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C.S.

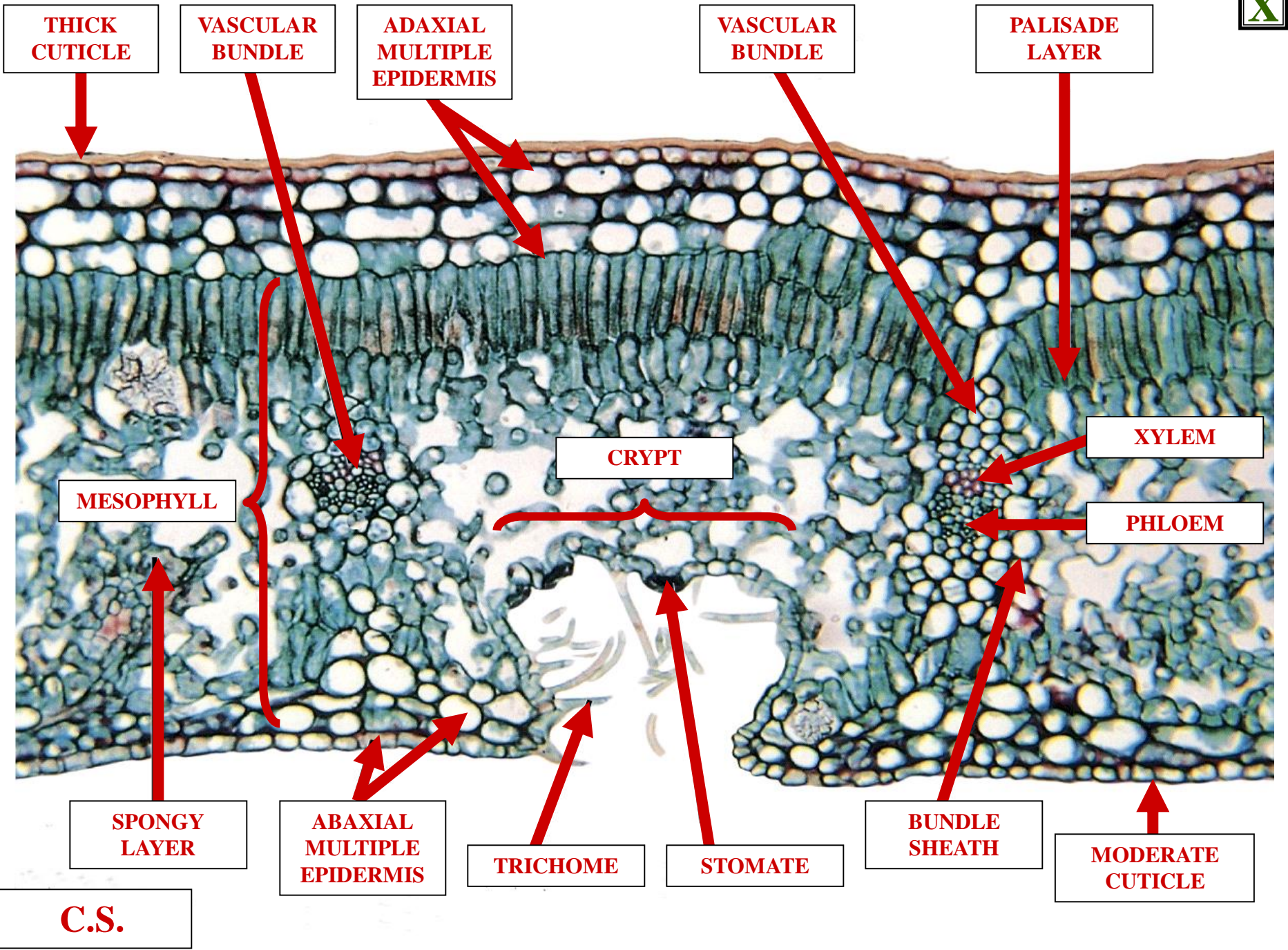
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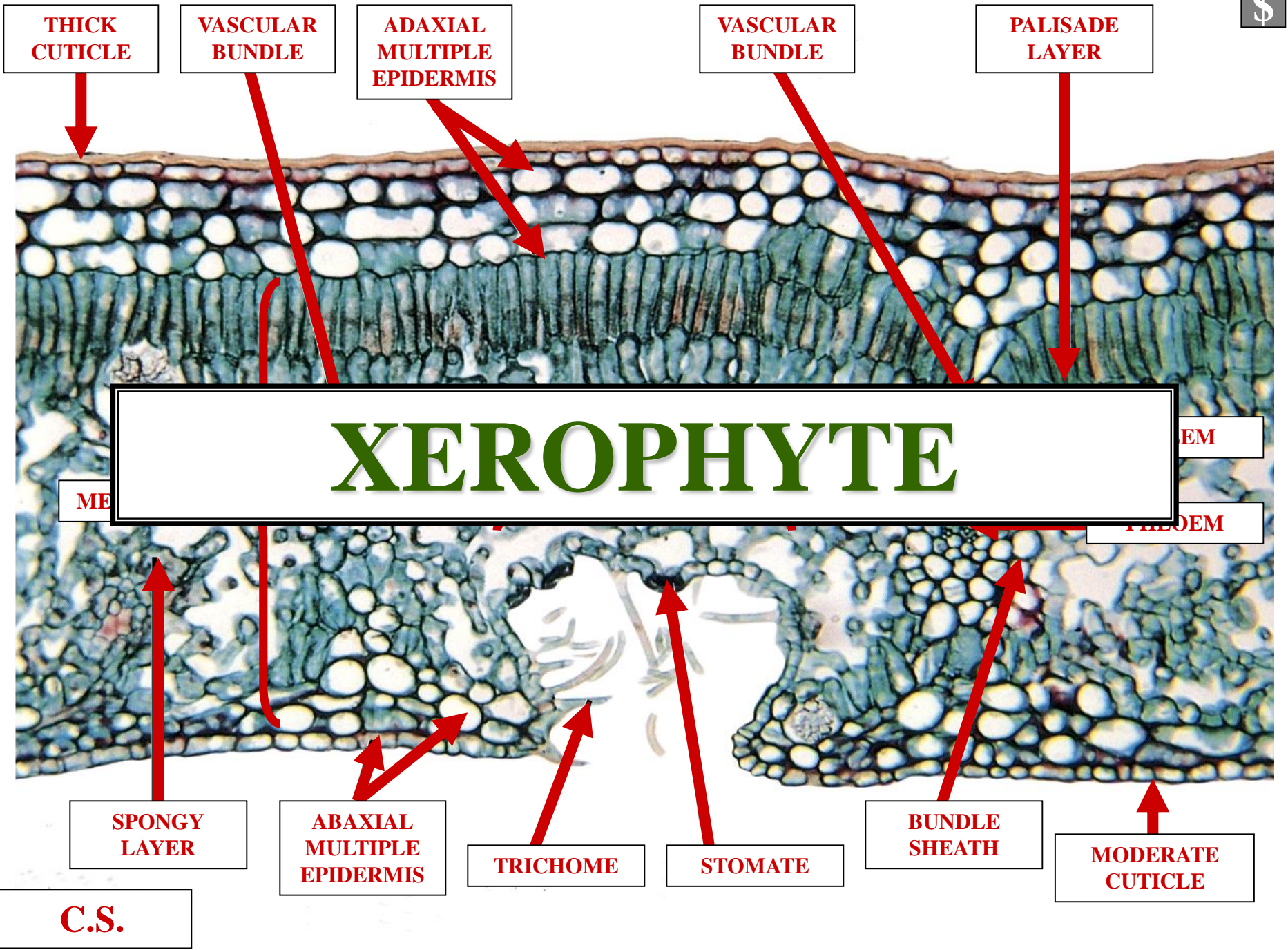
ABAXIAL STOMATES

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MODERATE CUTICLE





THICK CUTICLE

VASCULAR BUNDLE

ADAXIAL MULTIPLE EPIDERMIS

VASCULAR BUNDLE

PALISADE LAYER

XEROPHYTE

ME

EM

XYLEM

SPONGY LAYER

ABAXIAL MULTIPLE EPIDERMIS

TRICHOME

STOMATE

BUNDLE SHEATH

MODERATE CUTICLE

C.S.



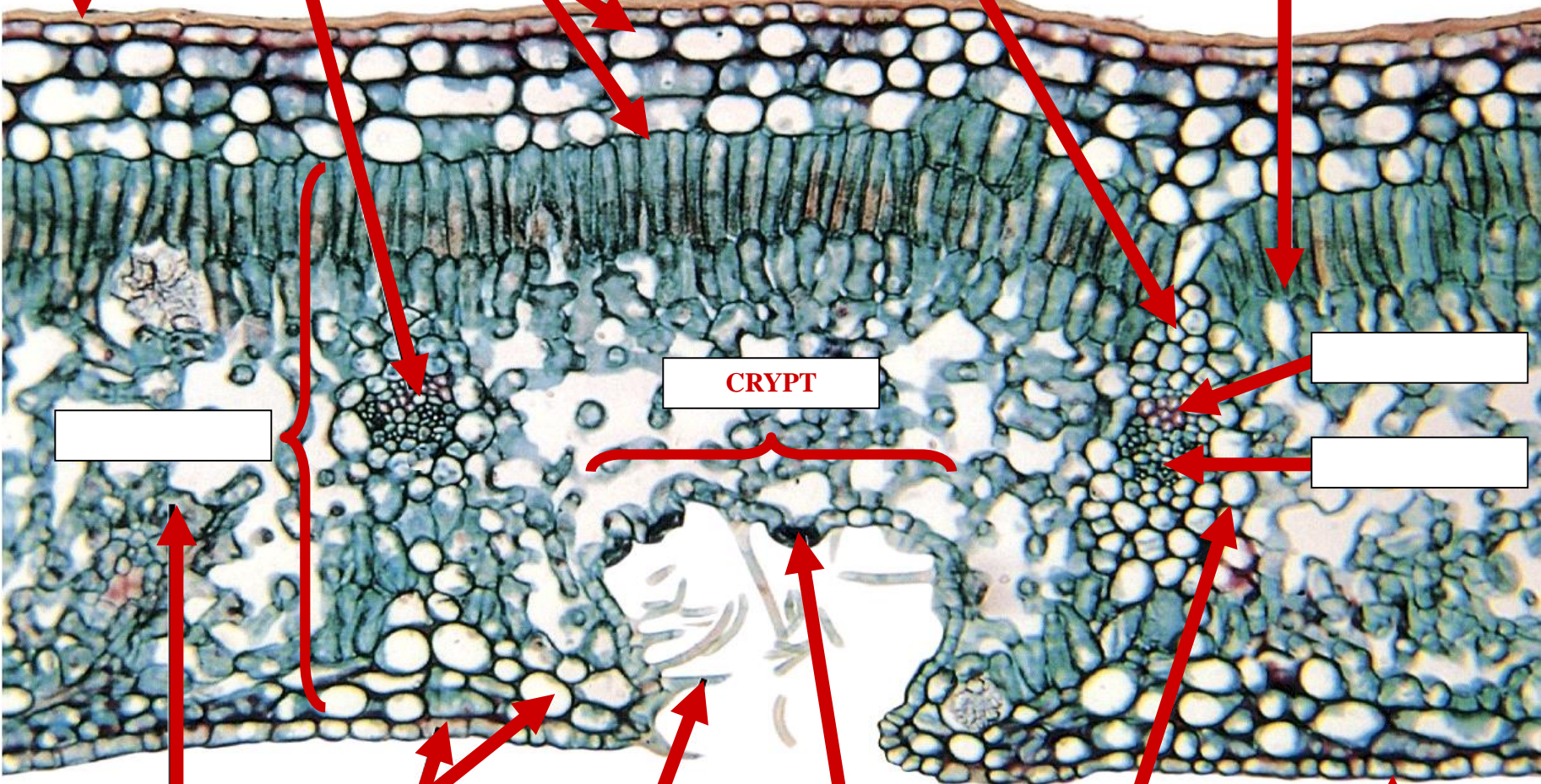
THICK CUTICLE

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ADAXIAL MULTIPLE EPIDERMIS

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CRYPT

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ABAXIAL MULTIPLE EPIDERMIS

[]

STOMATE

[]

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C.S.



MONOCOT LEAF



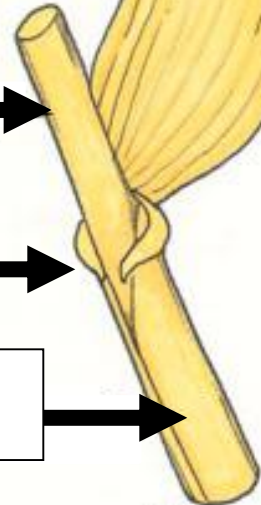
MONOCOT LEAF MORPHOLOGY



ZEA



STEM

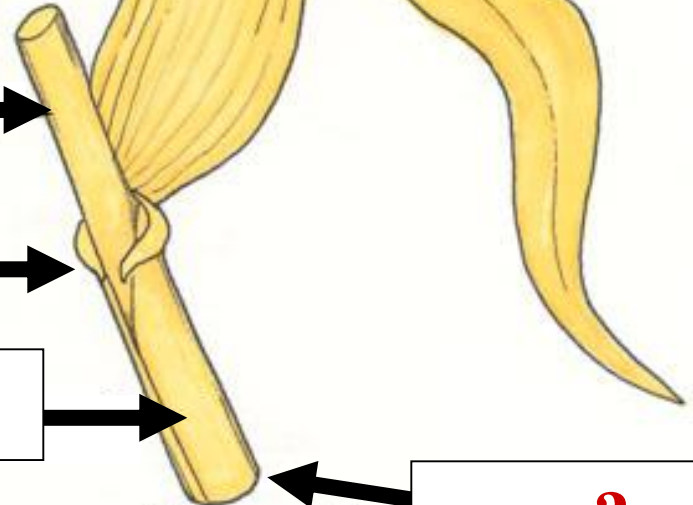


ZEA

MONOCOT LEAF MORPHOLOGY



STEM



ZEA

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MONOCOT LEAF MORPHOLOGY



STEM



ZEA

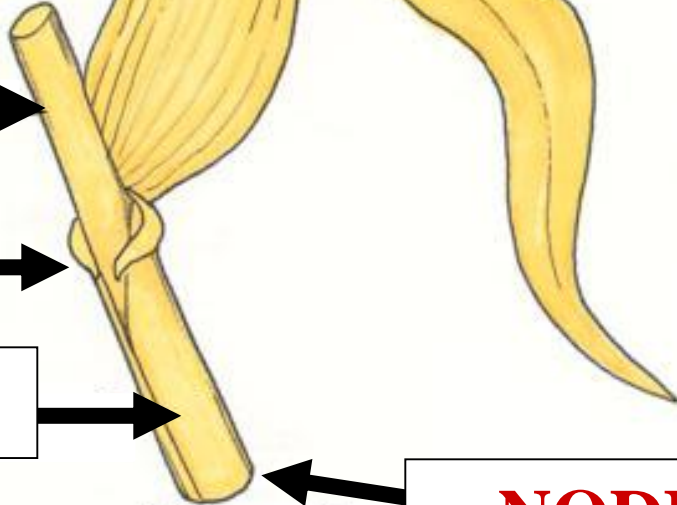
NODE

MONOCOT LEAF MORPHOLOGY



STEM

SHEATH



ZEA

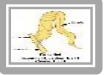
NODE

MONOCOT LEAF MORPHOLOGY

SHEATH

MONOCOT LEAF MORPHOLOGY

SHEATH



ENCIRCLES STEM

MONOCOT LEAF MORPHOLOGY

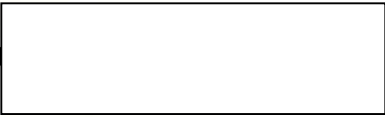
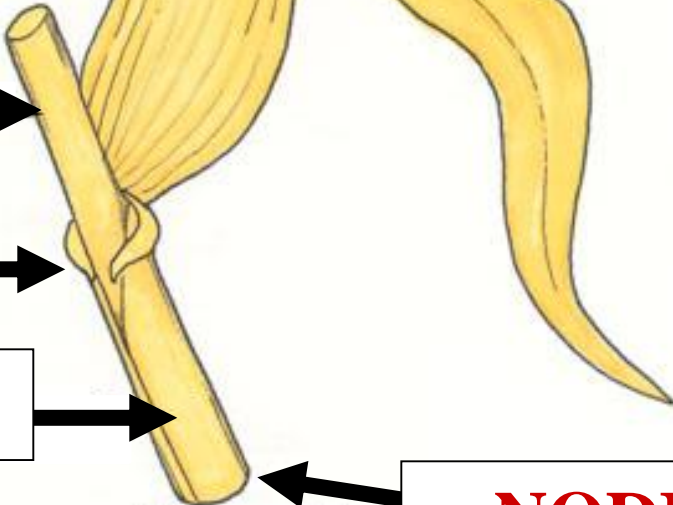
SHEATH



STEM



SHEATH



ZEA

NODE

MONOCOT LEAF MORPHOLOGY



STEM

LIGULE

SHEATH

[Empty box]

ZEA

NODE

MONOCOT LEAF MORPHOLOGY

LIGULE

MONOCOT LEAF MORPHOLOGY

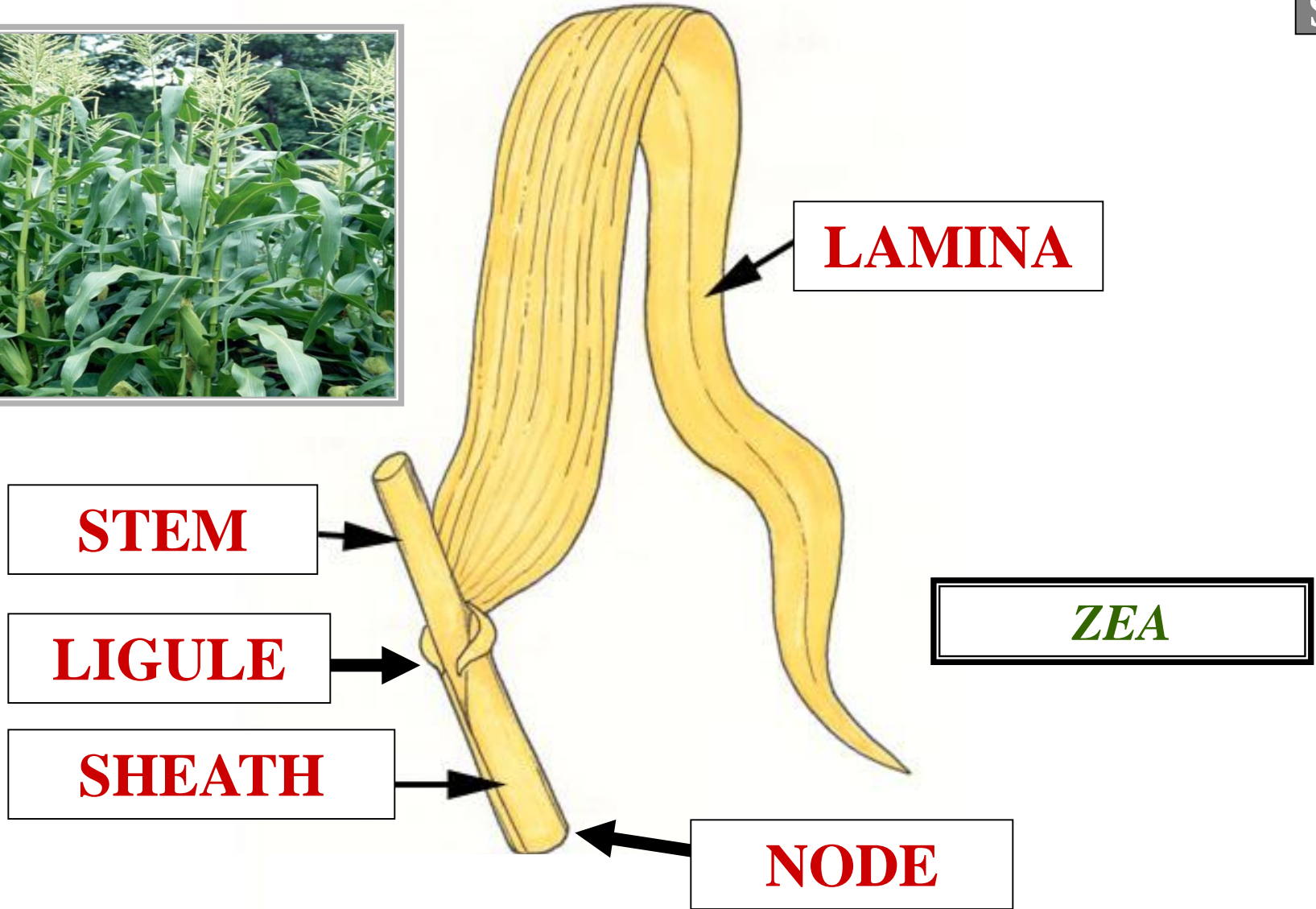
LIGULE



**JUNCTION POINT
BETWEEN
SHEATH & LAMINA**

MONOCOT LEAF MORPHOLOGY

LIGULE

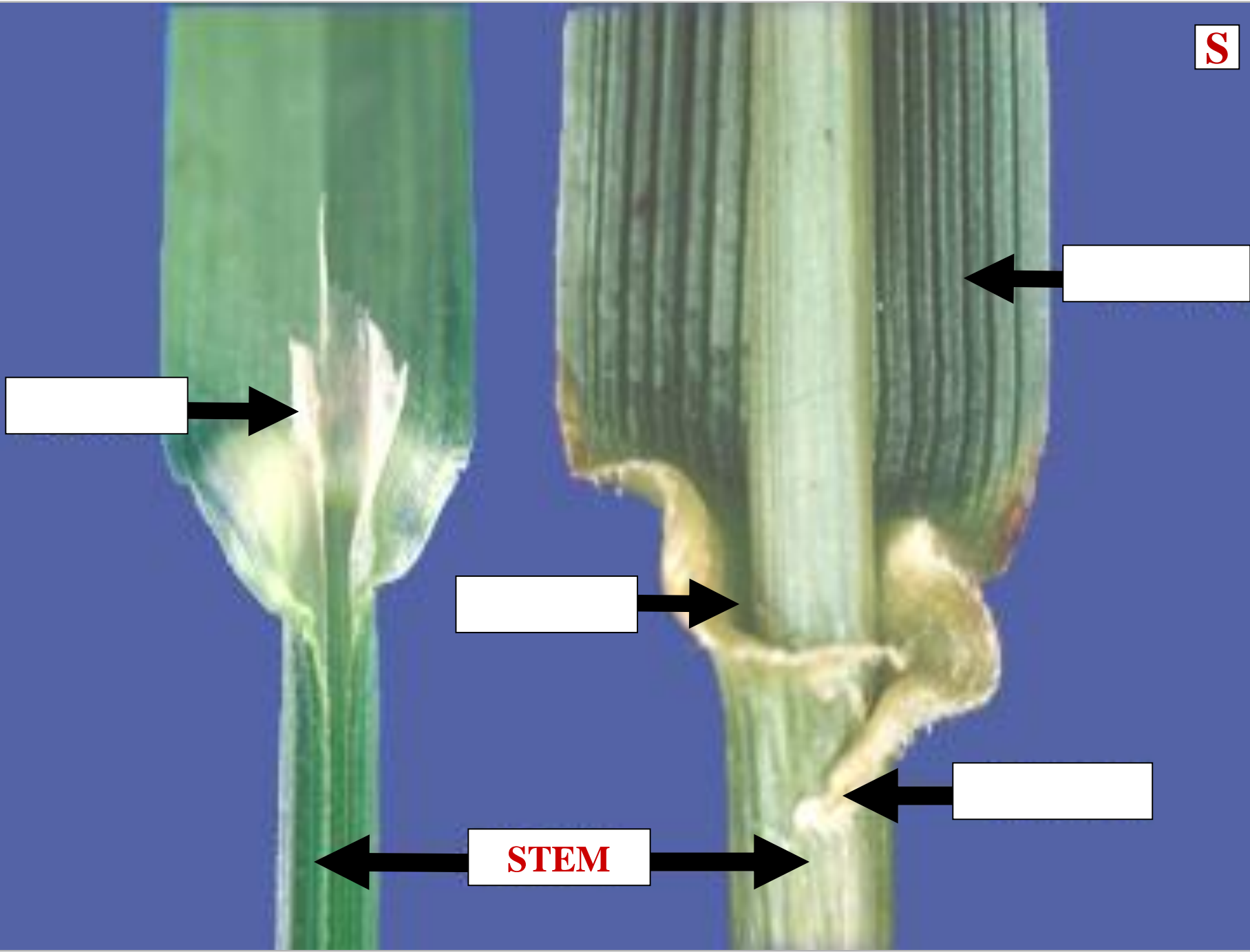


MONOCOT LEAF MORPHOLOGY



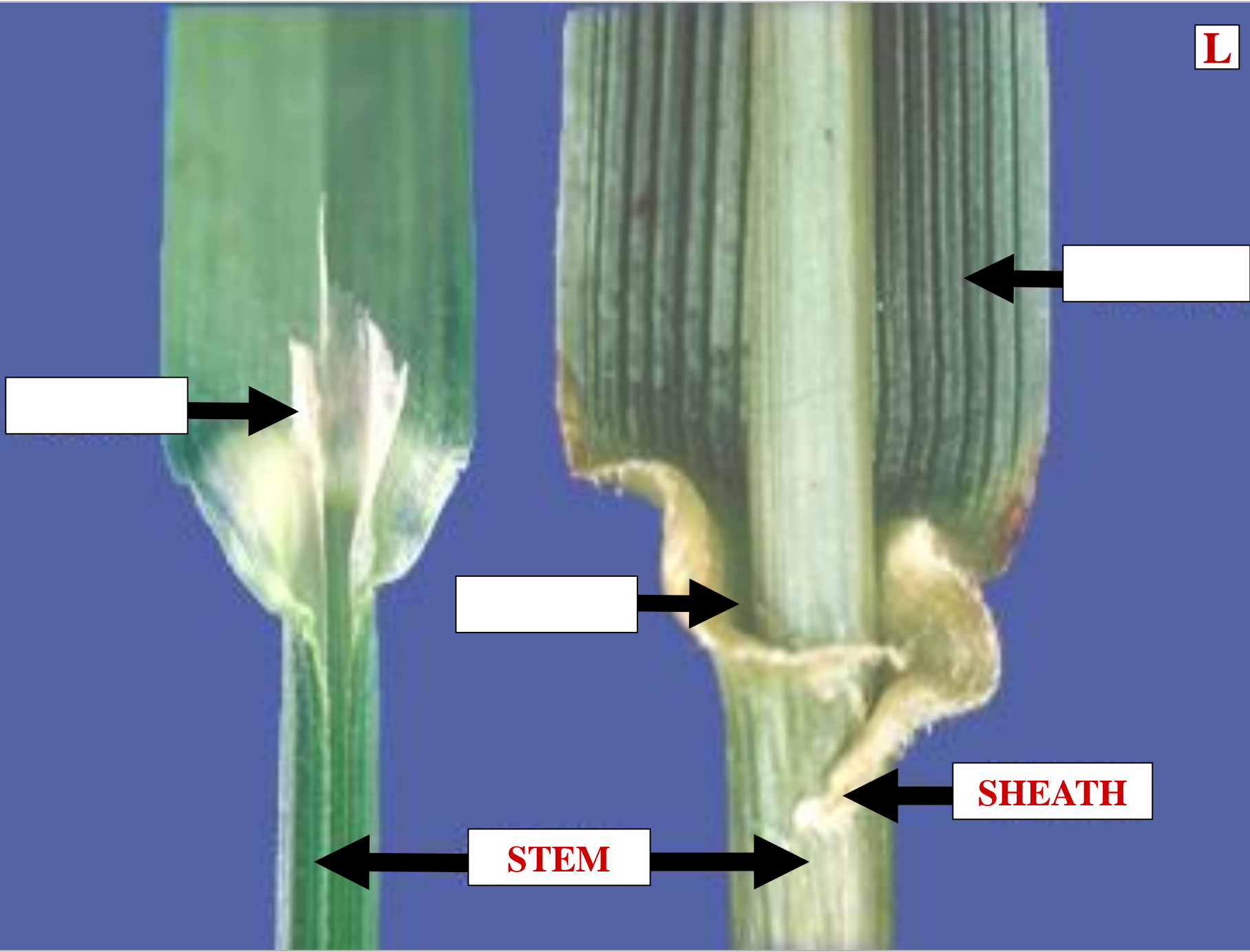
MONOCOT LEAF MORPHOLOGY SUMMARY

S



STEM

L



White arrow pointing to the node.

White arrow pointing to the node.

White arrow pointing to the leaf sheath.

STEM

SHEATH

L

LIGULE



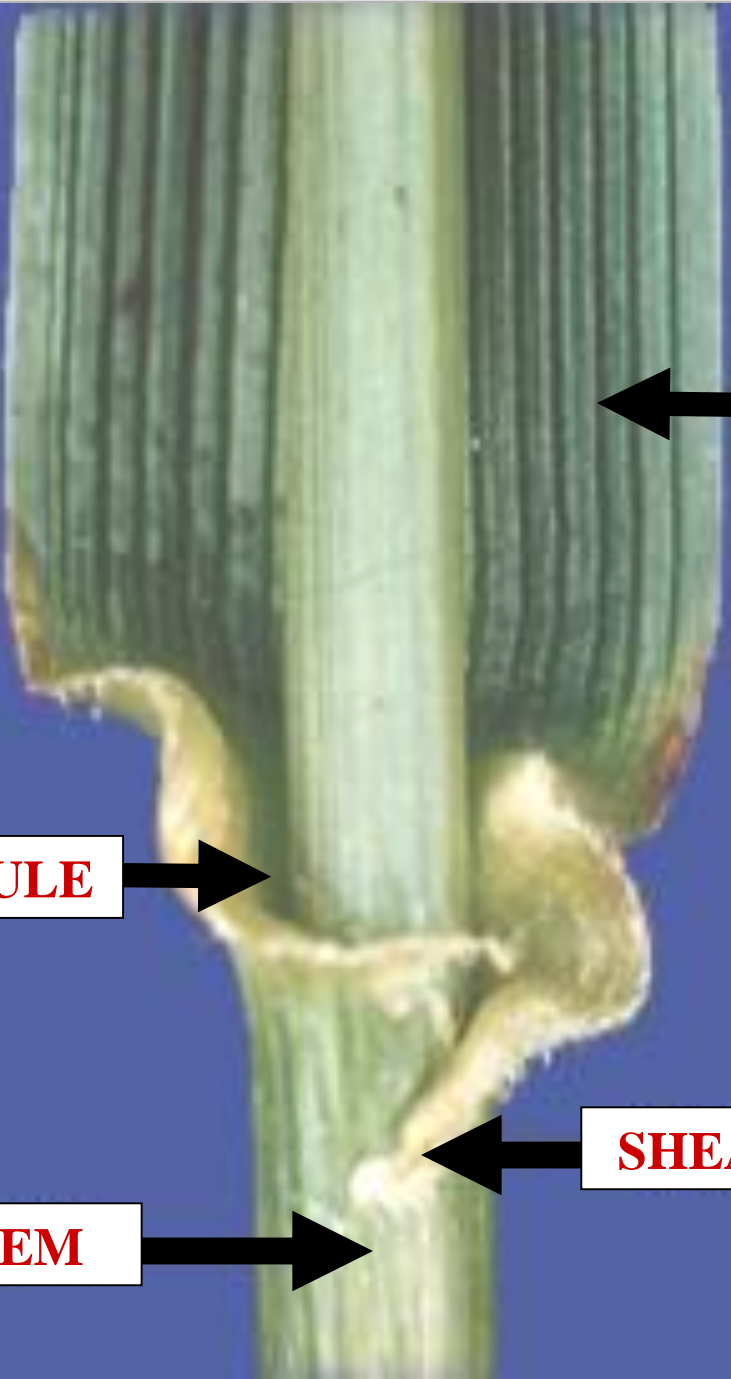
LIGULE

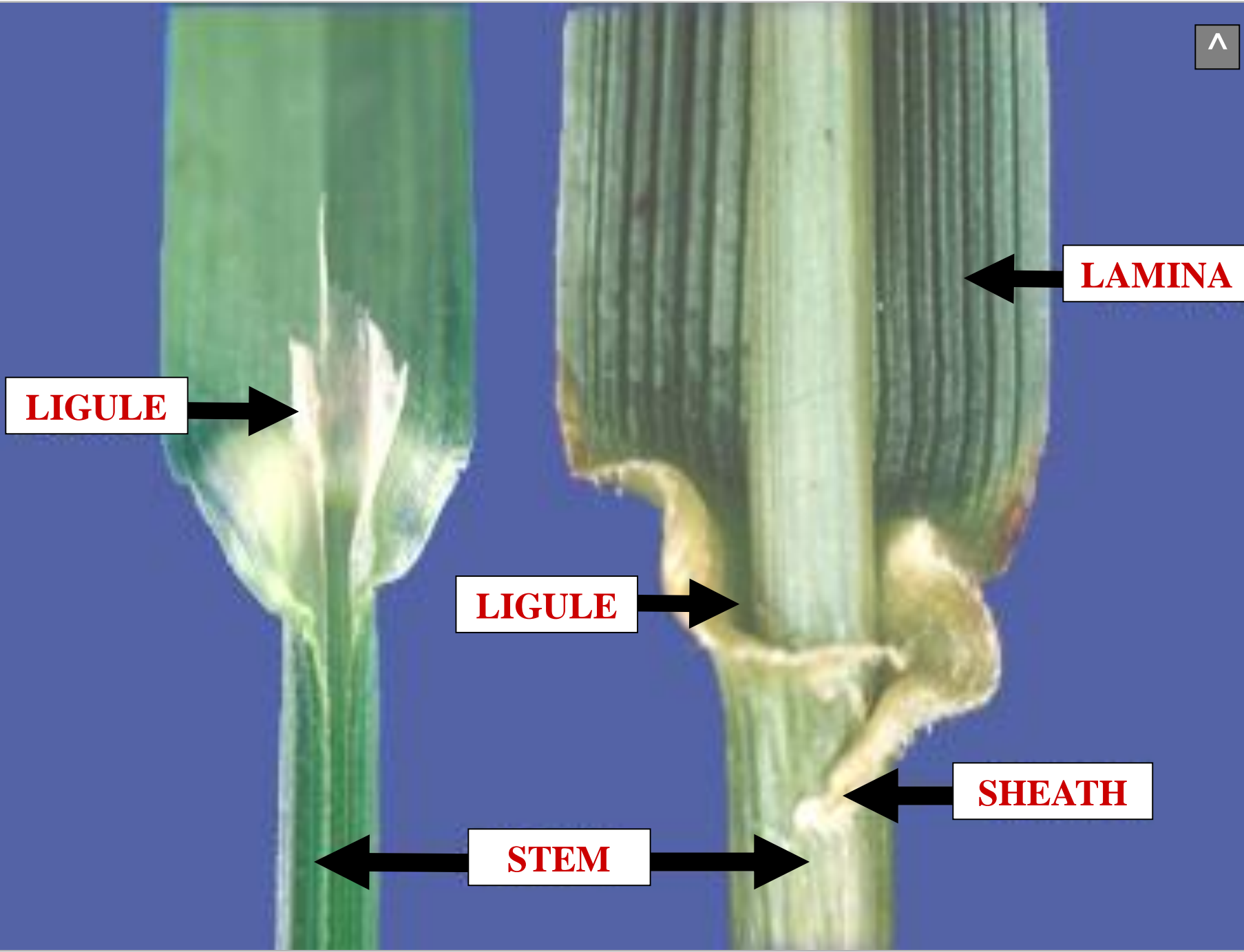


SHEATH



STEM





LIGULE



LIGULE



LAMINA



SHEATH

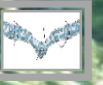


STEM

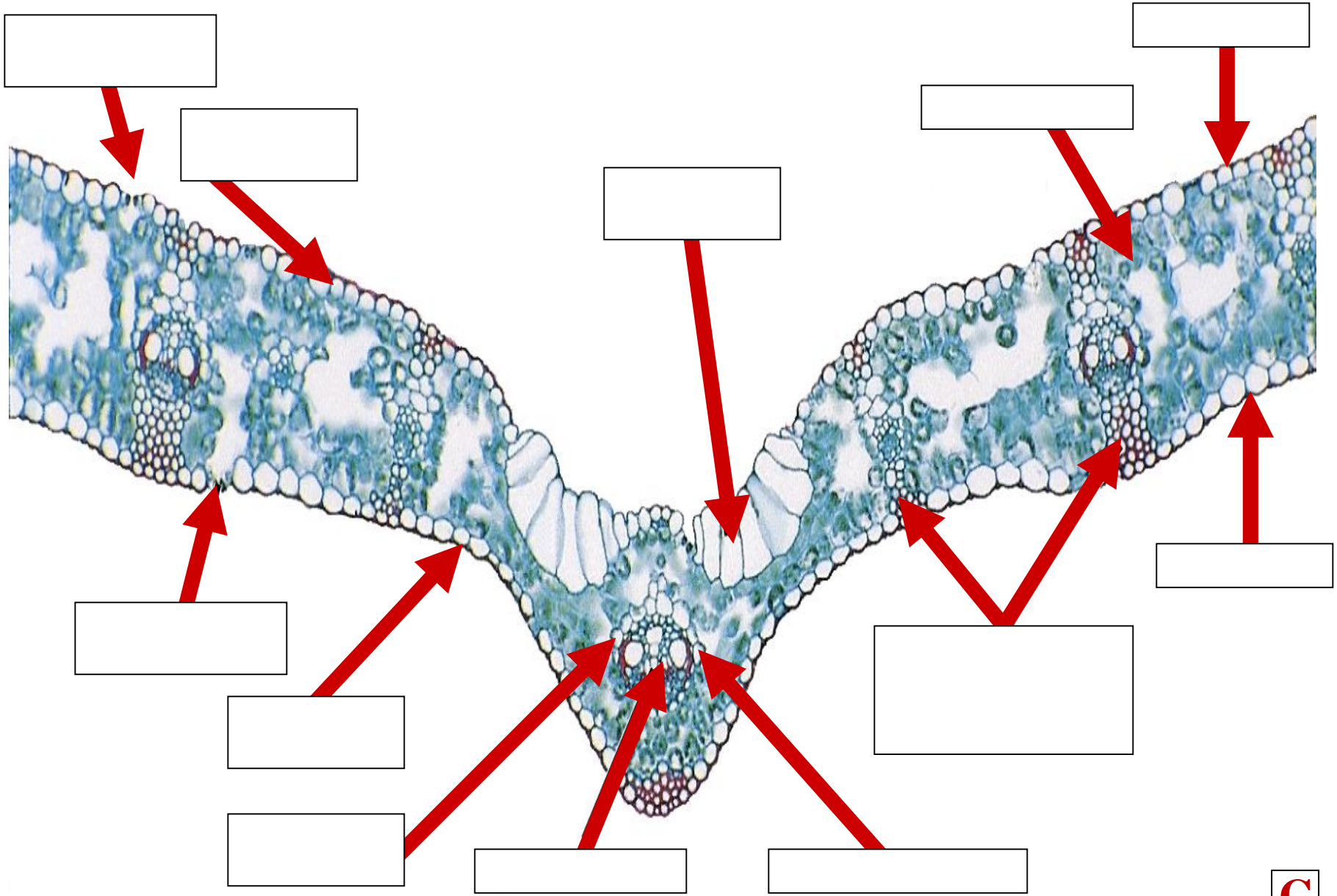




MONOCOT LEAF ANATOMY



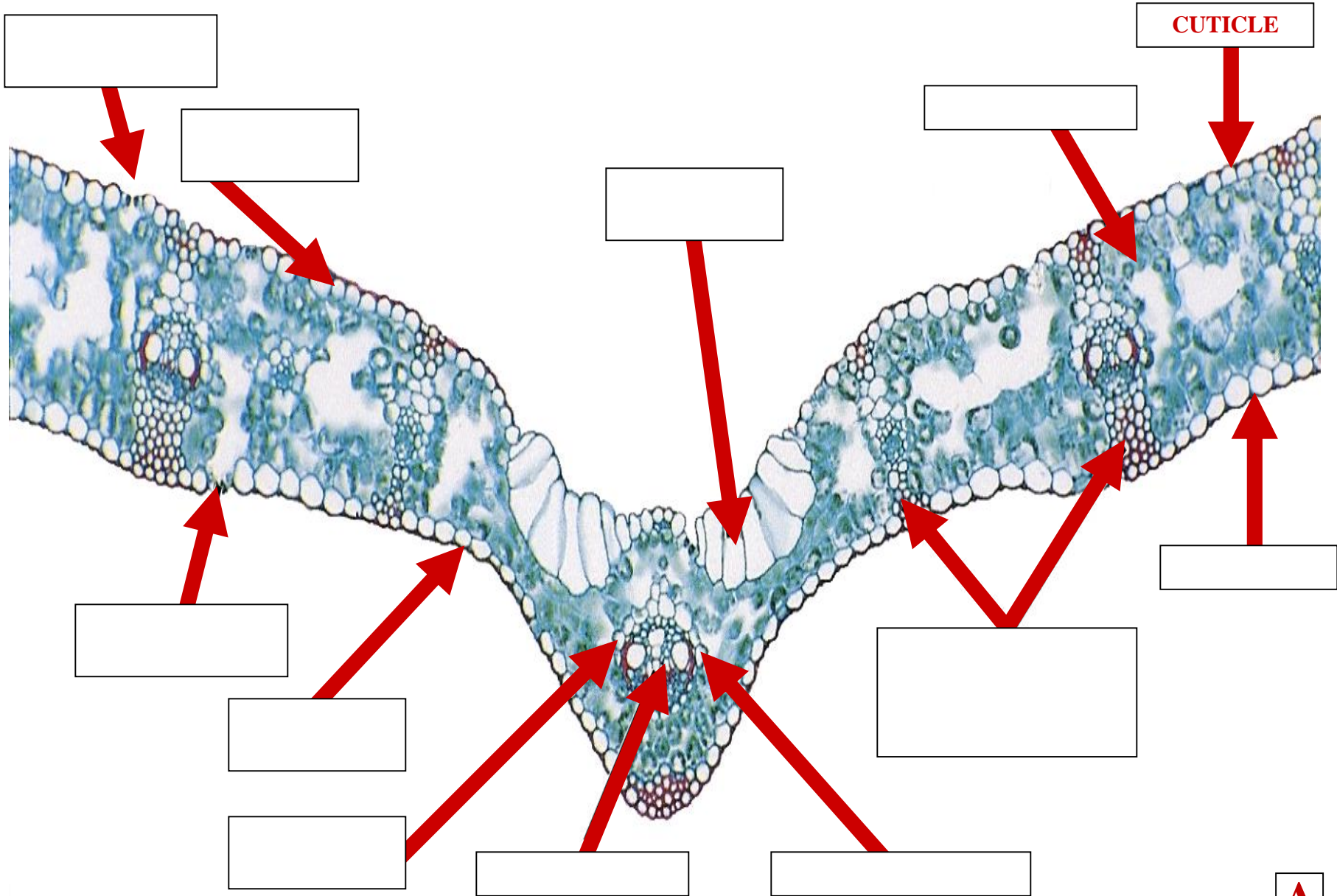
ZEA



ZEA

C.S.

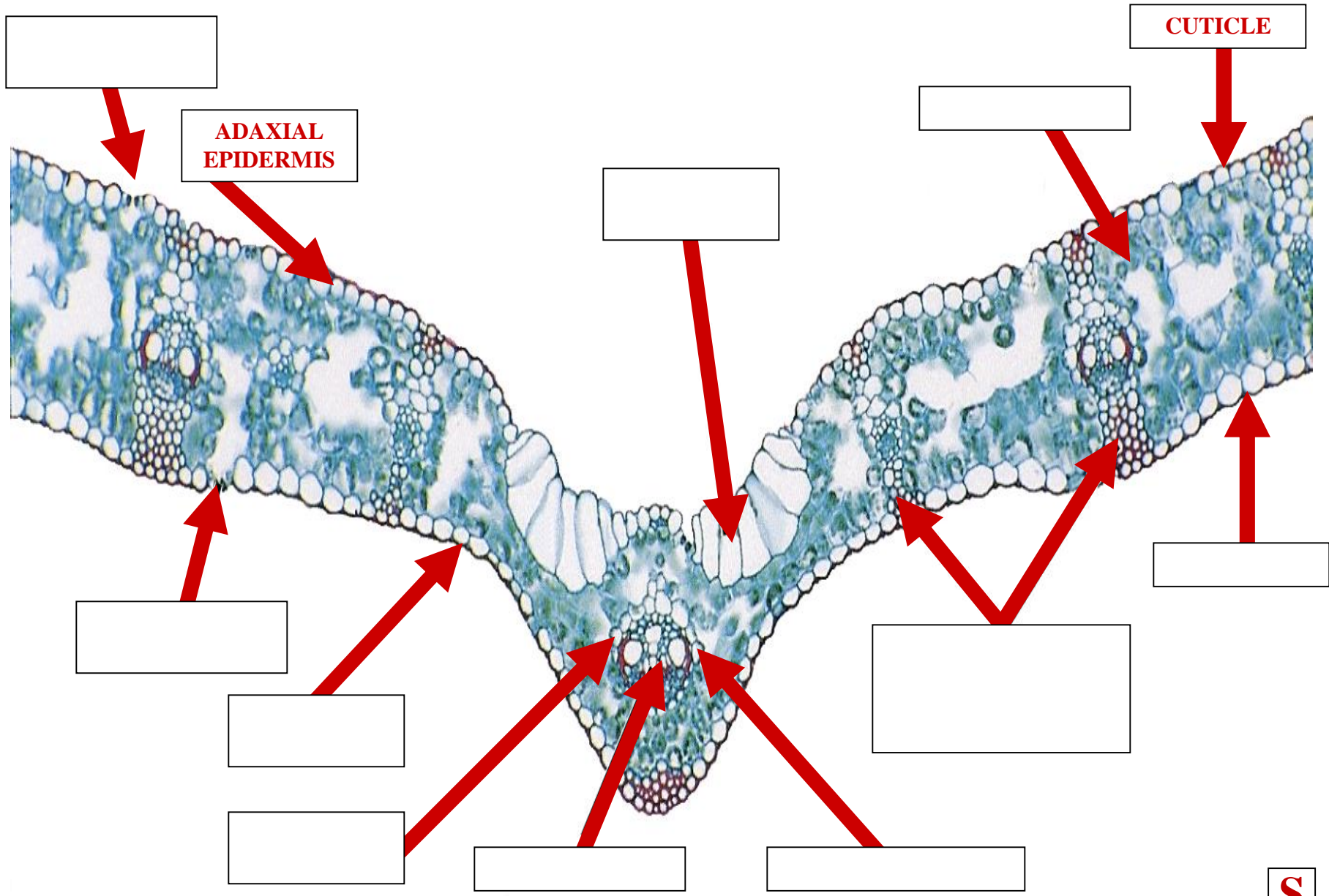
C



ZEA

C.S.

A



**ADAXIAL
EPIDERMIS**

CUTICLE

ZEA

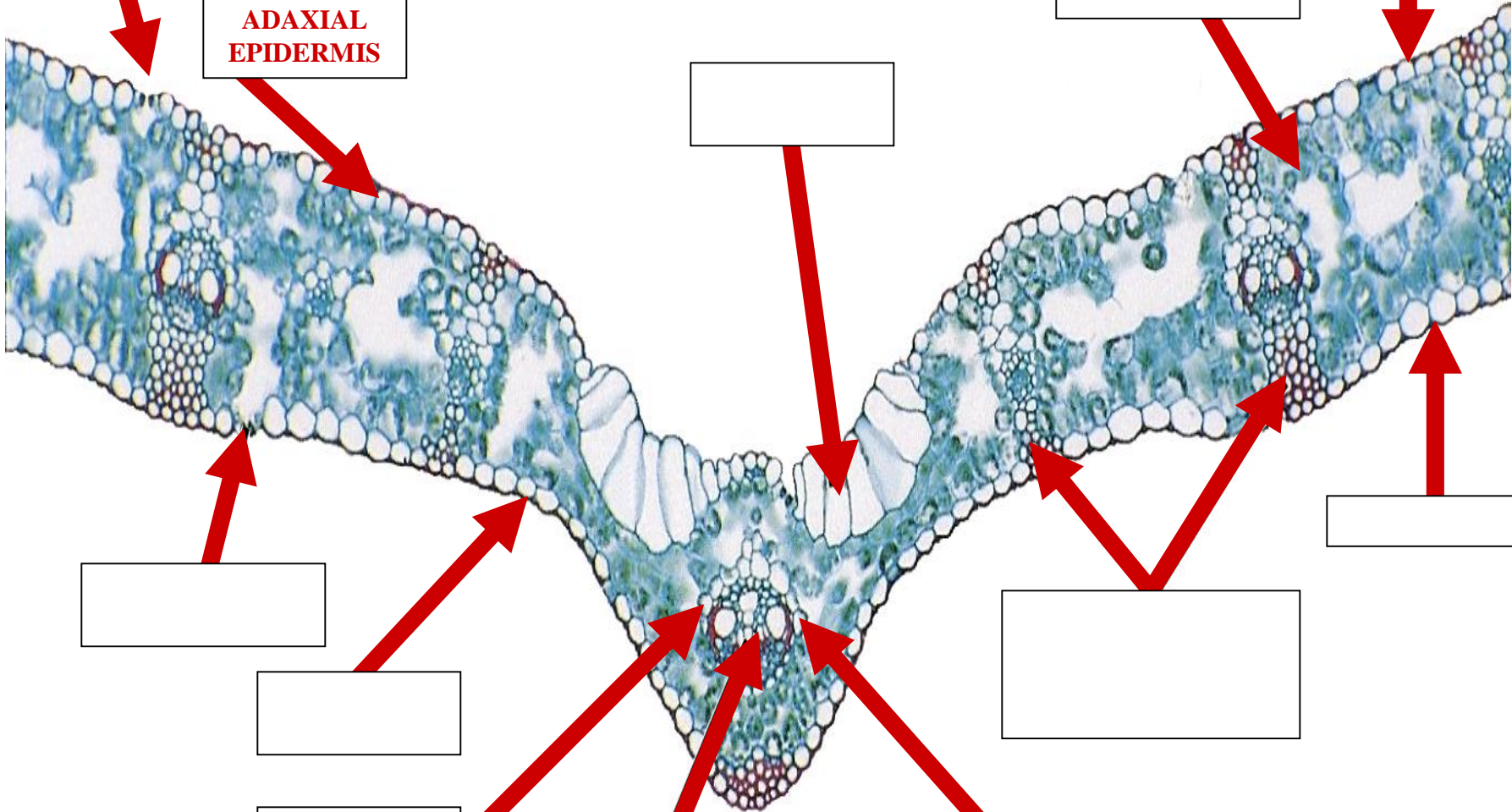
C.S.

S

**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

CUTICLE



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ZEA

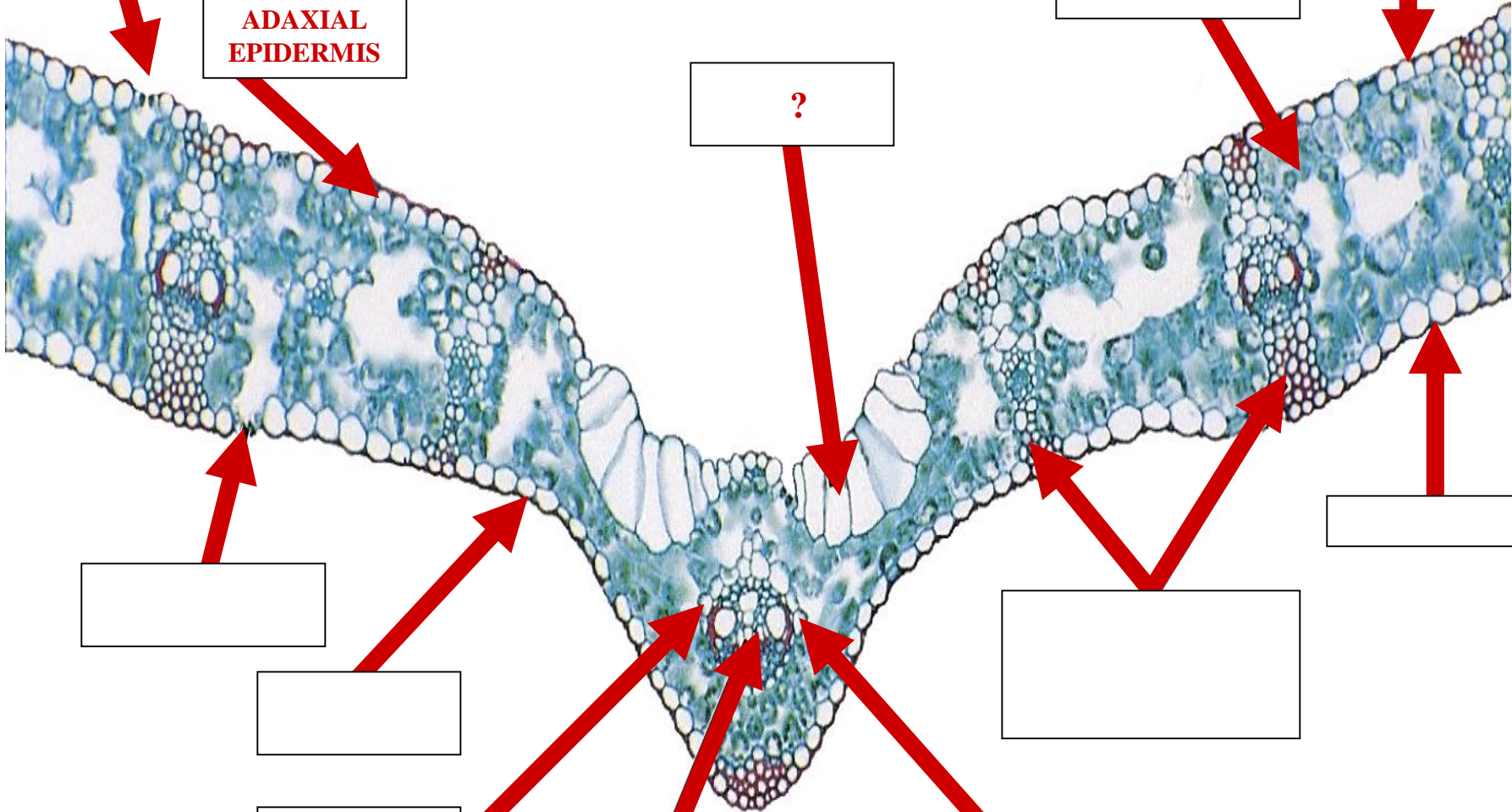
C.S.

**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

CUTICLE

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ZEA

B

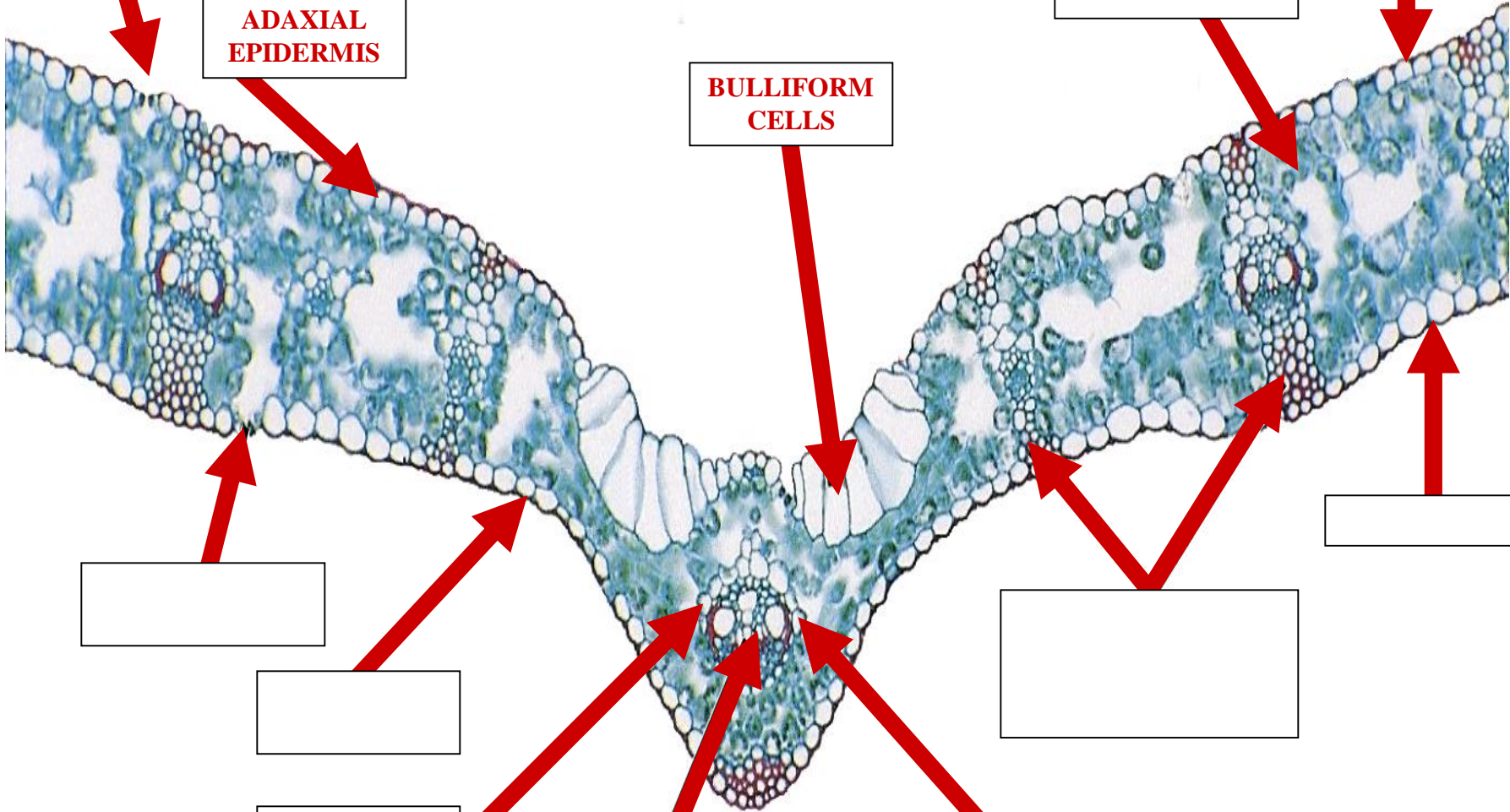
C.S.

**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

**BULLIFORM
CELLS**

CUTICLE



[]

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ZEA

B

C.S.

BULLIFORM CELLS

MONOCOT LEAF ANATOMY

BULLIFORM CELLS



EPIDERMIS CELLS

MONOCOT LEAF ANATOMY

BULLIFORM CELLS

MONOCOT LEAF ANATOMY

BULLIFORM CELLS

EPIDERMIS CELLS

CONTRACT WITH WATER LOSS

MONOCOT LEAF ANATOMY

BULLIFORM CELLS

MONOCOT LEAF ANATOMY

BULLIFORM CELLS



EPIDERMIS CELLS

CONTRACT WITH WATER LOSS

REDUCE LEAF SURFACE AREA

MONOCOT LEAF ANATOMY

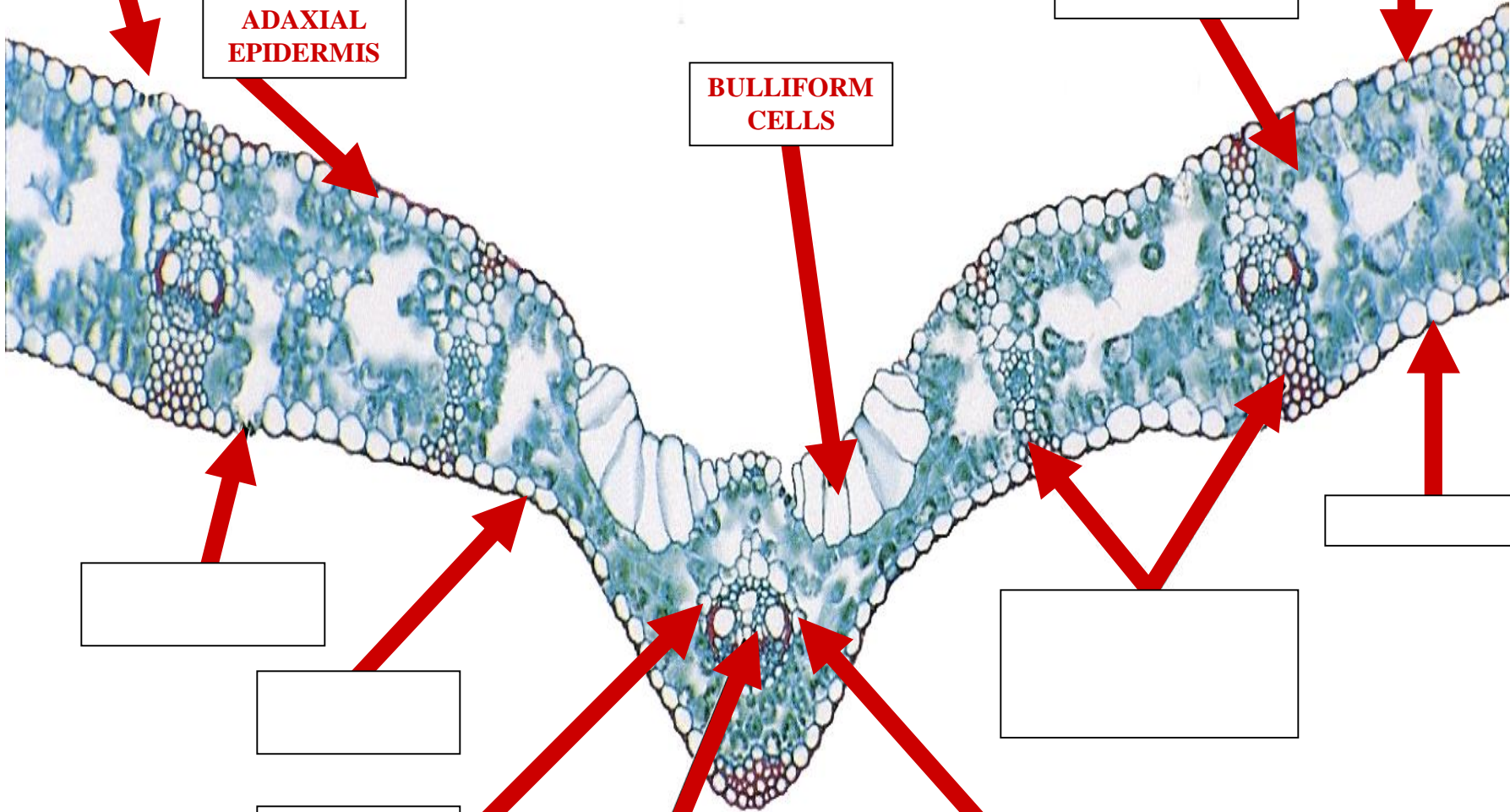
BULLIFORM CELLS

**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

**BULLIFORM
CELLS**

CUTICLE



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ZEA

C.S.

M

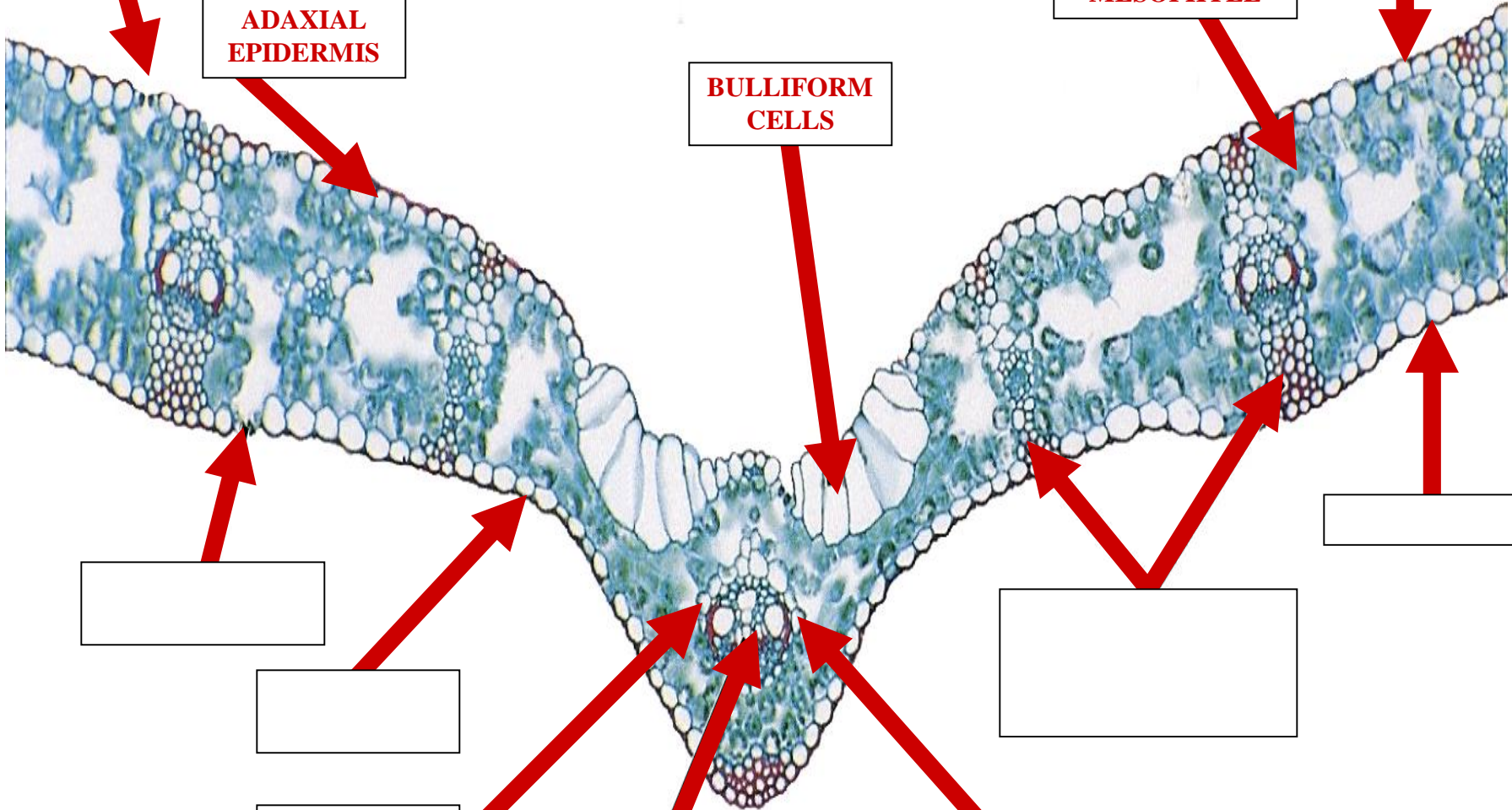
**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

**BULLIFORM
CELLS**

MESOPHYLL

CUTICLE



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ZEA

P	AB
C.S.	

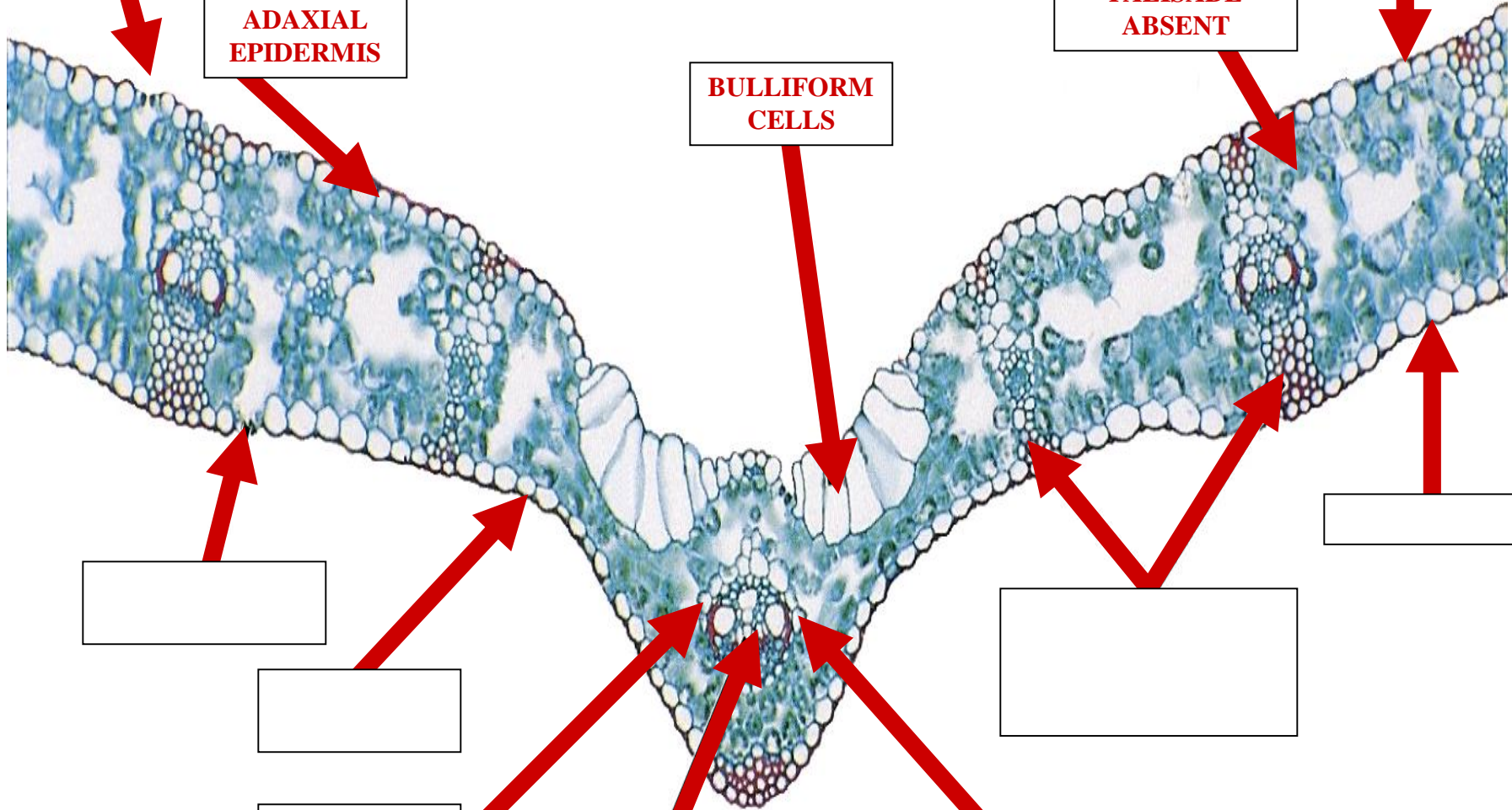
**STOMATES
PRESENT**

**ADAXIAL
EPIDERMIS**

**BULLIFORM
CELLS**

**PALISADE
ABSENT**

CUTICLE



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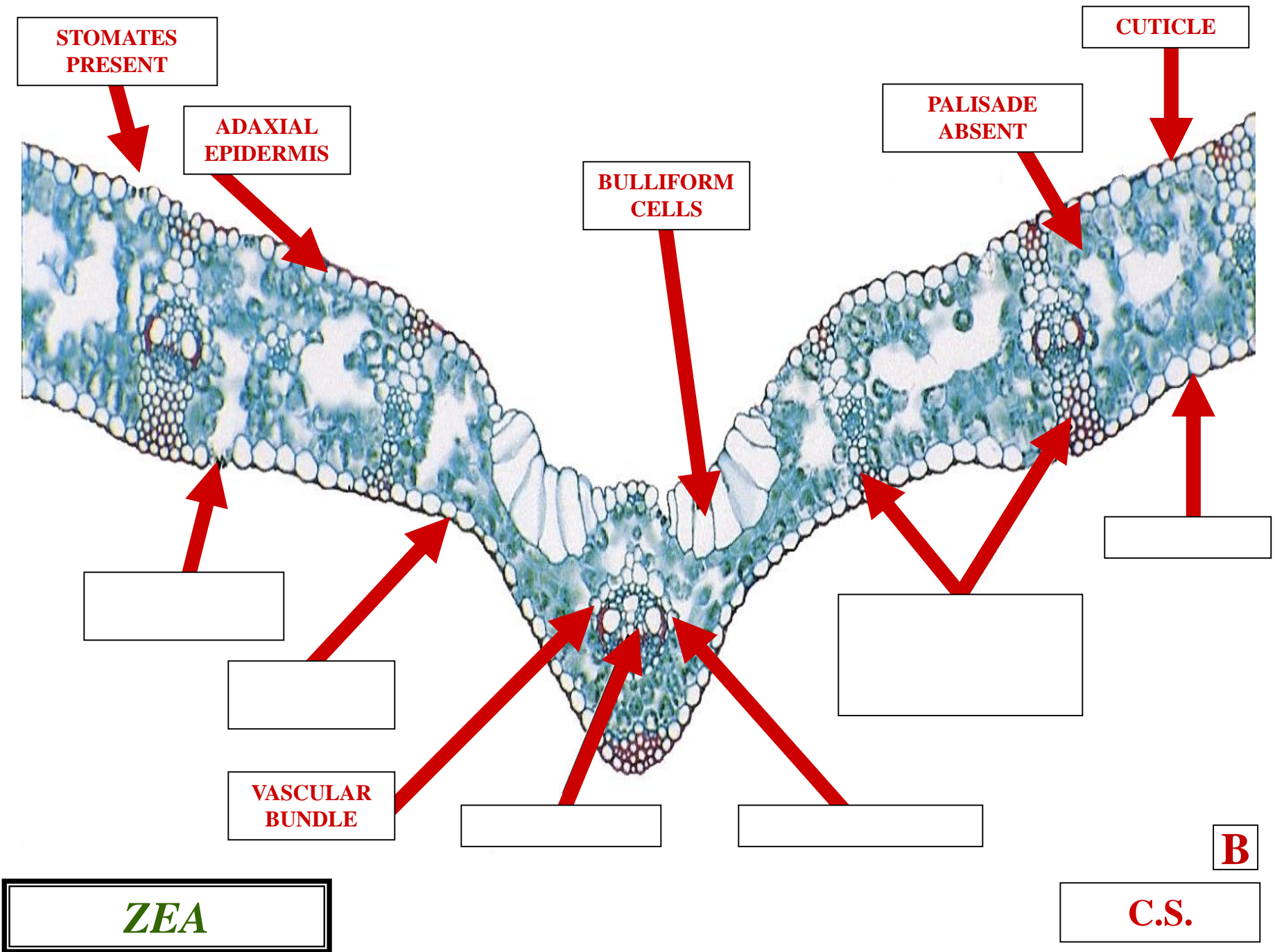
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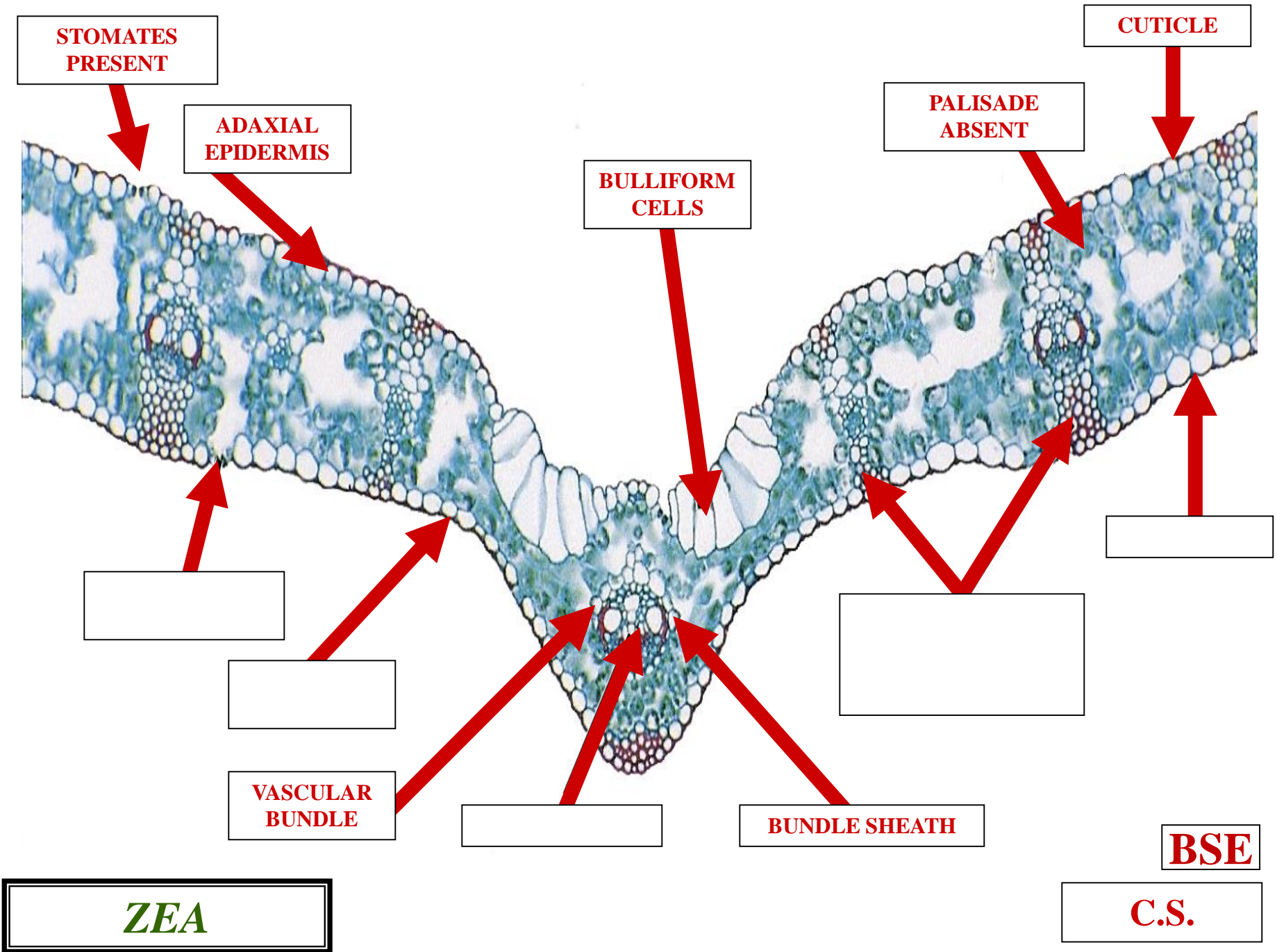
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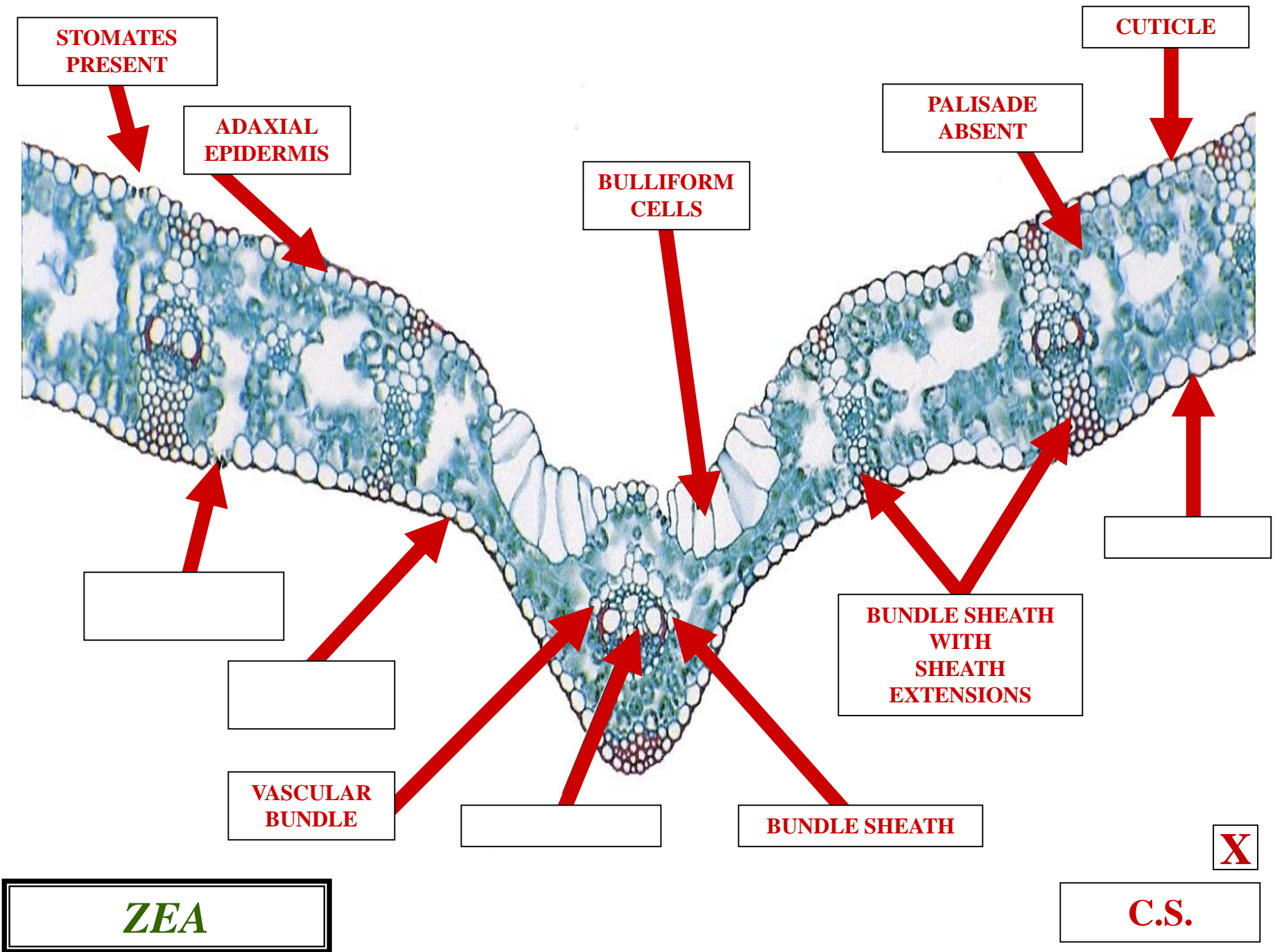
ZEA

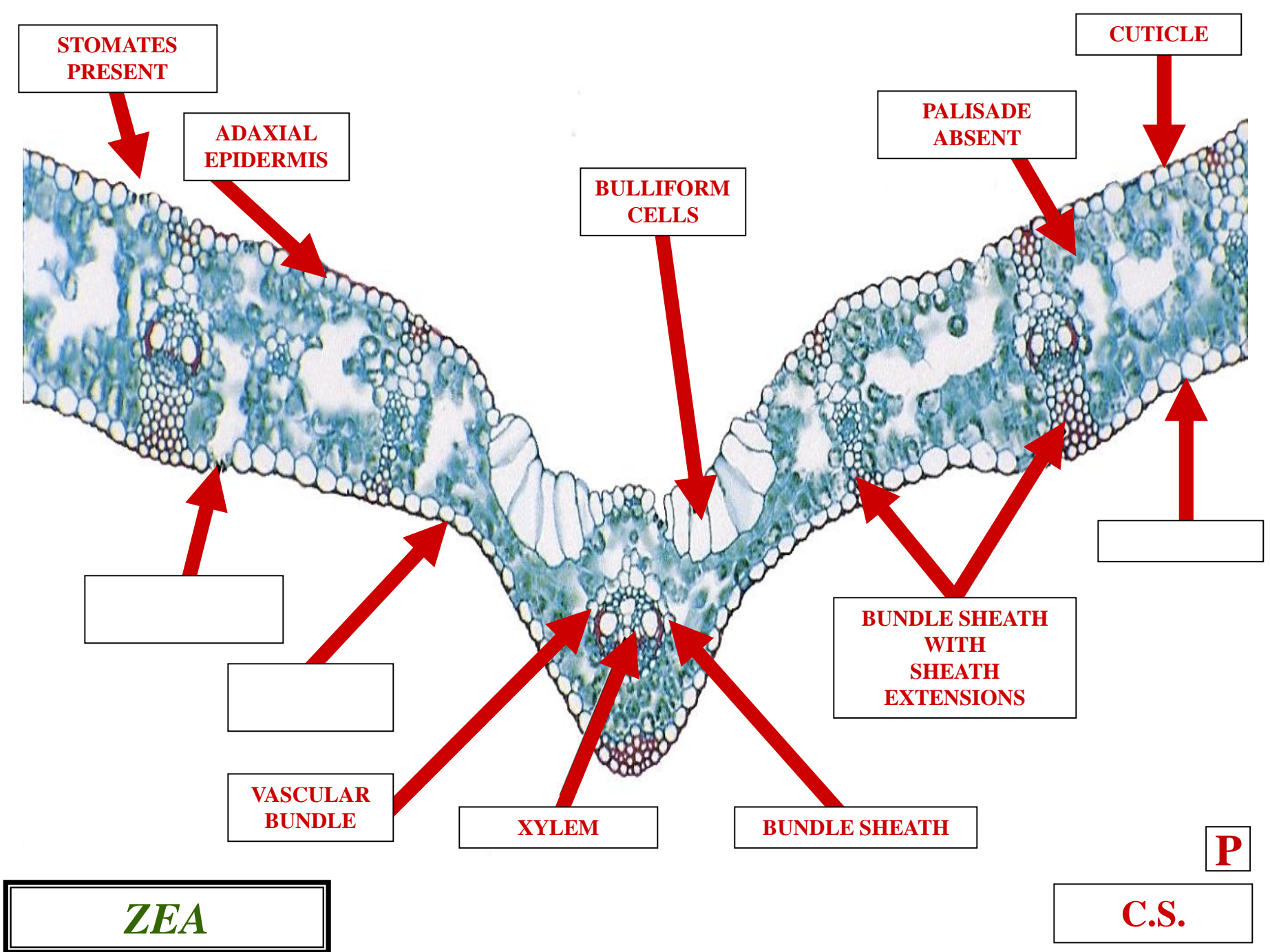
C.S.

V









**STOMATES
PRESENT**

CUTICLE

**ADAXIAL
EPIDERMIS**

**PALISADE
ABSENT**

**BULLIFORM
CELLS**

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**BUNDLE SHEATH
WITH
SHEATH
EXTENSIONS**

**VASCULAR
BUNDLE**

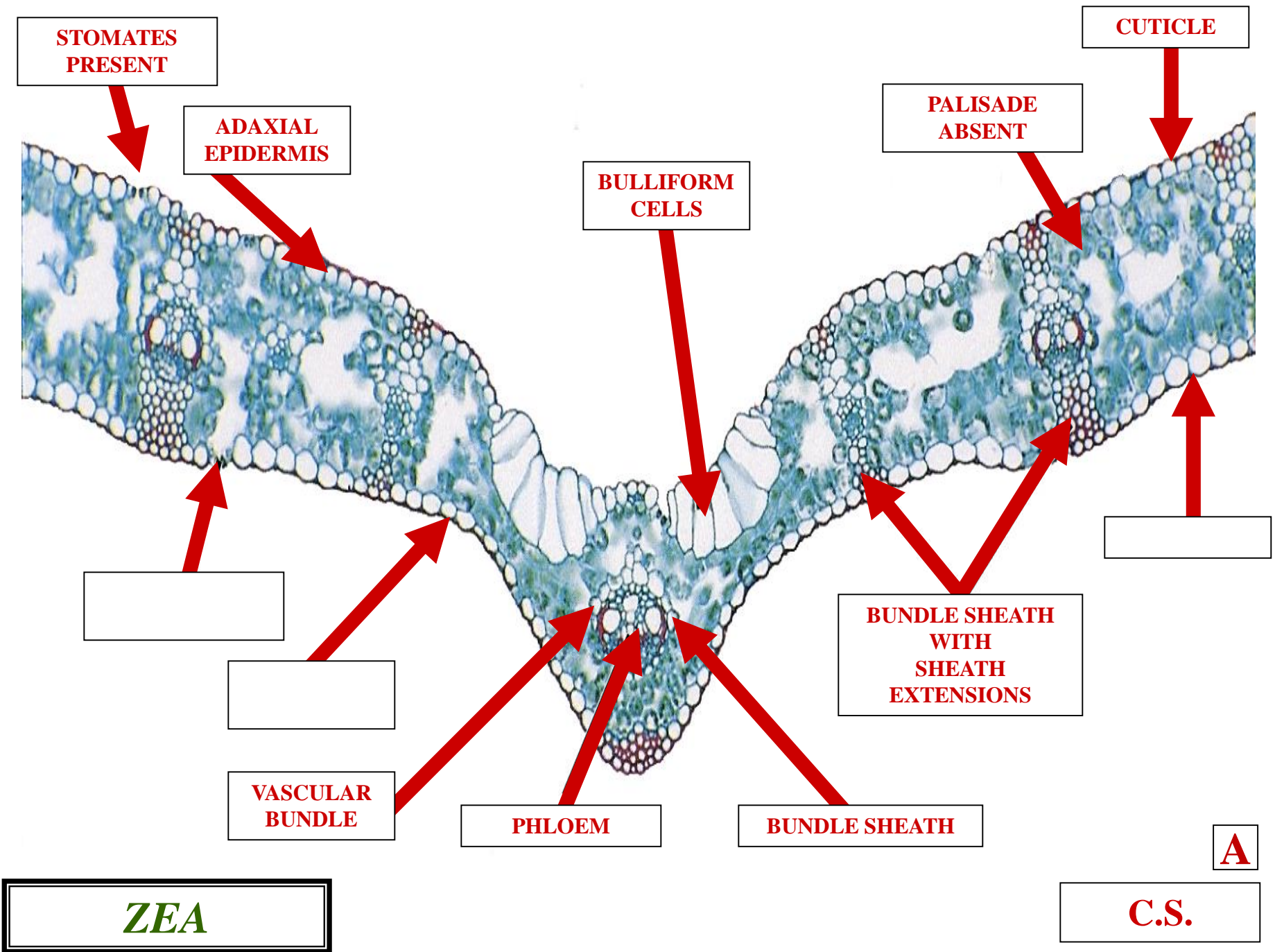
XYLEM

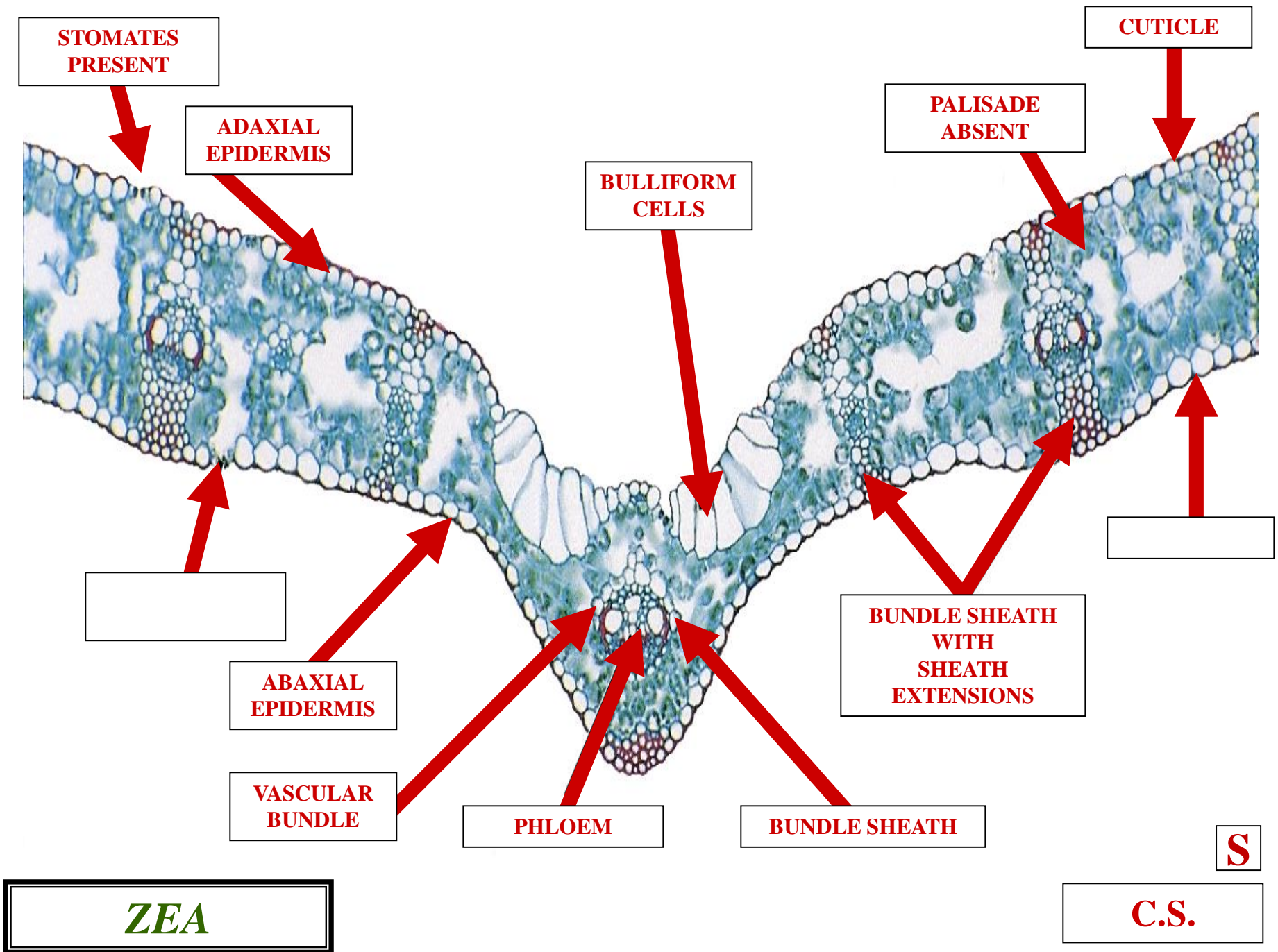
BUNDLE SHEATH

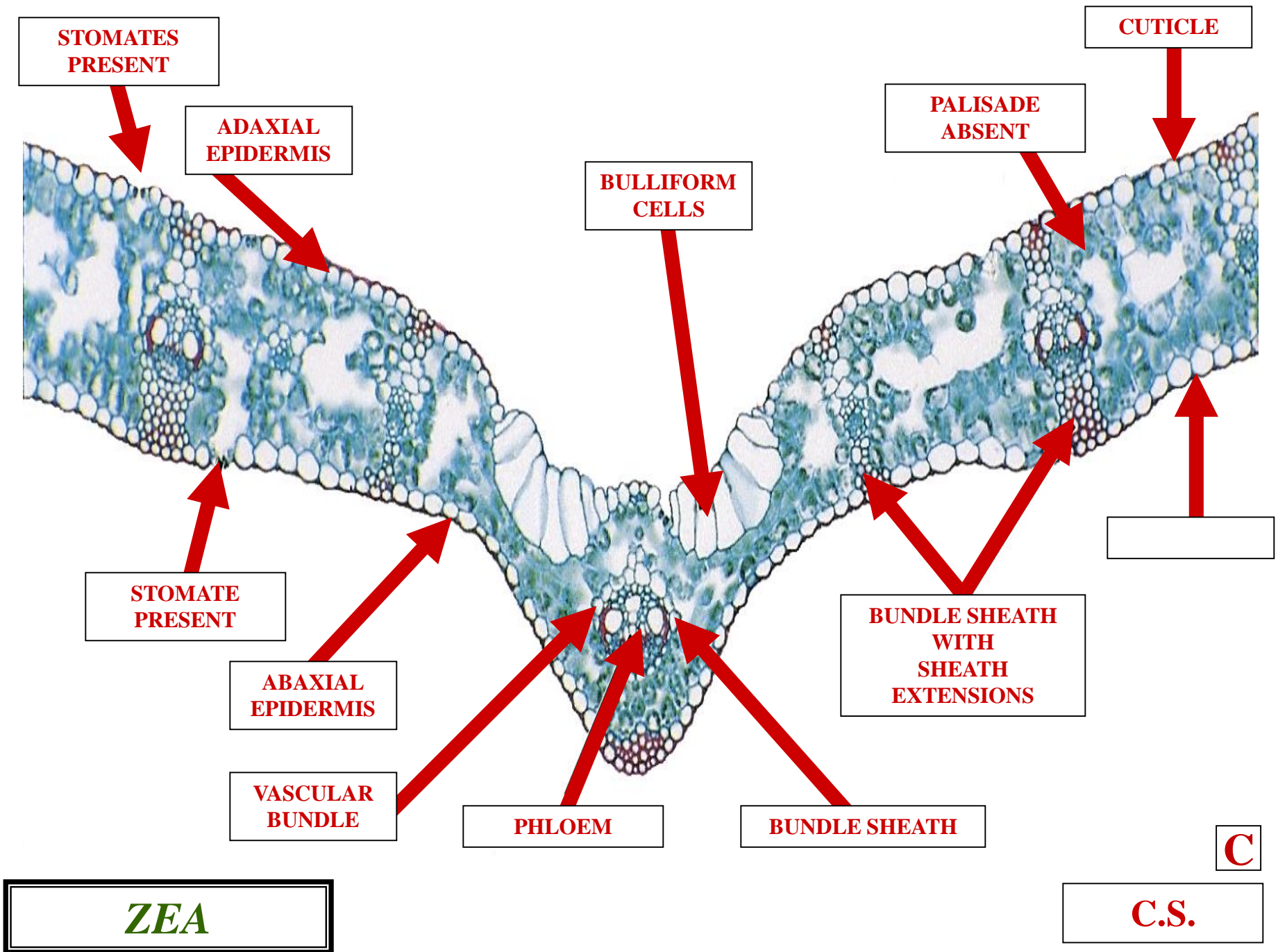
ZEA

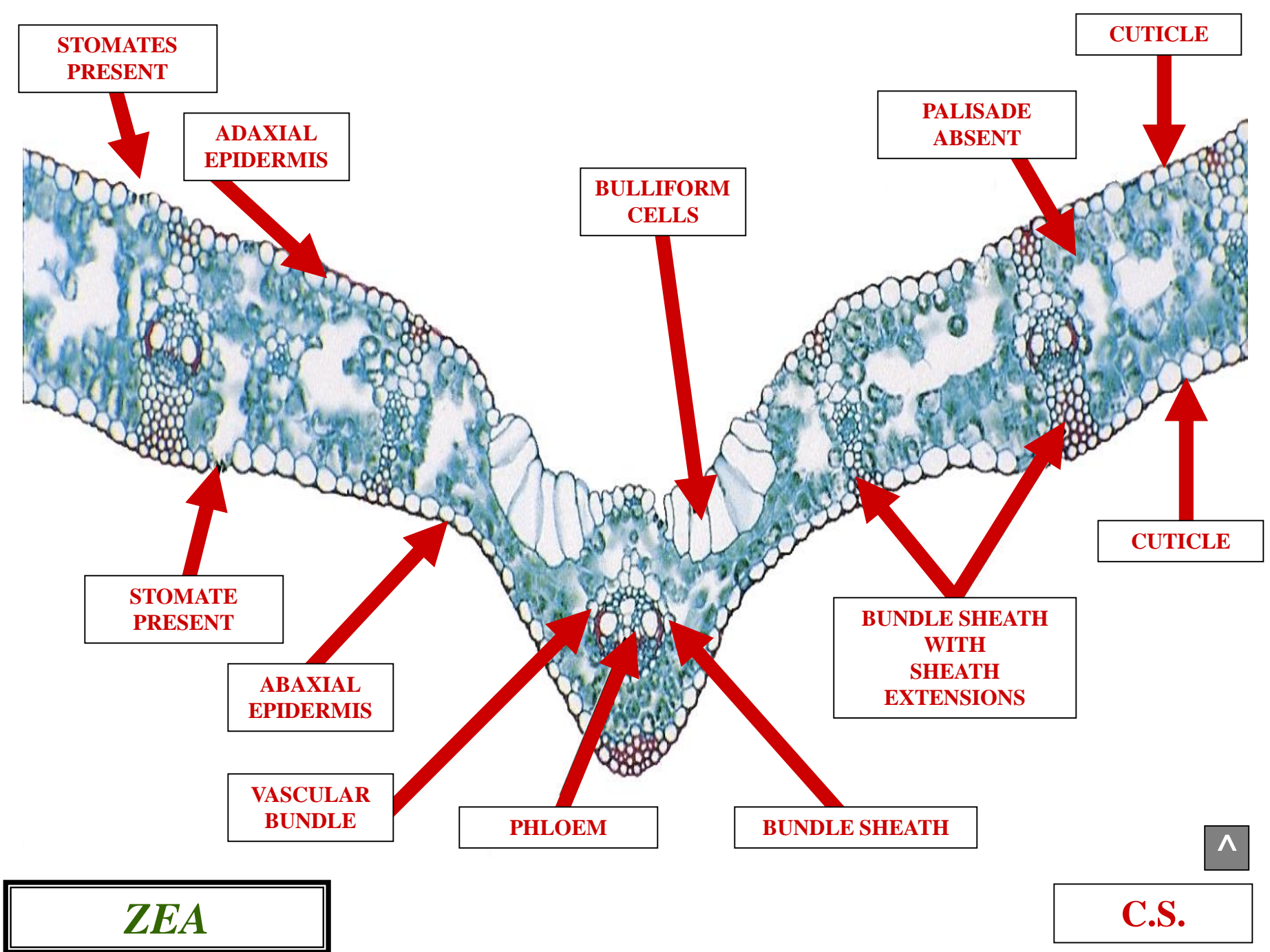
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C.S.









ZEA

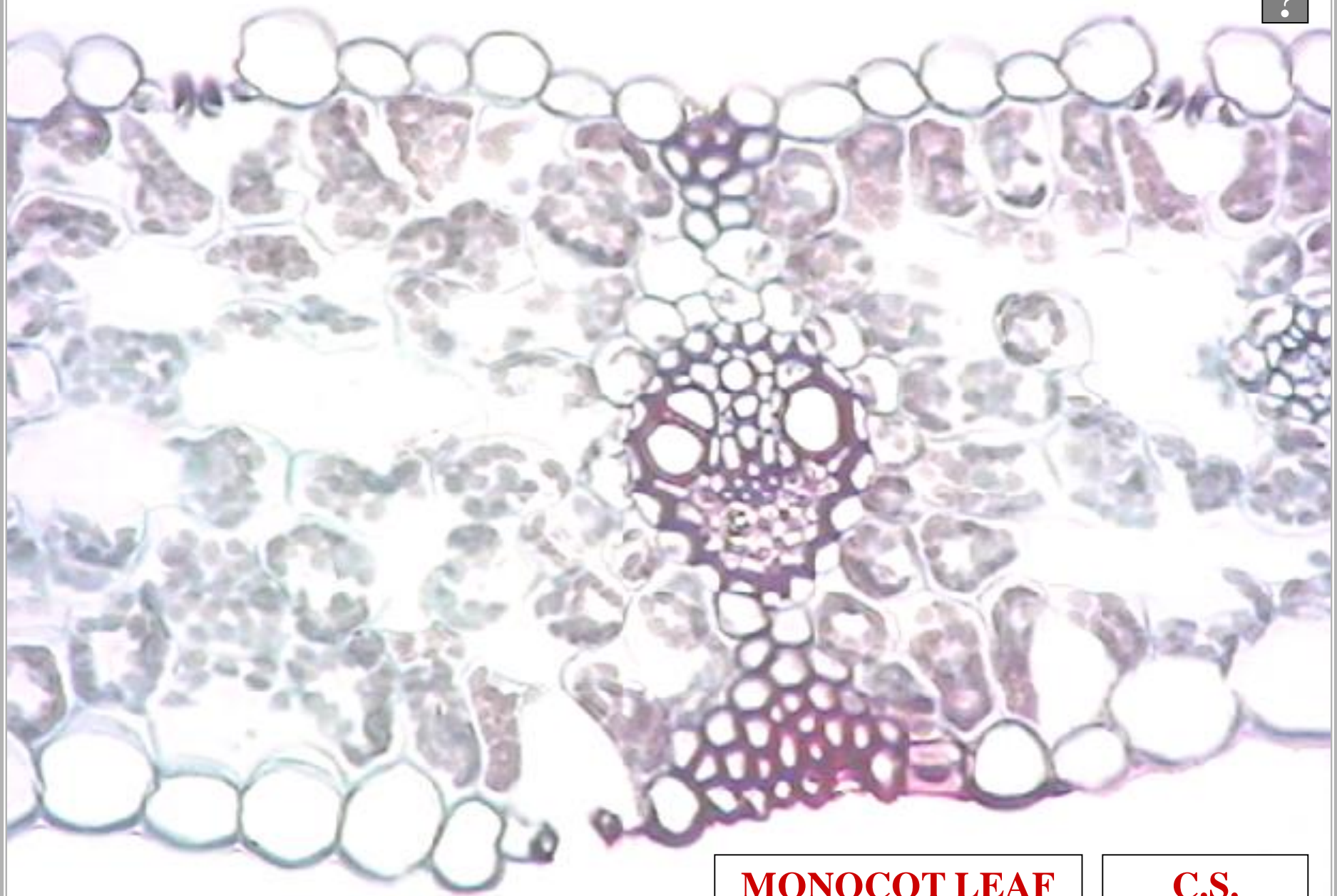
C.S.





MONOCOT LEAF ANATOMY SUMMARY

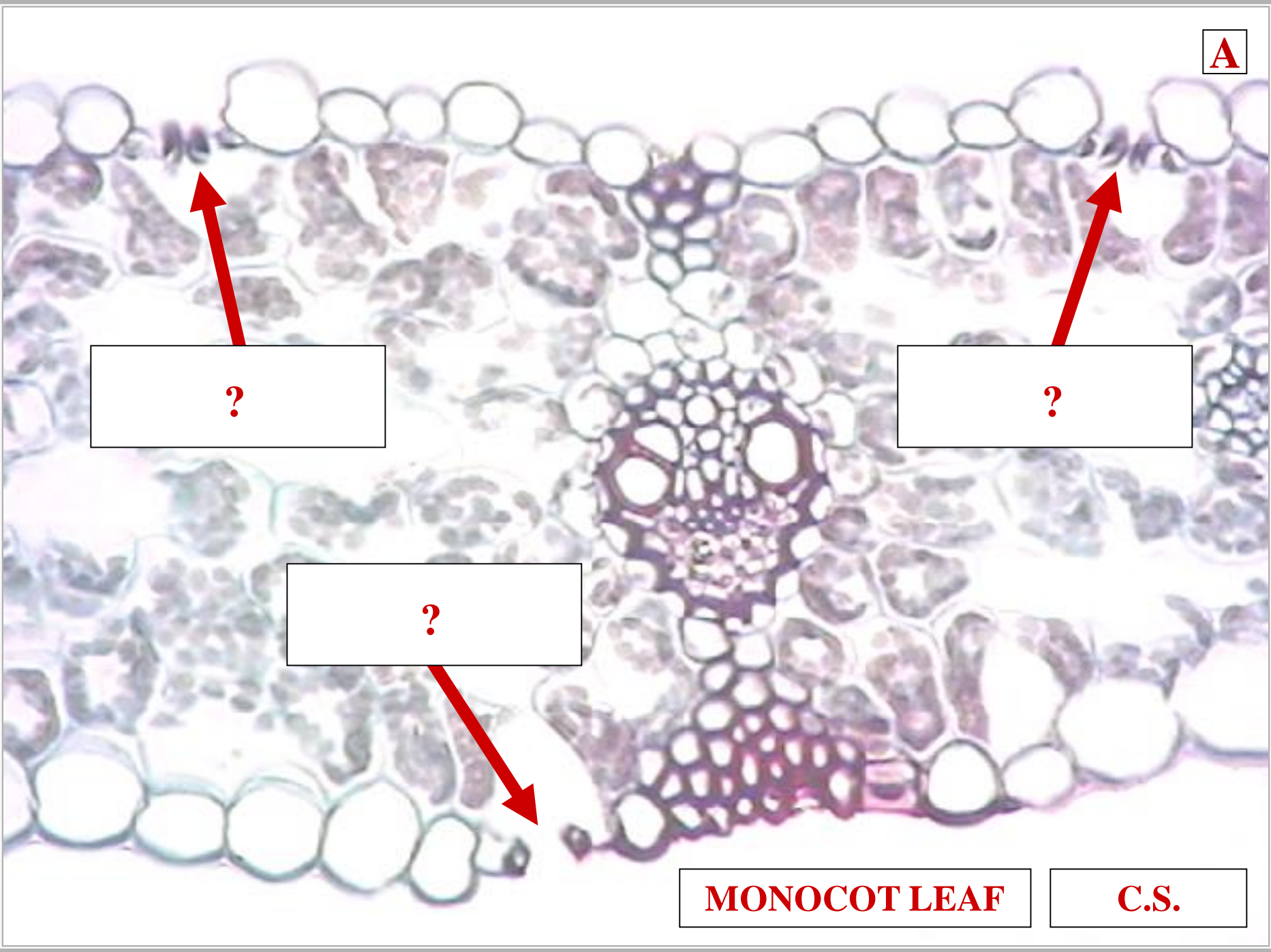
?



MONOCOT LEAF

C.S.

A



?

?

?

MONOCOT LEAF

C.S.

?



ADAXIAL
STOMATES

This micrograph shows a cross-section of a monocot leaf. The upper surface (top) is covered by a single layer of epidermal cells, with small, sunken stomata visible. The middle part of the leaf is the mesophyll, consisting of several layers of cells. The lower surface (bottom) is also covered by a single layer of epidermal cells, with sunken stomata. The vascular bundles are arranged in a scattered pattern throughout the mesophyll. Red arrows point from the labels to the stomata on both the upper and lower surfaces.

ADAXIAL
STOMATES

ABAXIAL
STOMATES

MONOCOT LEAF

C.S.

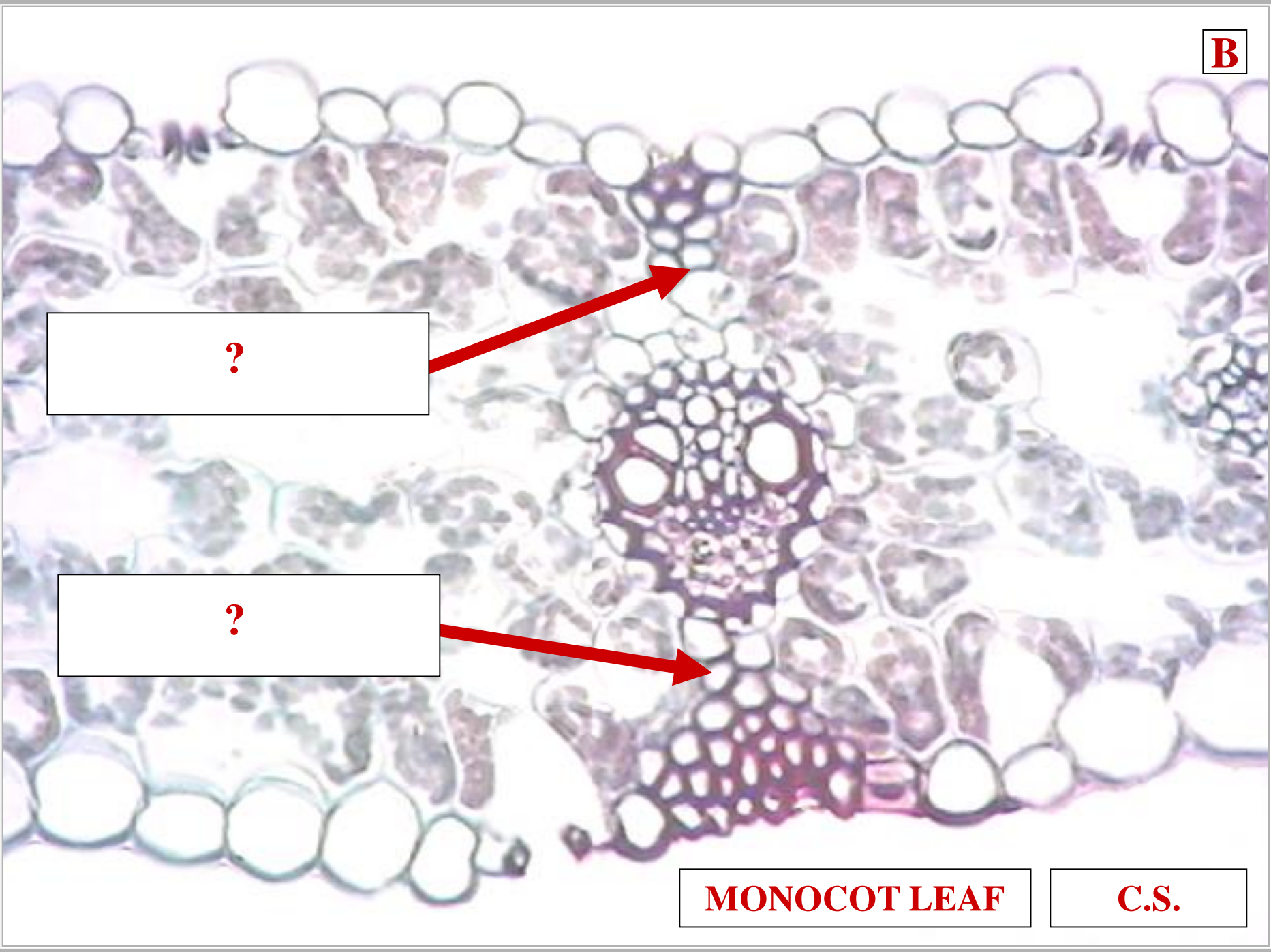
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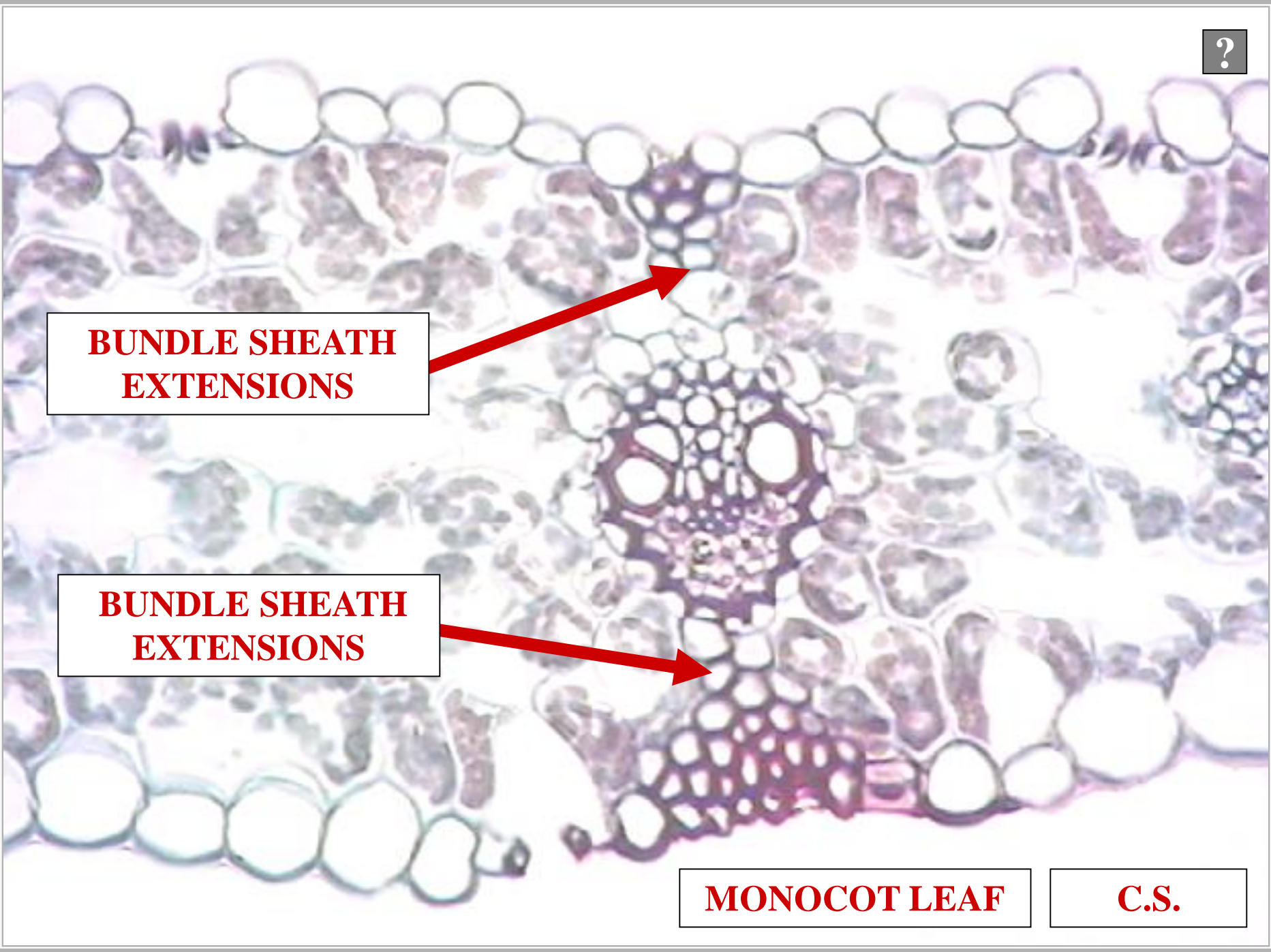
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MONOCOT LEAF

C.S.

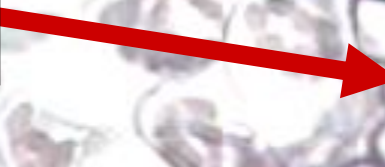




**BUNDLE SHEATH
EXTENSIONS**



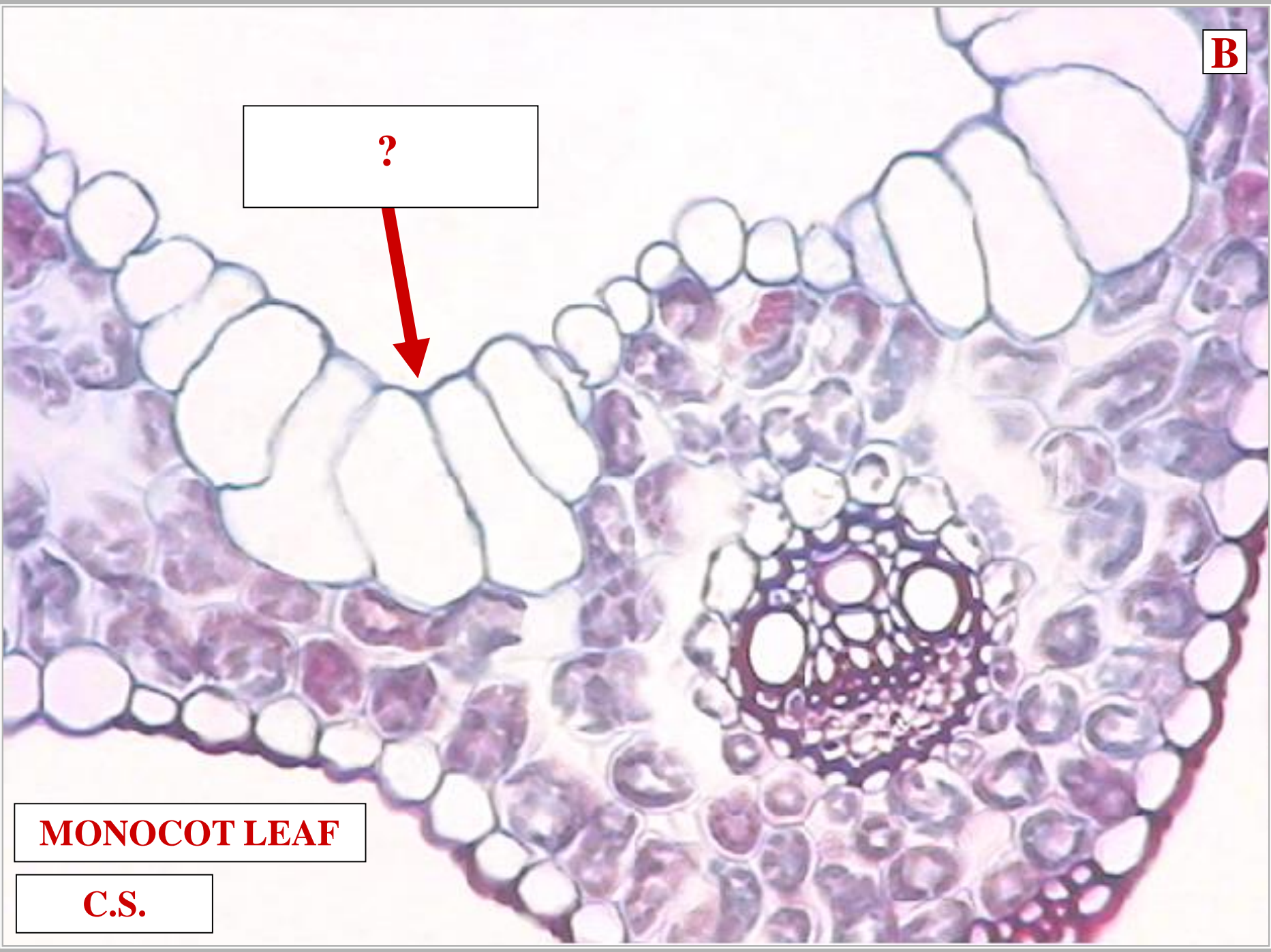
**BUNDLE SHEATH
EXTENSIONS**



MONOCOT LEAF

C.S.

B

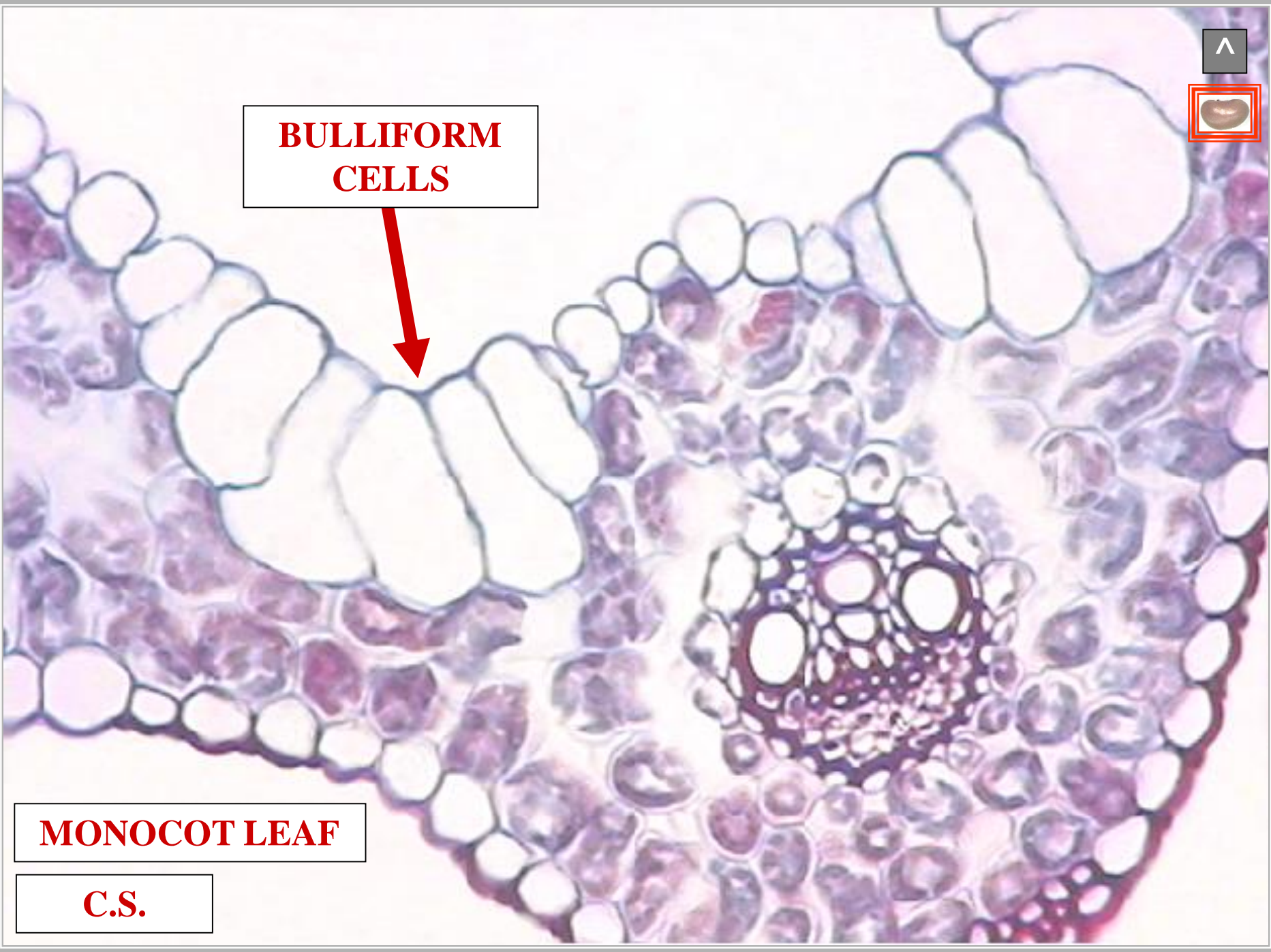


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MONOCOT LEAF

C.S.

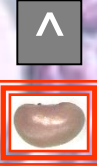


**BULLIFORM
CELLS**



MONOCOT LEAF

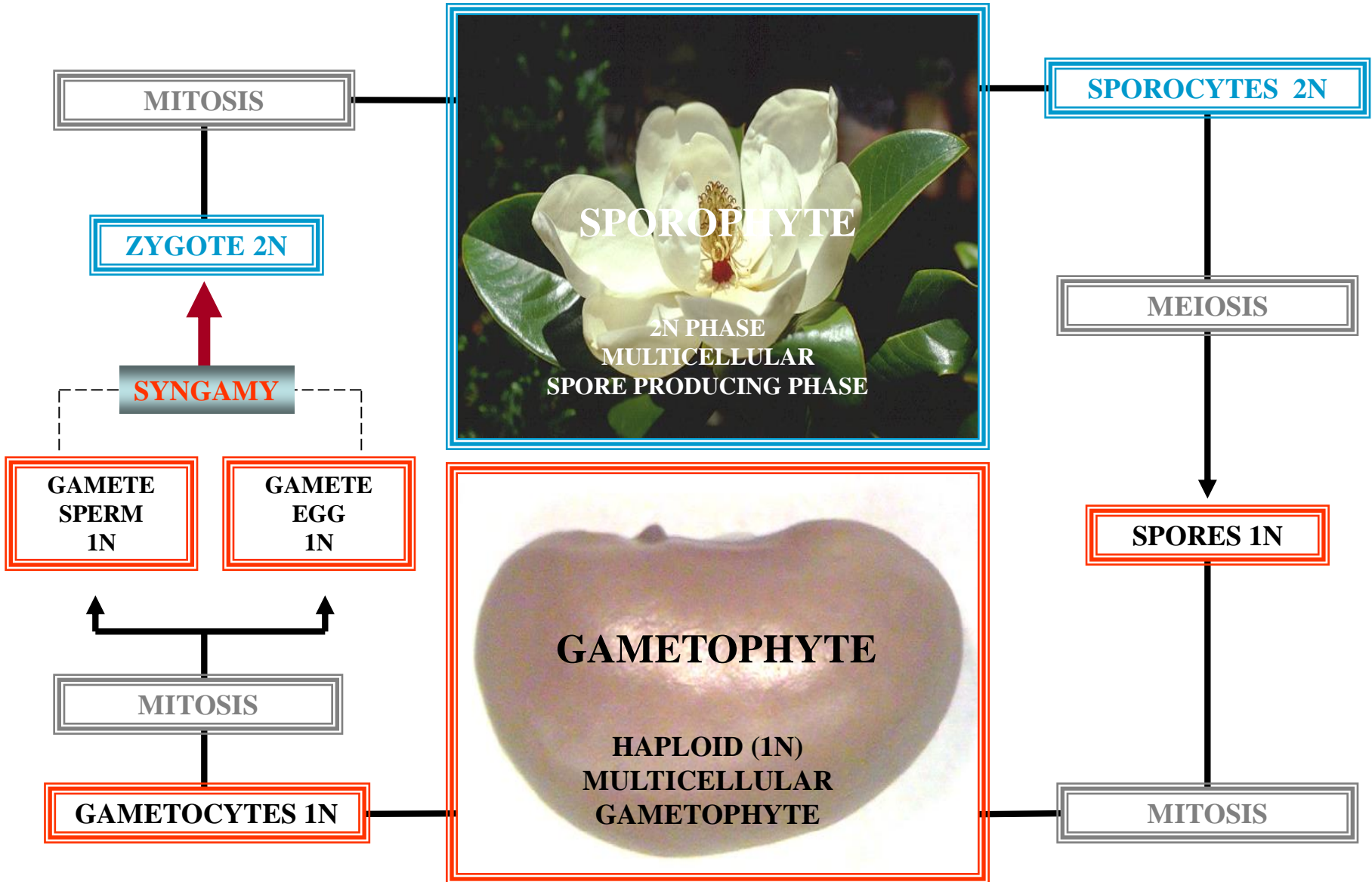
C.S.



MAGNOLIOPHYTA



LIFE CYCLE





GAMETOPHYTE CHARACTERS

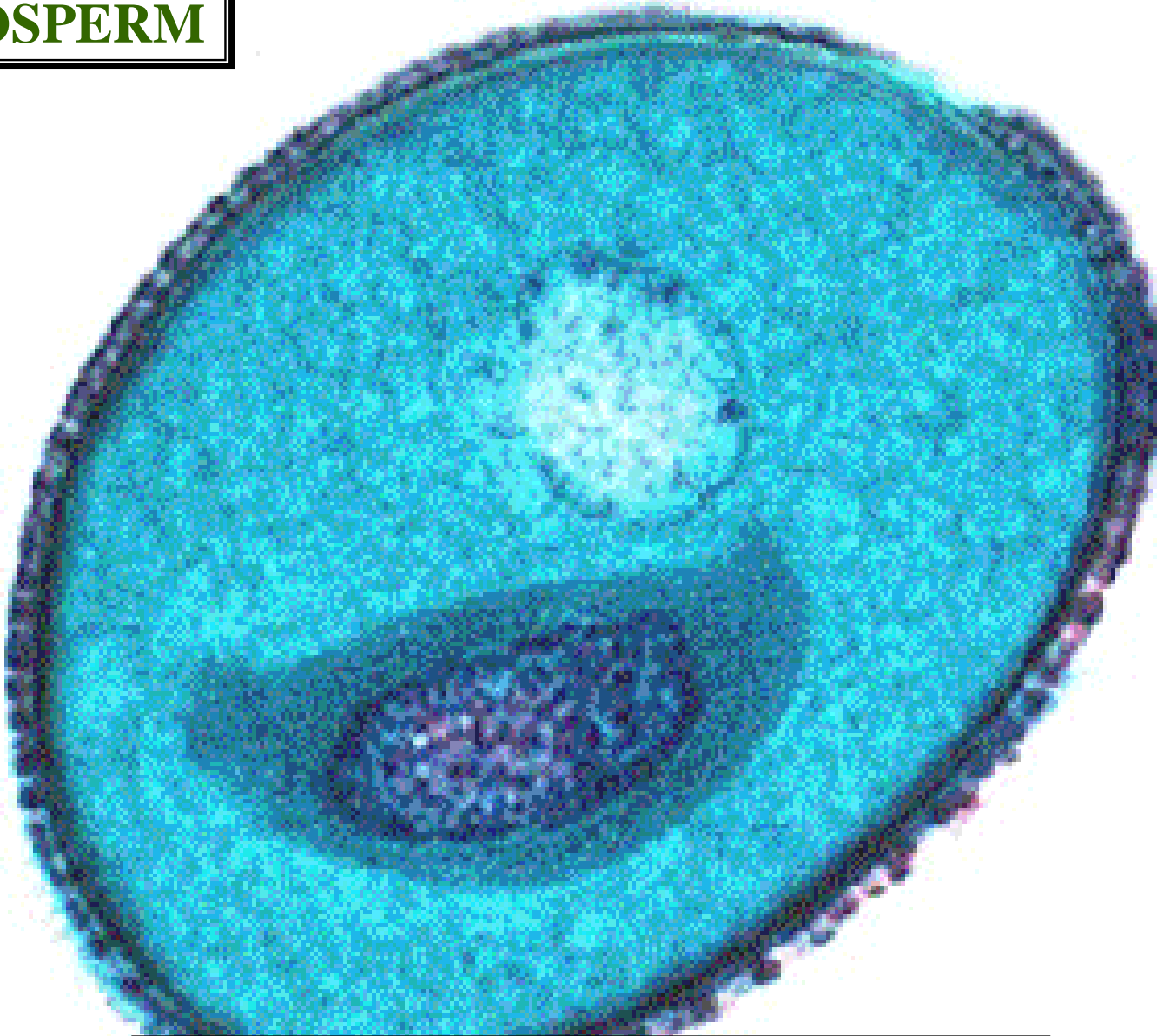


**ANGIOSPERM
GAMETOPHYTE
CONTINUED
REDUCTION**



MICROGAMETOPHYTE

ANGIOSPERM



L.S.

MICROGAMETOPHYTE



ANGIOSPERM

2

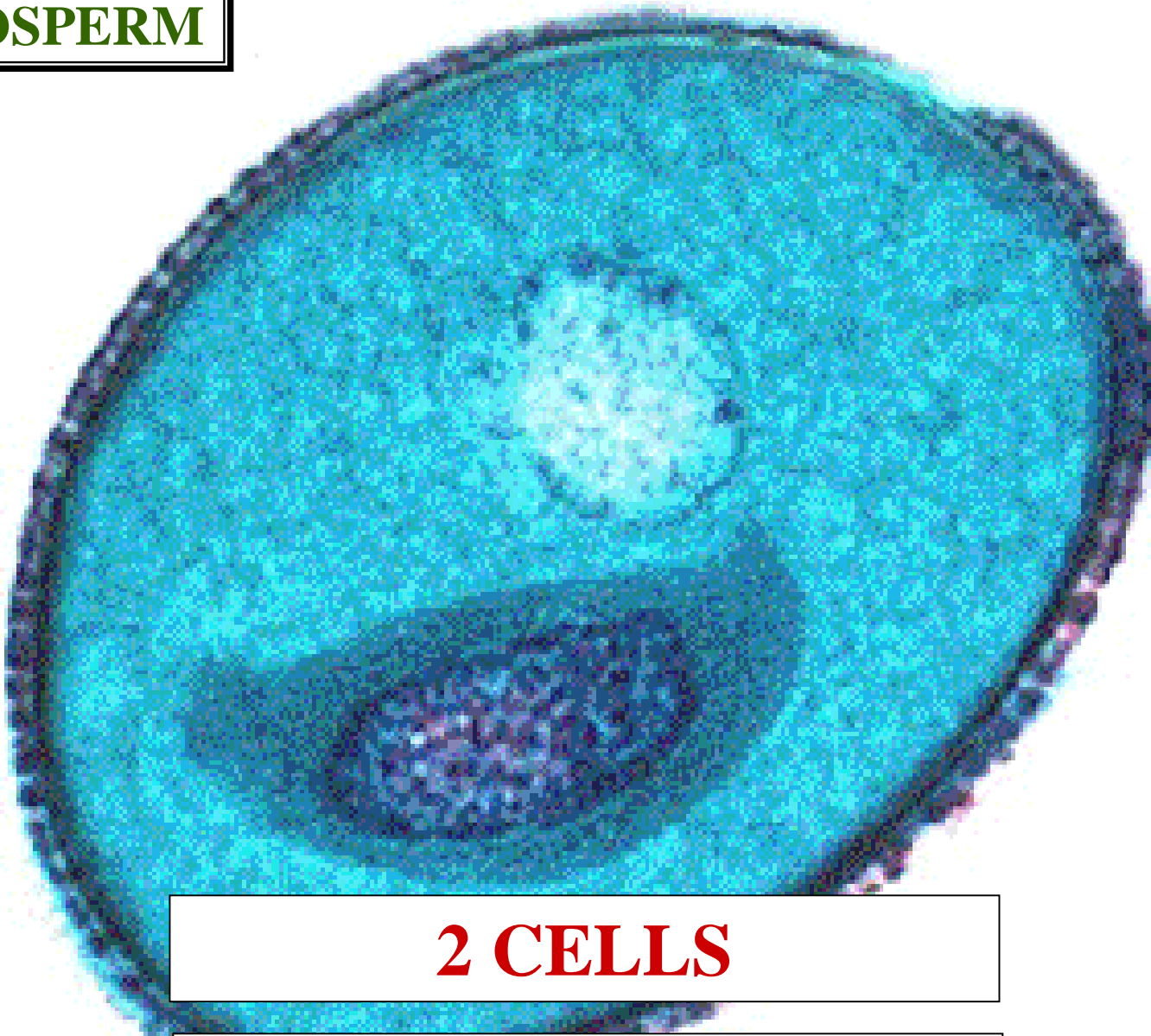


L.S.

POLLEN GRAIN

ANGIOSPERM

T



2 CELLS

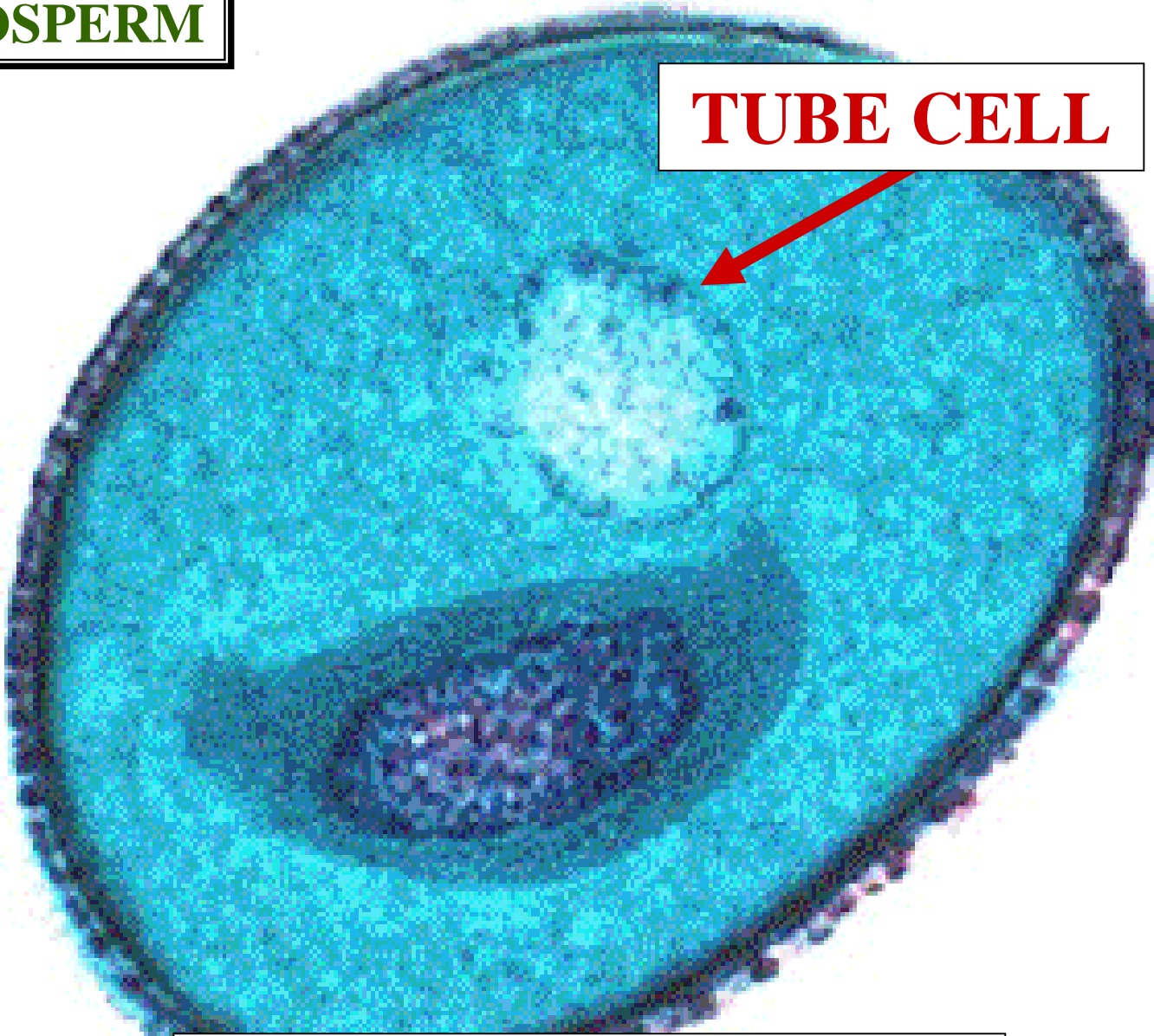
L.S.

POLLEN GRAIN

ANGIOSPERM

G

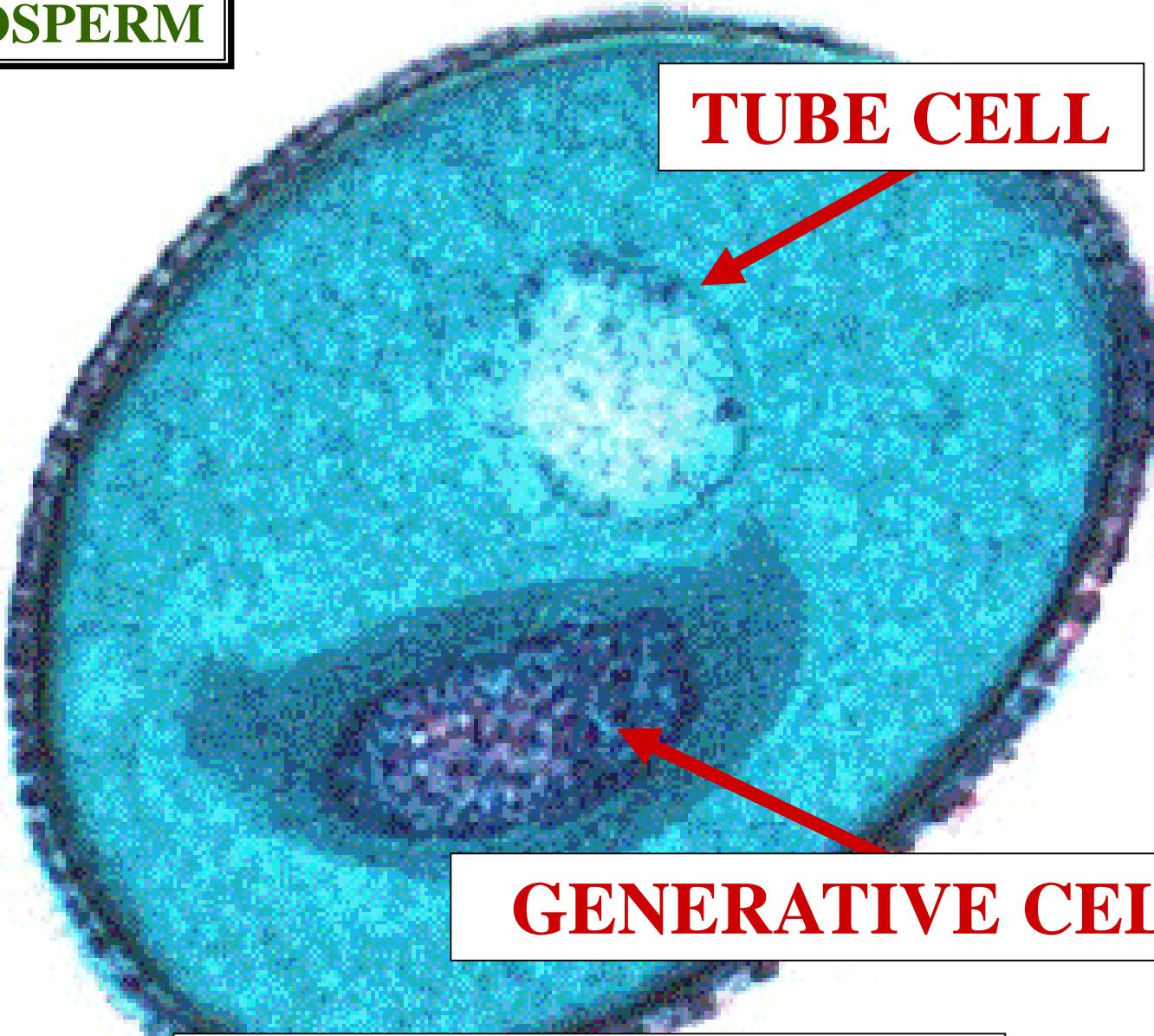
TUBE CELL



L.S.

POLLEN GRAIN

ANGIOSPERM



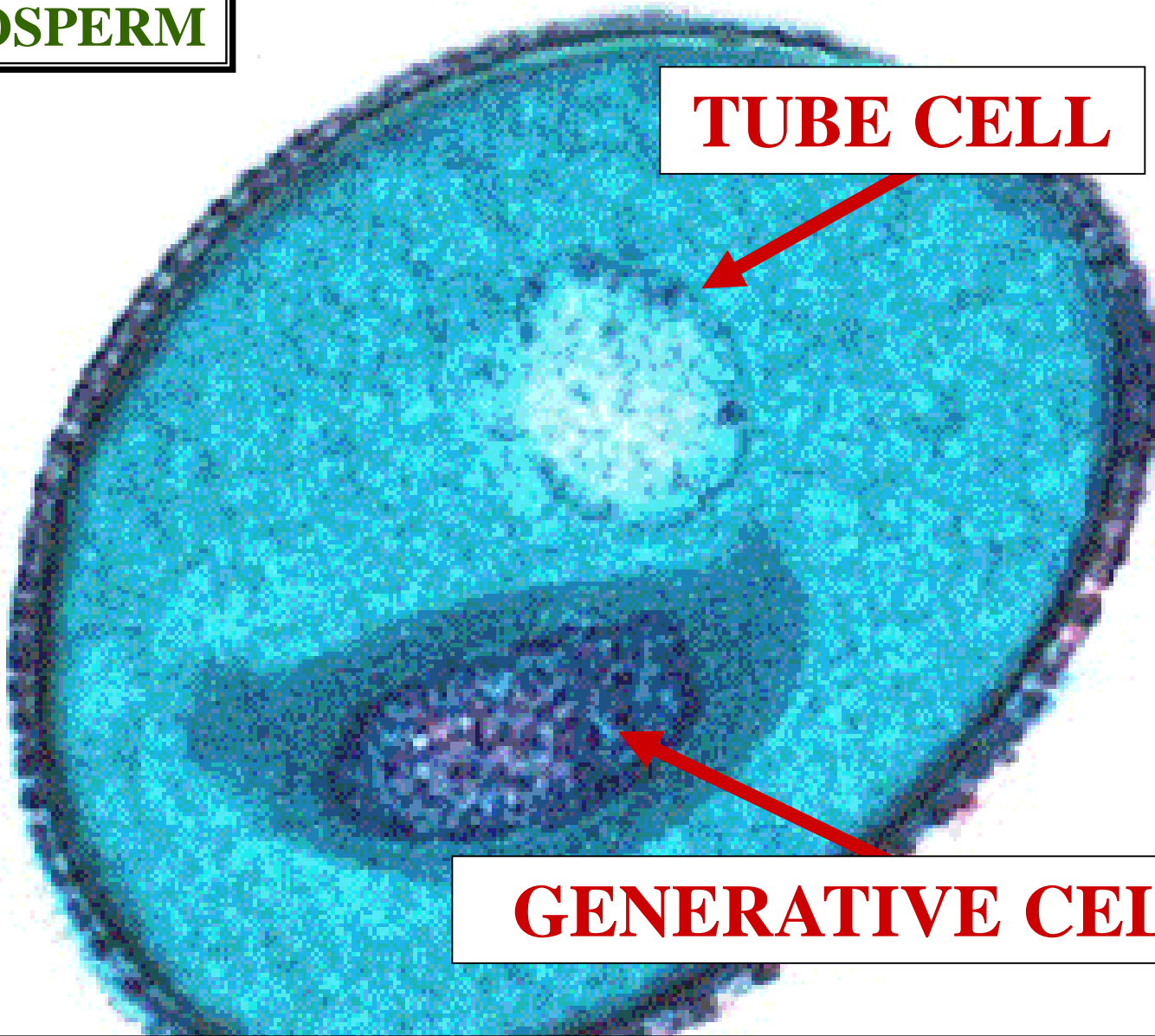
TUBE CELL

GENERATIVE CELL

POLLEN GRAIN

L.S.

ANGIOSPERM



TUBE CELL

GENERATIVE CELL

PROTHALLIAL CELLS: ABSENT

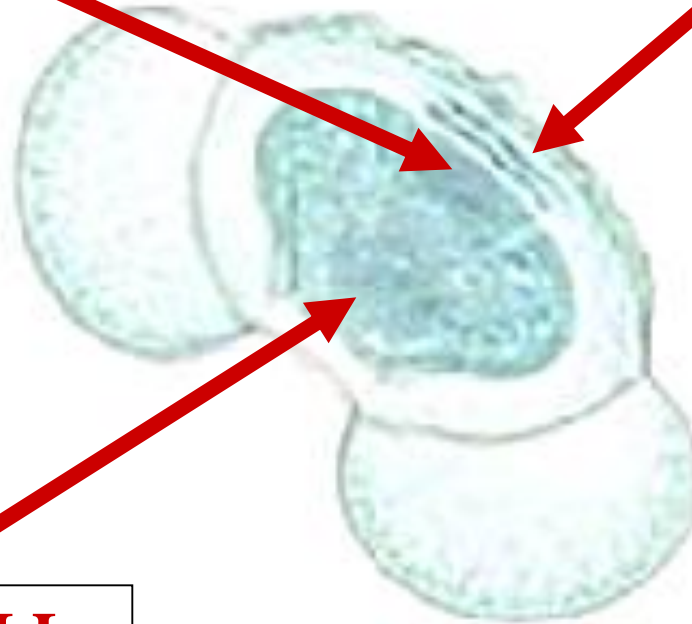


GYMNOSPERM



GENERATIVE CELL

2 PROTHALLIAL CELLS

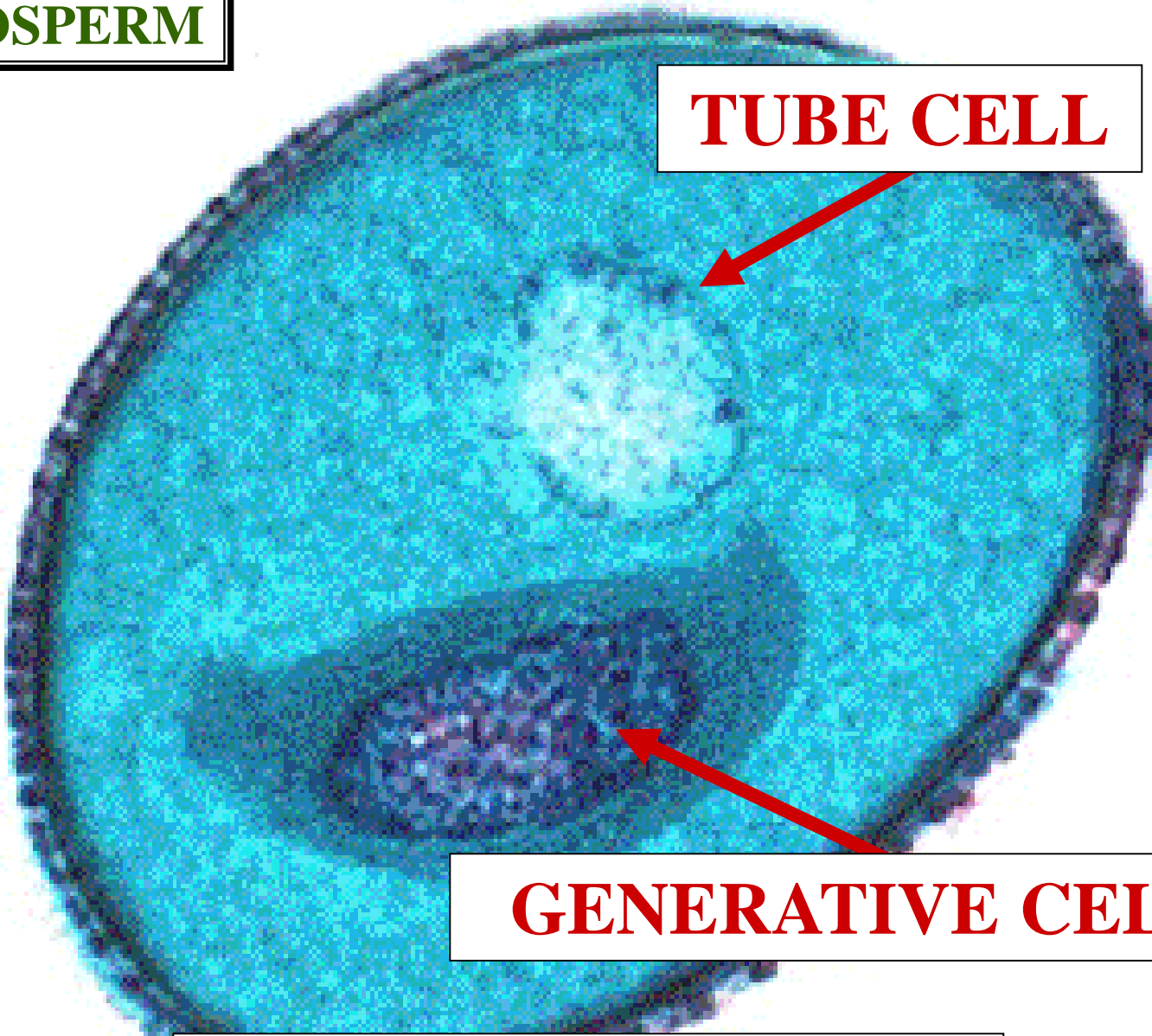


TUBE CELL

PINUS

POLLEN GRAIN

ANGIOSPERM



TUBE CELL

GENERATIVE CELL

L.S.

POLLEN GRAIN



MEGAGAMETOPHYTE



SYNONYM



MEGAGAMETOPHYTE

SYNONYMOUS

EMBRYO SAC

EMBRYO SAC

Type	Megasporocyte	Meiosis		First Mitosis	Second Mitosis	Third Mitosis	Mature embryo sac
Polygonum							
Allium							
Penaea							
Lilium							
Plumbagella							
Plumbago							

ANGIOSPERM

EMBRYO SAC

NUMEROUS

TYPES

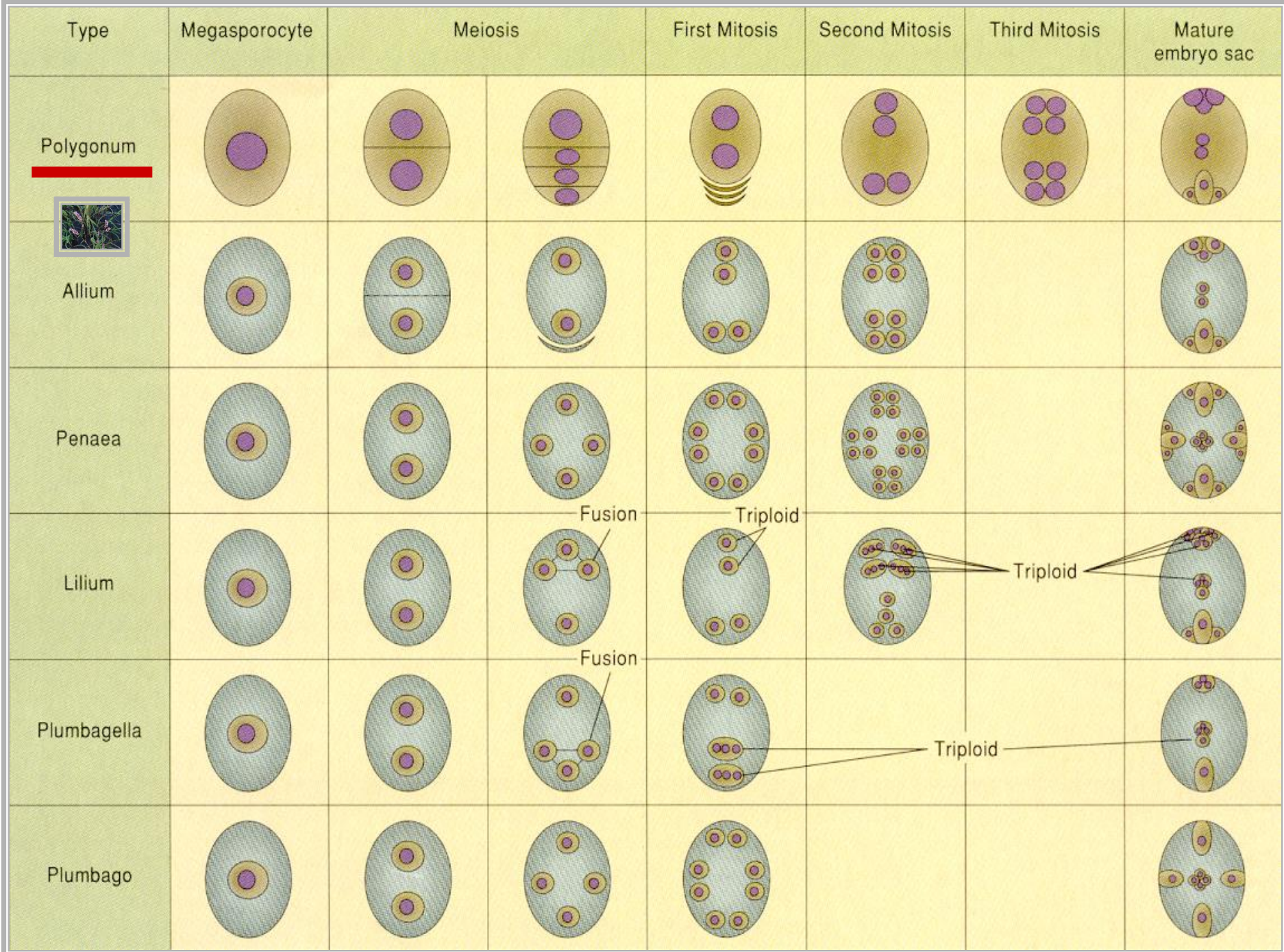
P

Fusion

Triploid

Fusion

Triploid





POLYGONUM

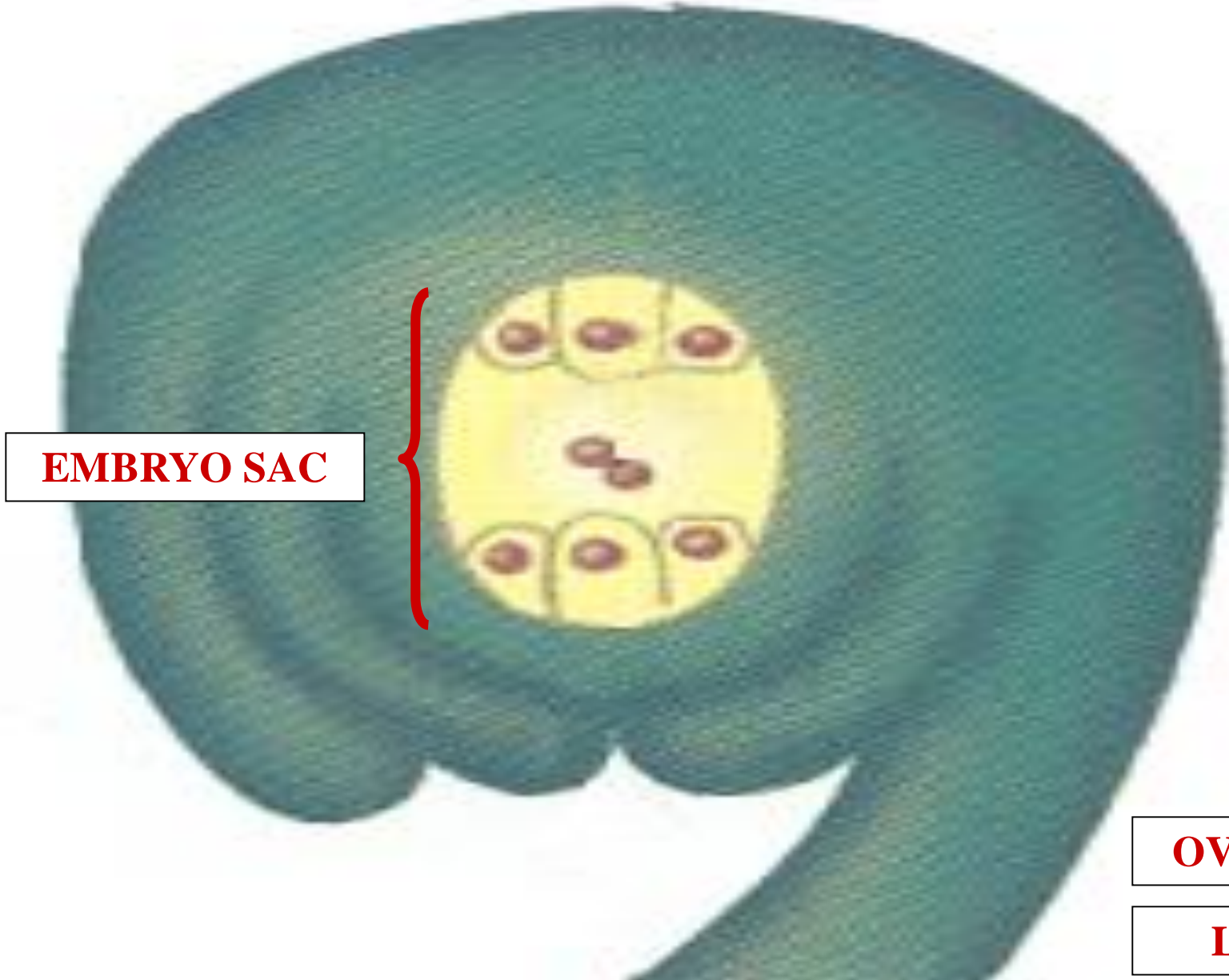


POLYGONUM
TYPE
EMBRYO SAC
STANDARD
EXAMPLE



POLYGONUM
EMBRYO SAC

POLYGONUM EMBRYO SAC



EMBRYO SAC

OVULE

L.S.

POLYGONUM EMBRYO SAC

C

EMBRYO SAC
7 CELLS
8 NUCLEI

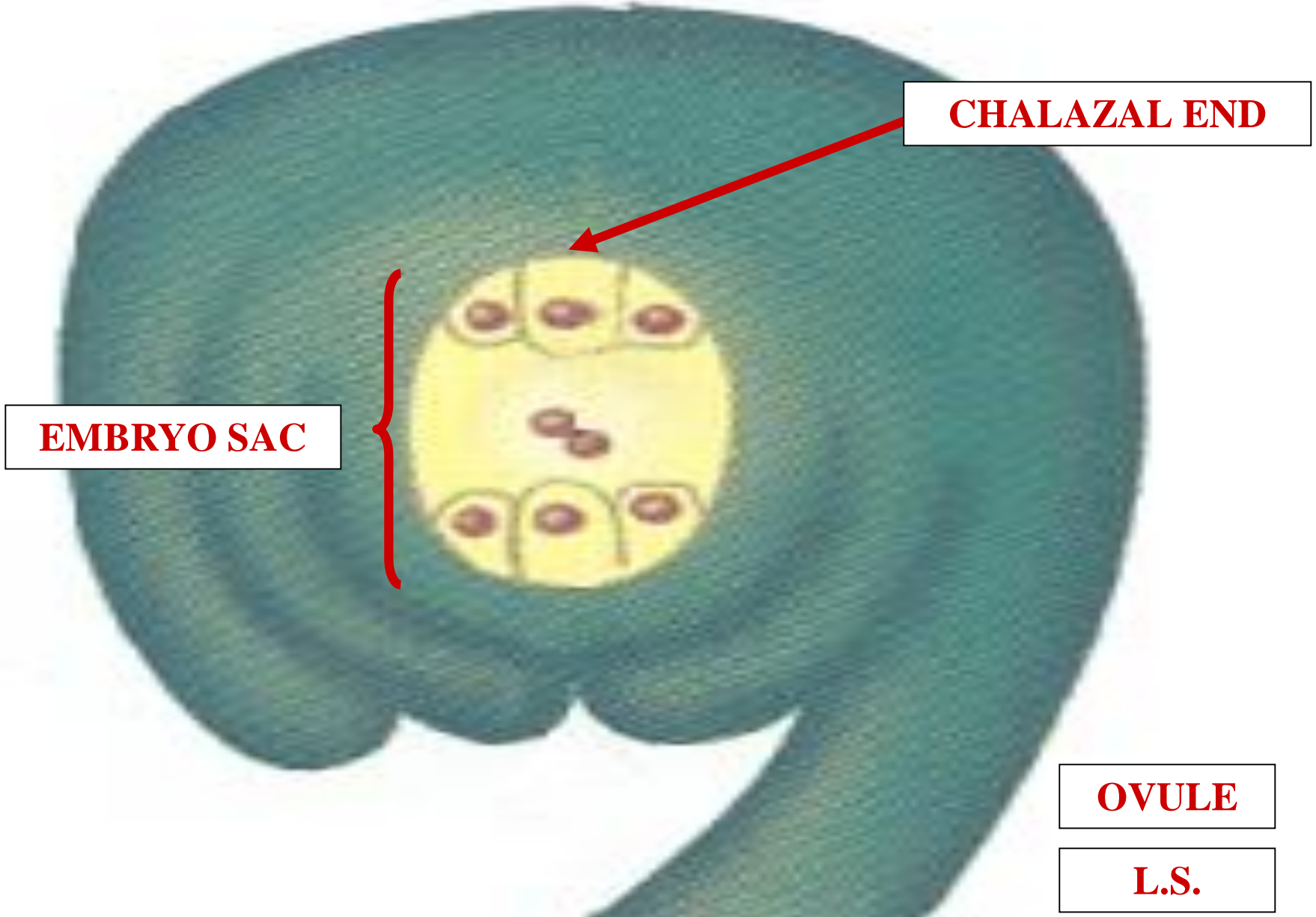


OVULE

L.S.

POLYGONUM EMBRYO SAC

A



CHALAZAL END

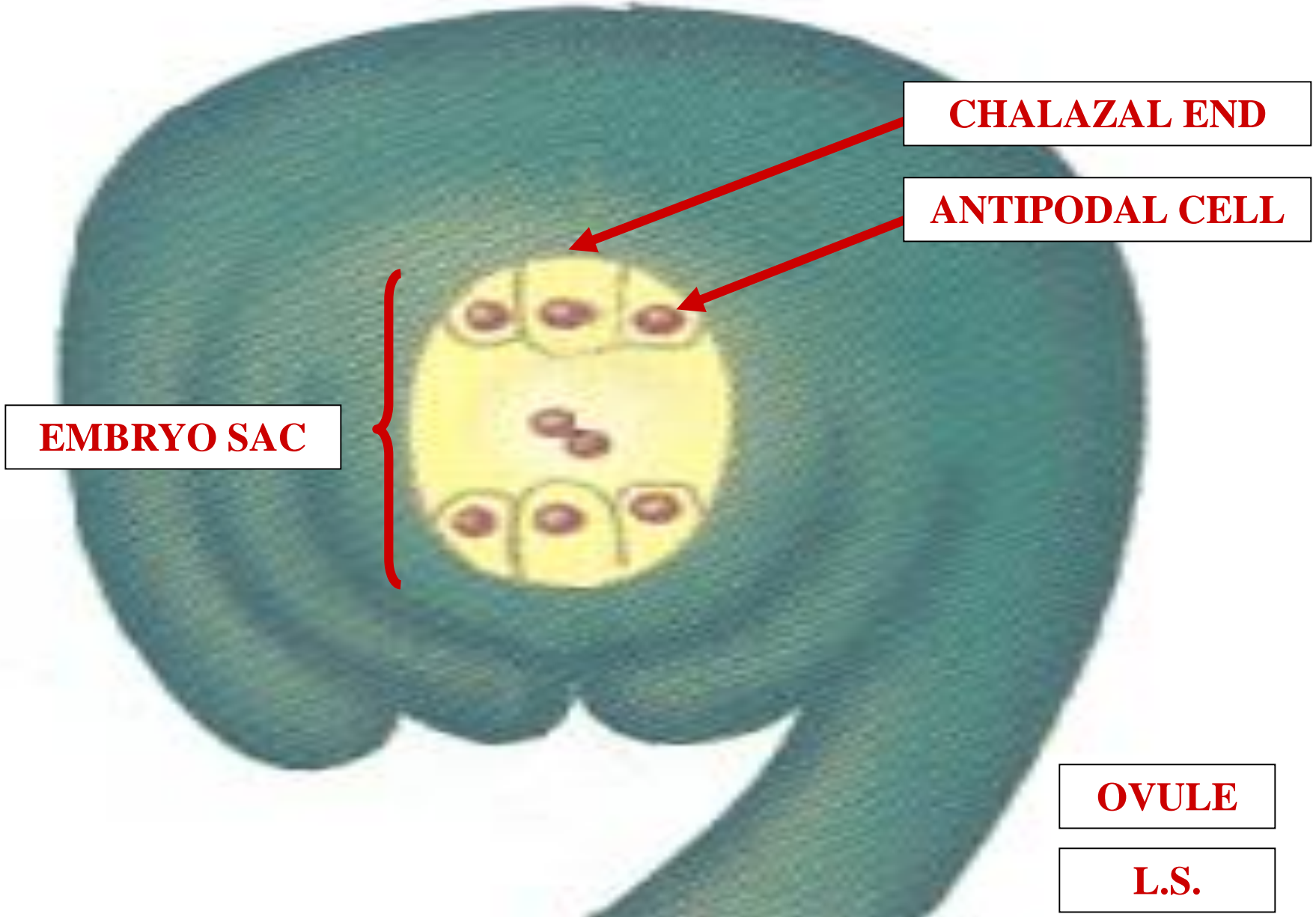
EMBRYO SAC

OVULE

L.S.

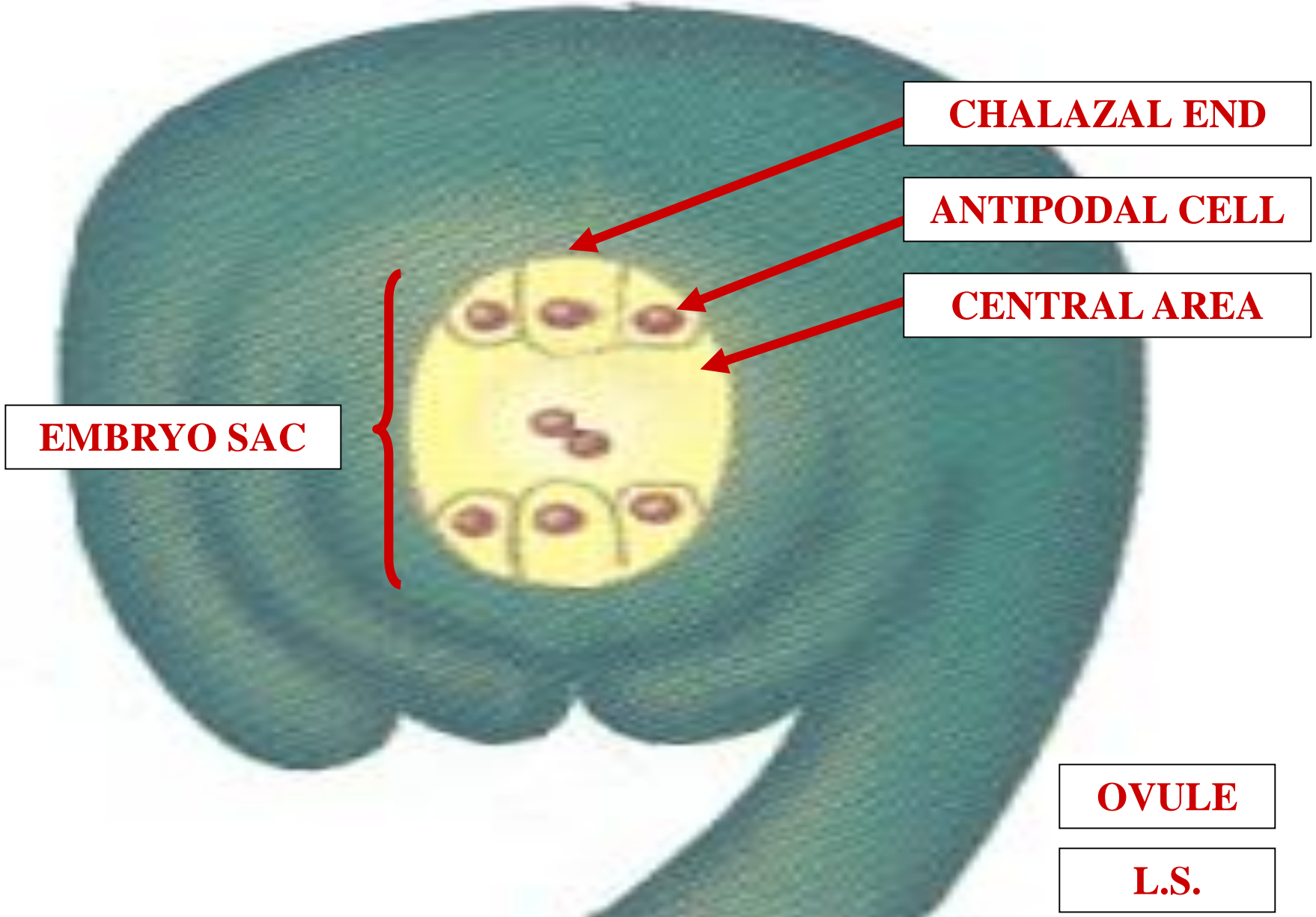
POLYGONUM EMBRYO SAC

C



POLYGONUM EMBRYO SAC

C



CHALAZAL END

ANTIPODAL CELL

CENTRAL AREA

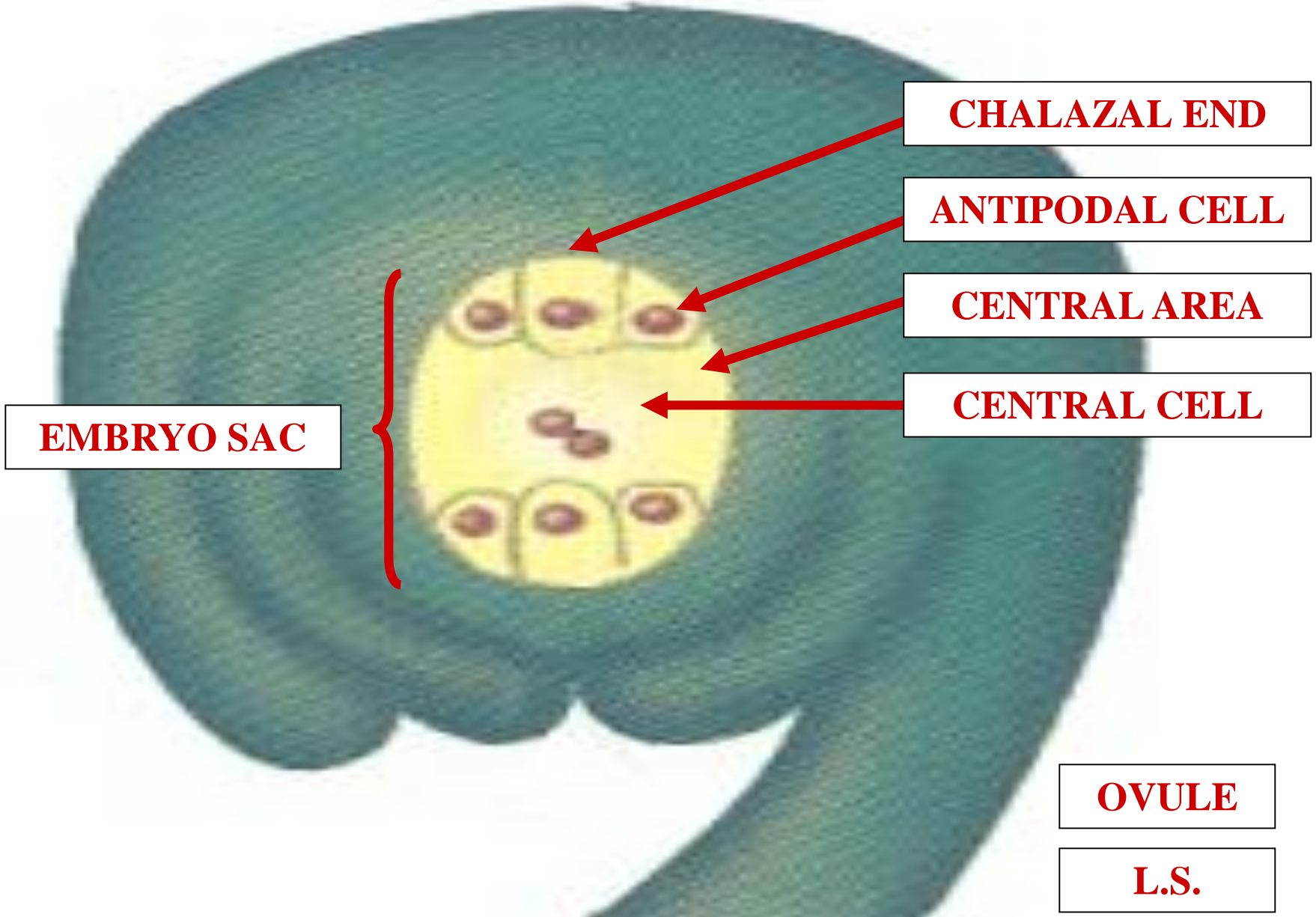
EMBRYO SAC

OVULE

L.S.

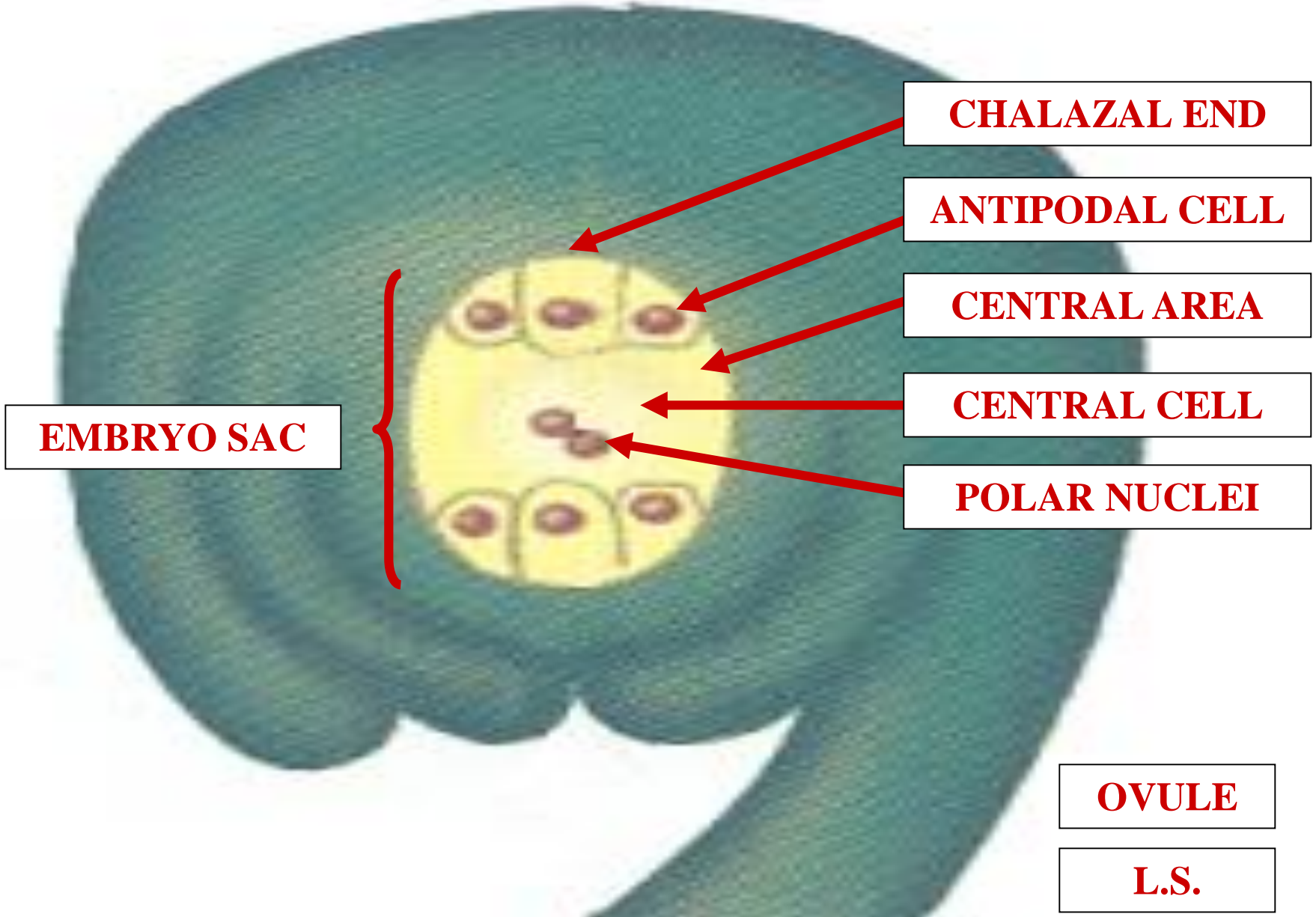
POLYGONUM EMBRYO SAC

P



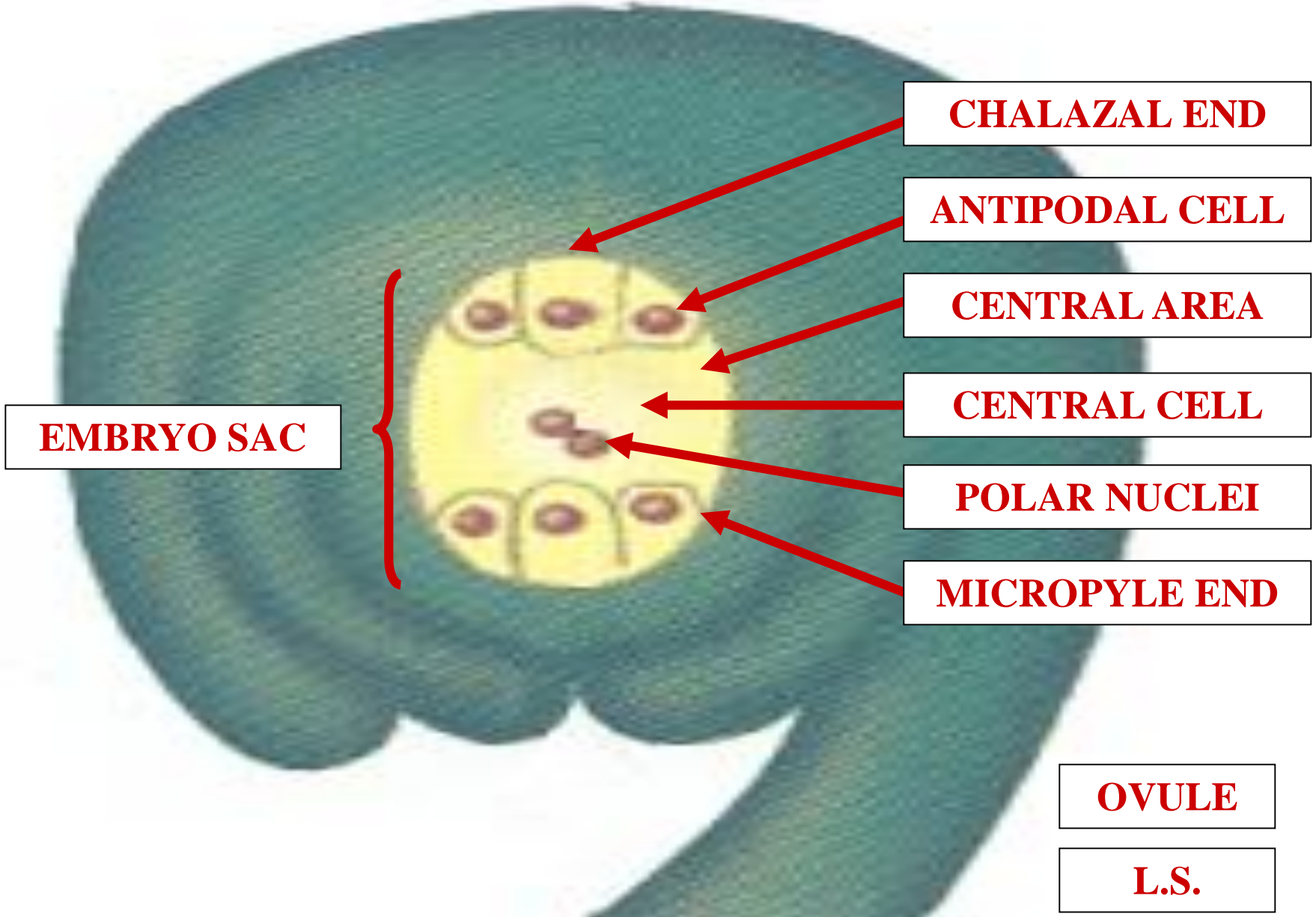
POLYGONUM EMBRYO SAC

M



POLYGONUM EMBRYO SAC

S



CHALAZAL END

ANTIPODAL CELL

CENTRAL AREA

CENTRAL CELL

POLAR NUCLEI

MICROPYLE END

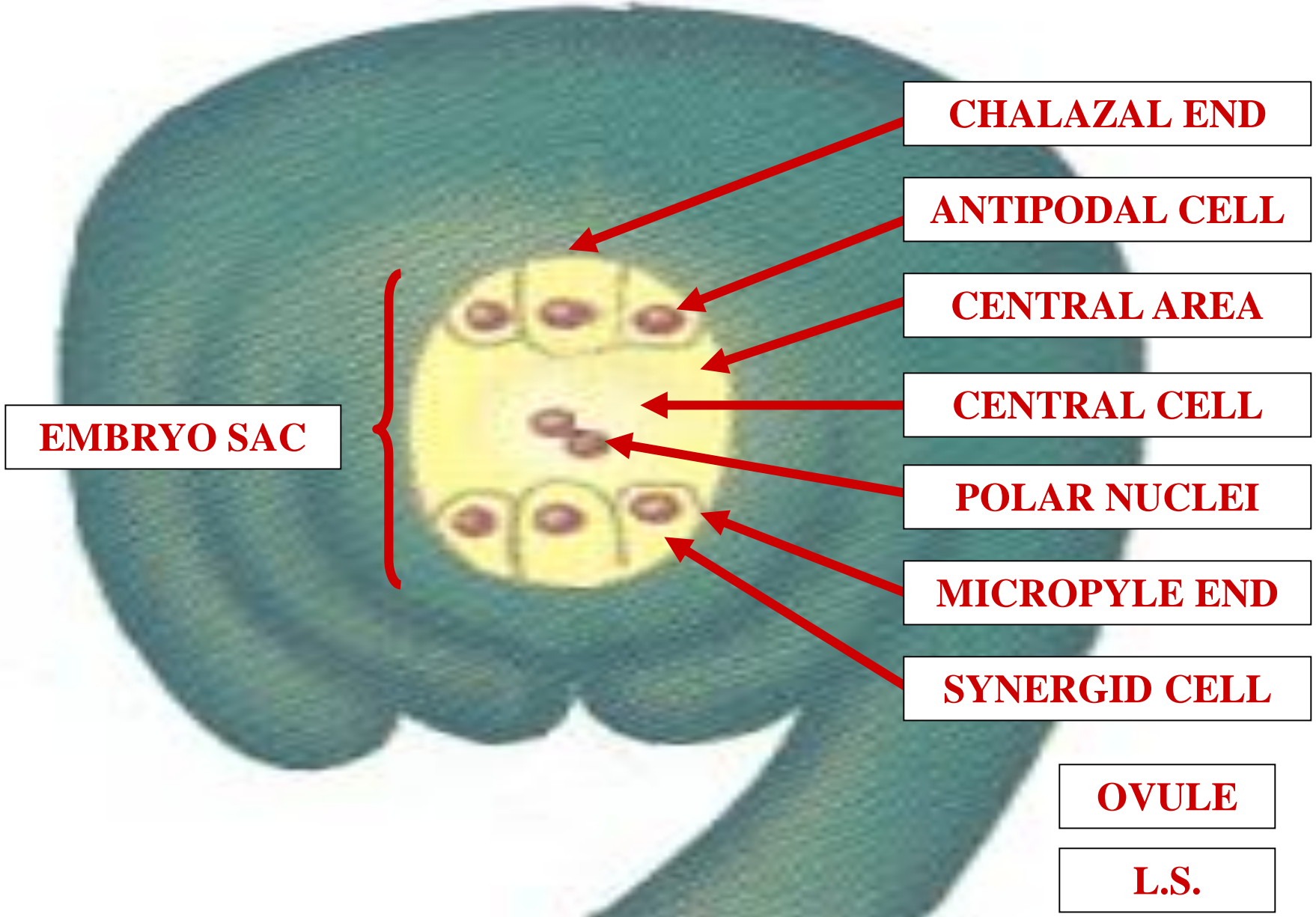
EMBRYO SAC

OVULE

L.S.

POLYGONUM EMBRYO SAC

E



CHALAZAL END

ANTIPODAL CELL

CENTRAL AREA

CENTRAL CELL

POLAR NUCLEI

MICROPYLE END

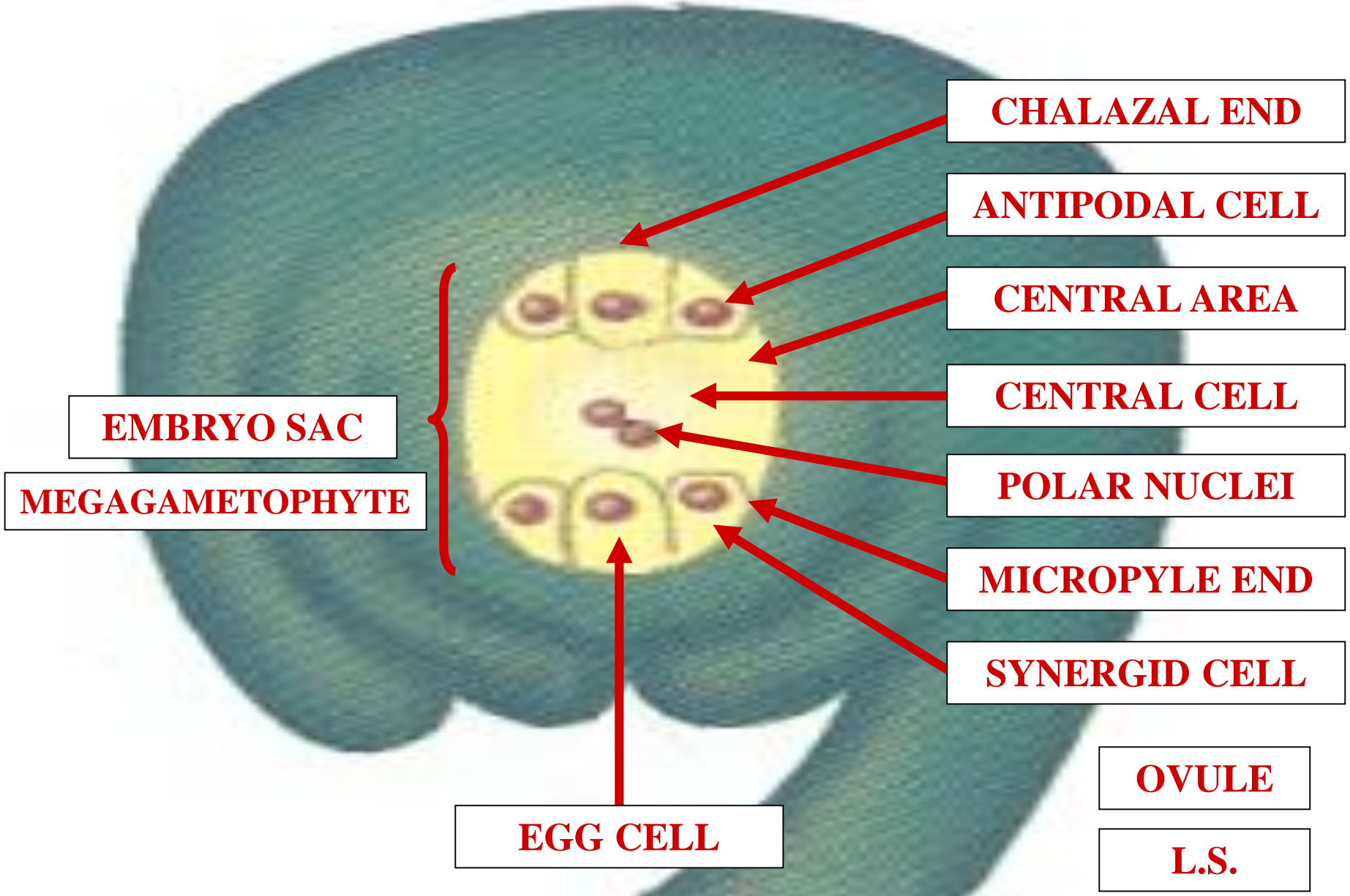
SYNERGID CELL

EMBRYO SAC

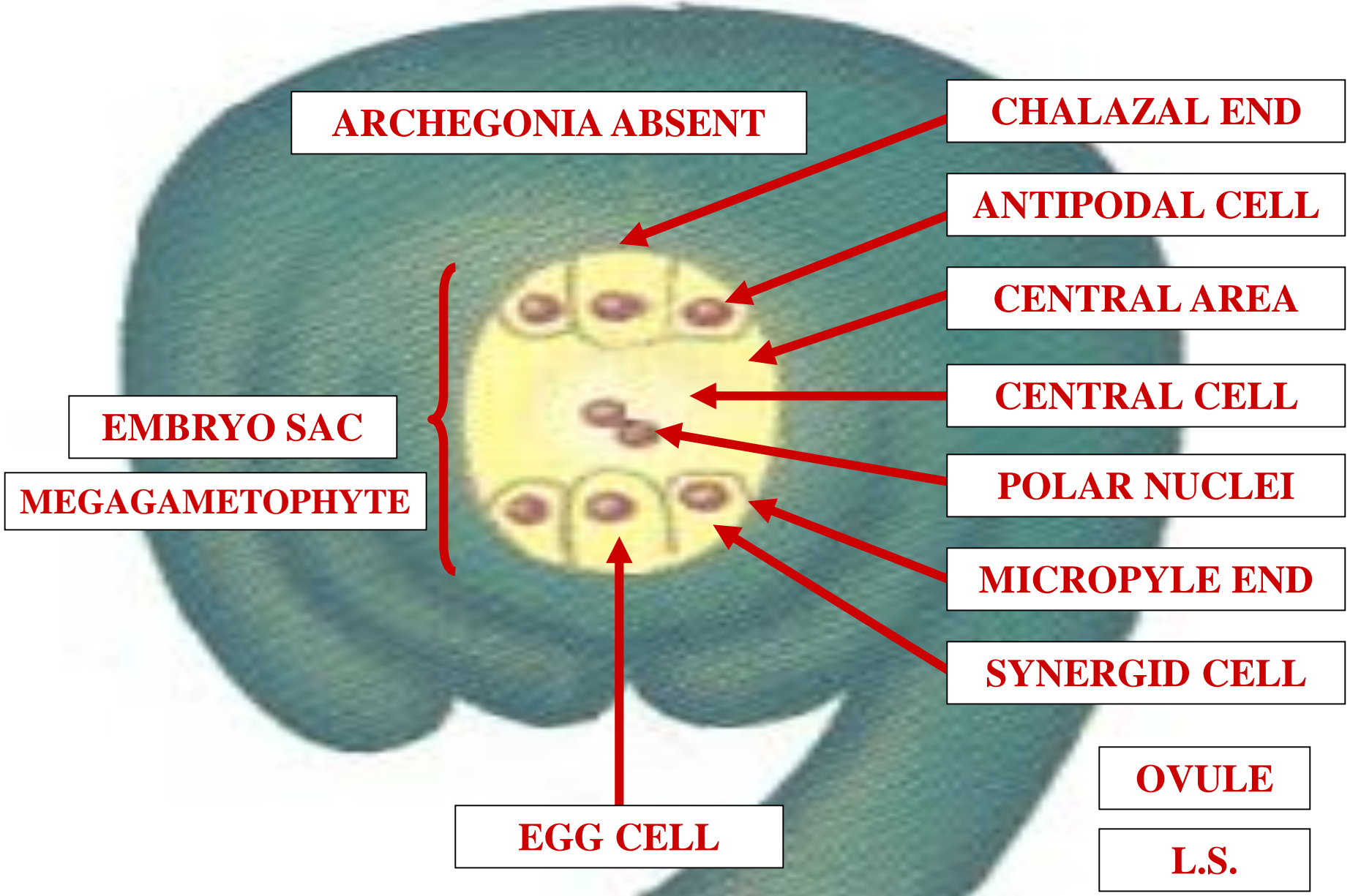
OVULE

L.S.

POLYGONUM EMBRYO SAC



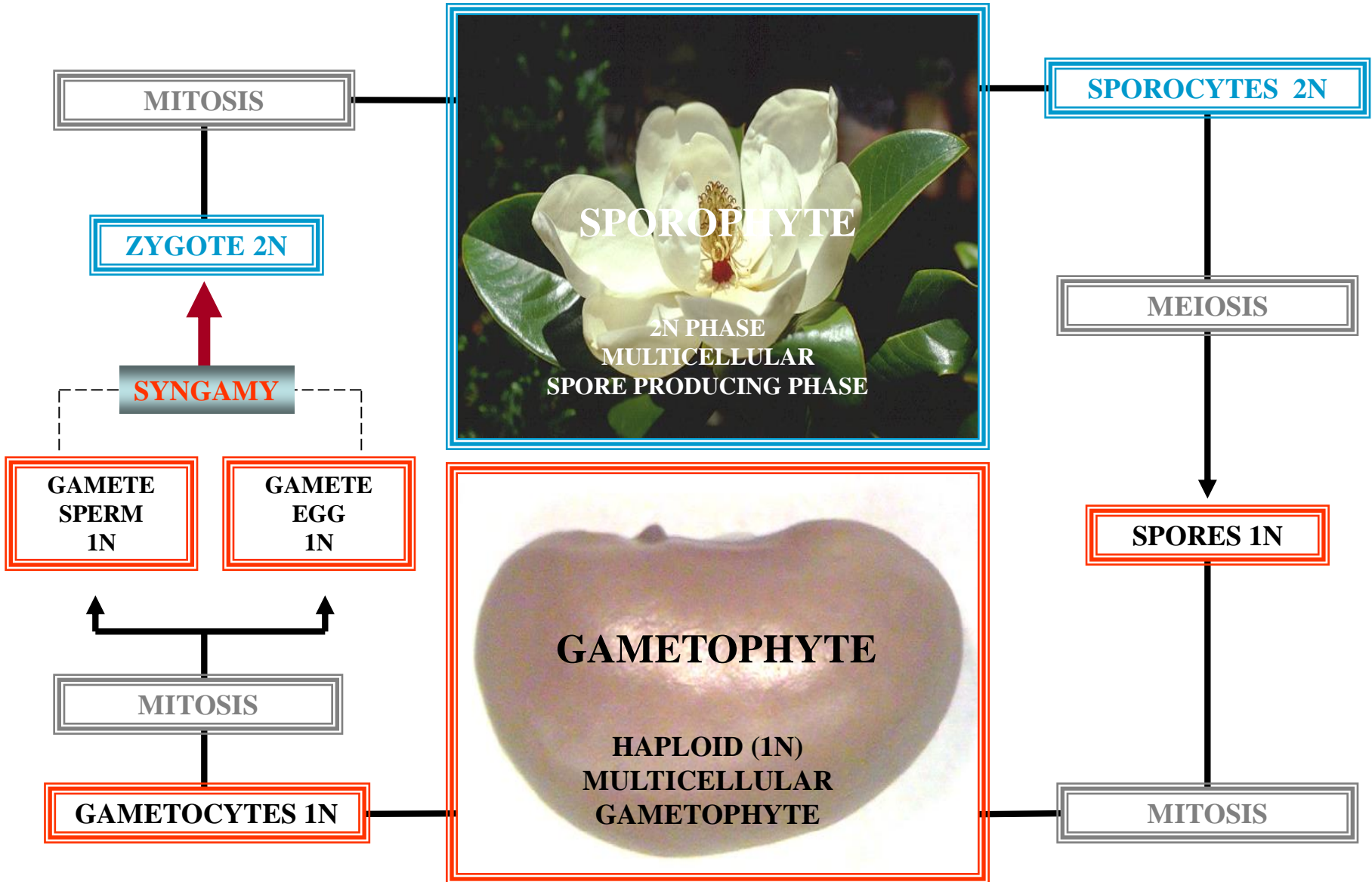
POLYGONUM EMBRYO SAC



MAGNOLIOPHYTA



LIFE CYCLE





REPRODUCTION

FLOWER

FLOWER

ANGIOSPERM FLOWER



AGGREGATE MODIFIED
REPRODUCTIVE LEAVES

ANGIOSPERM
FLOWER

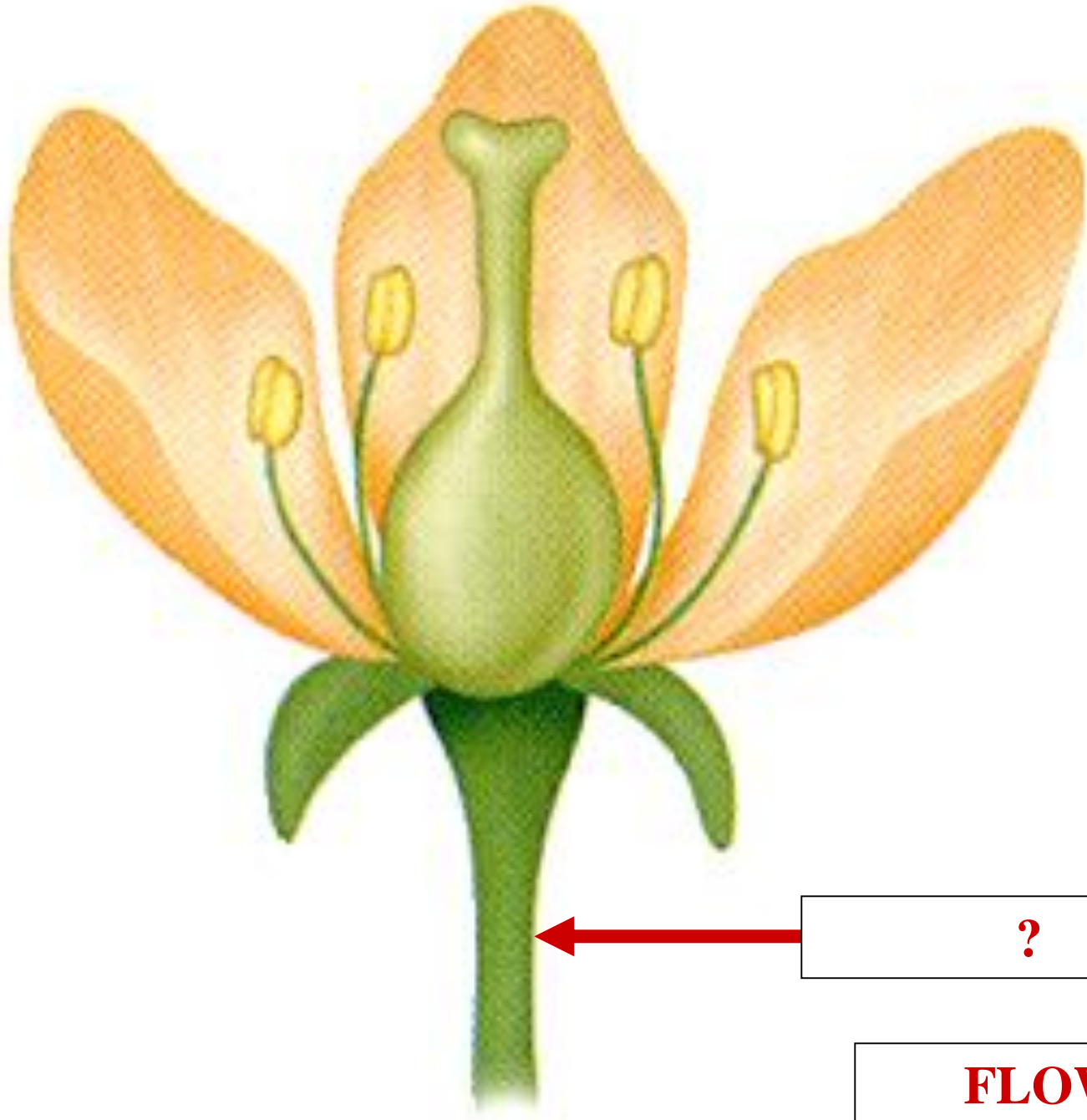




FLOWER MORPHOLOGY

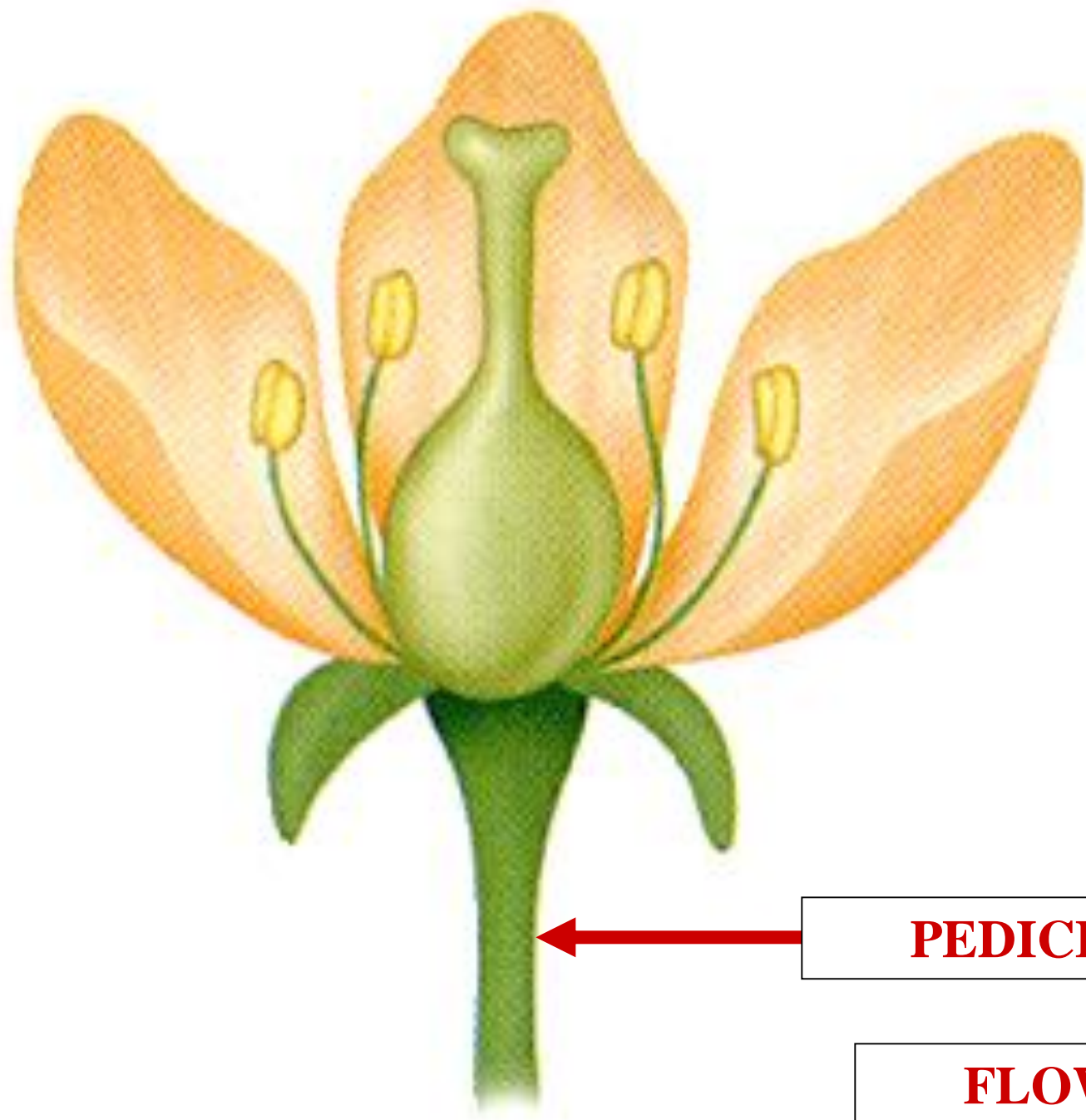


ANGIOSPERM FLOWER



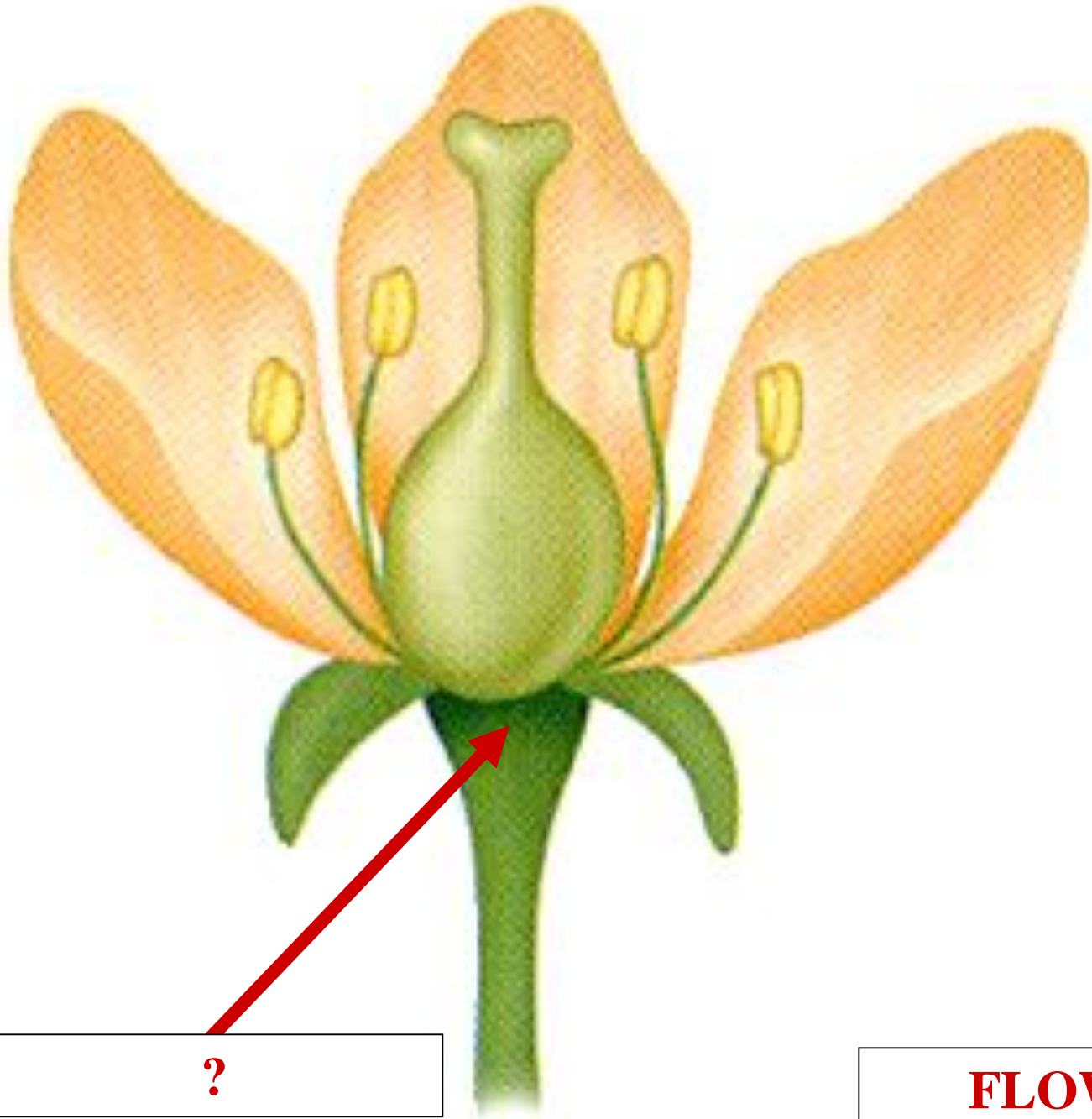
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FLOWER



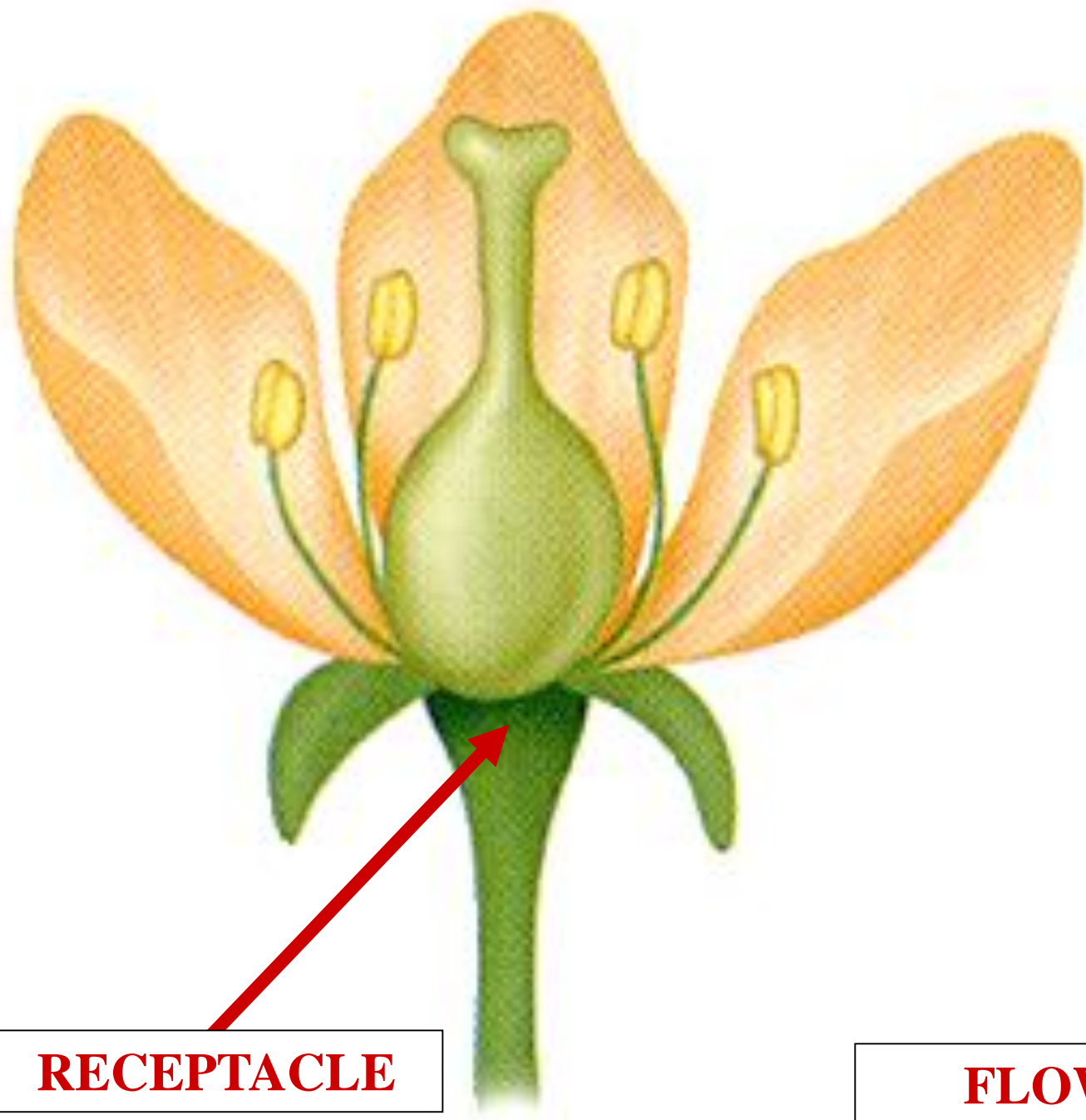
PEDICEL

FLOWER



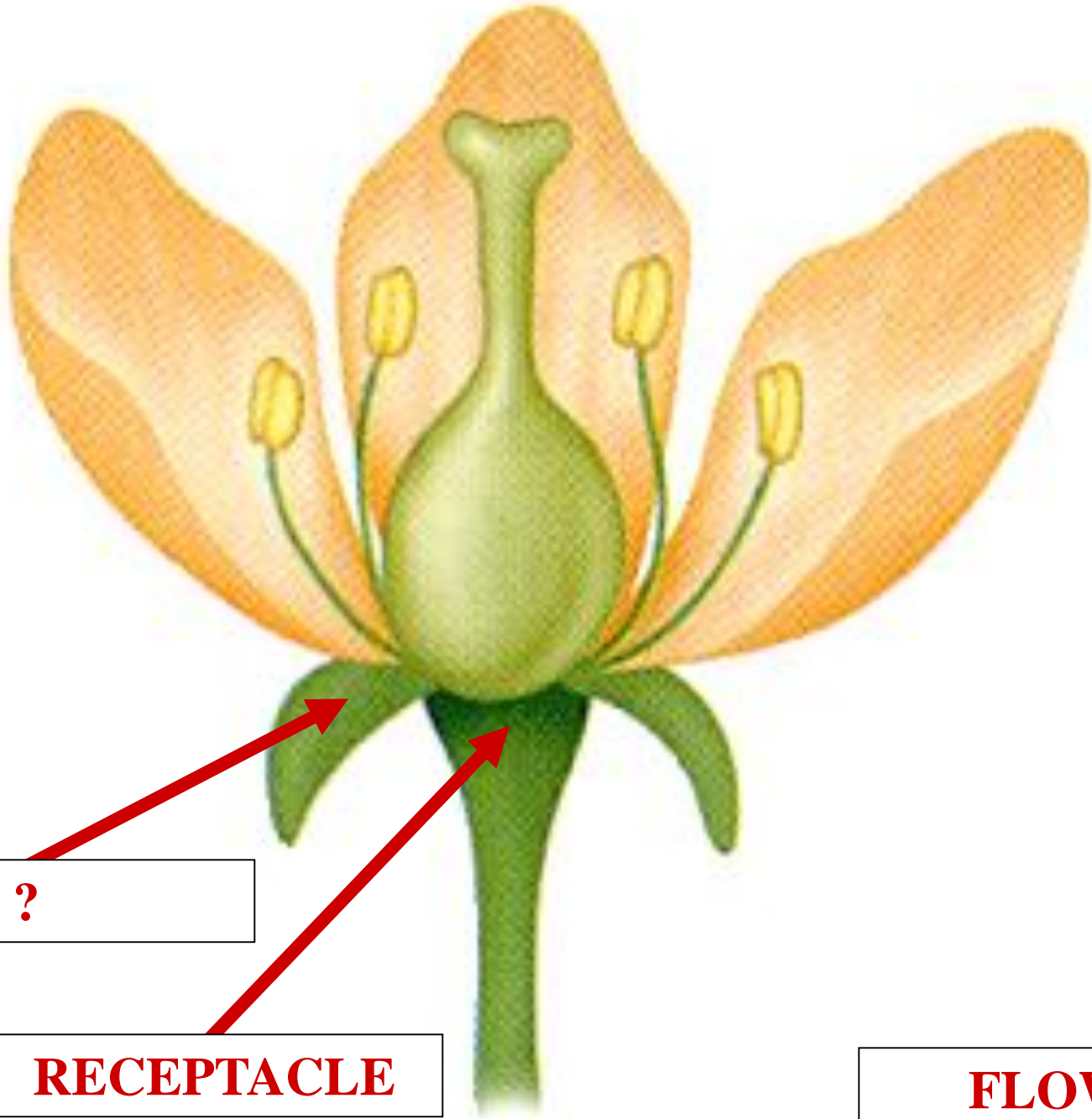
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FLOWER



RECEPTACLE

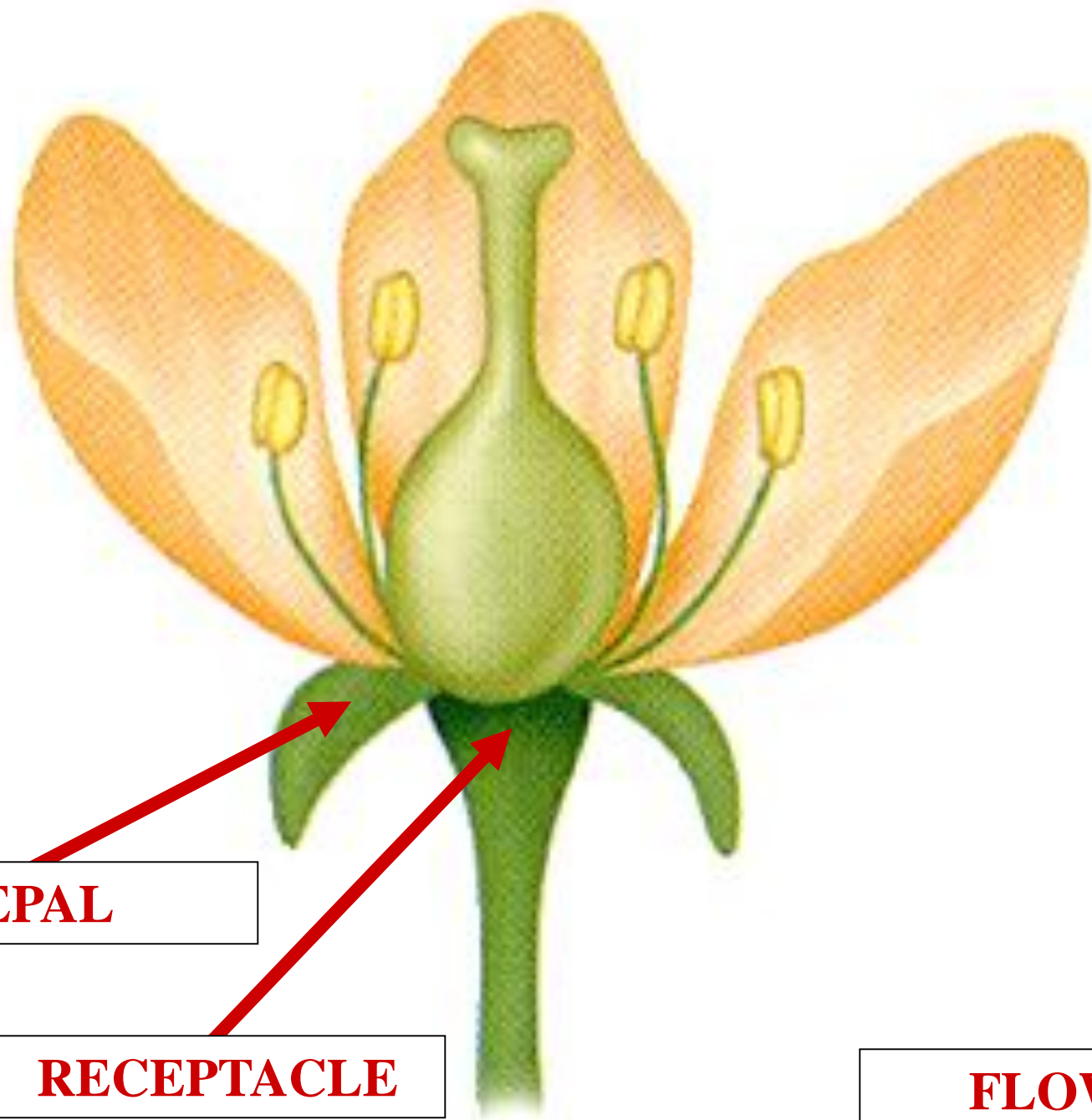
FLOWER



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RECEPTACLE

FLOWER



SEPAL

RECEPTACLE

FLOWER