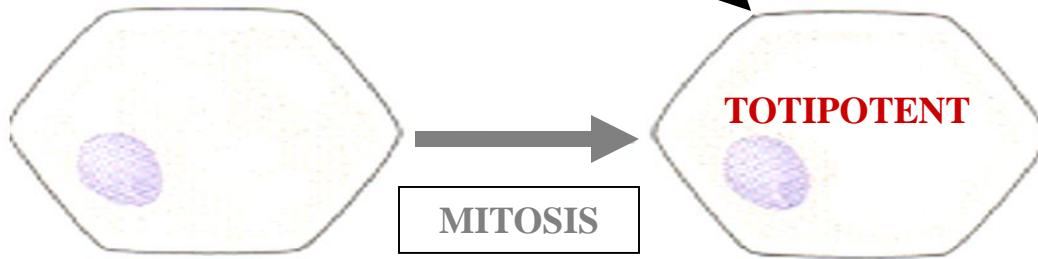
**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**

**STEM APICAL  
MERISTEM**

**DERIVATIVE CELL**

**PARENCHYMA CELL**



**PARENCHYMA CELL  
CAN POTENTIALLY  
DIFFERENTIATE  
INTO ANY PLANT CELL TYPE**

**MERISTEM CELL INITIAL**

**PARENCHYMA CELL**

**PARENCHYMA  
BASIC  
PLANT CELL**