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Organization of Shoot Apex

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Apical Cell Theory

- Nageli in 1858 stated: cryptogam's single solitary cell has been found as the growing point
- According to this theory the apical meristem consists of a single apical cell called apical initial
- This cell is interpreted as the 'structural and functional unit of apical meristem
- Large and an inverted pyramid
- Tetrahedral in shape and has three or four cutting faces



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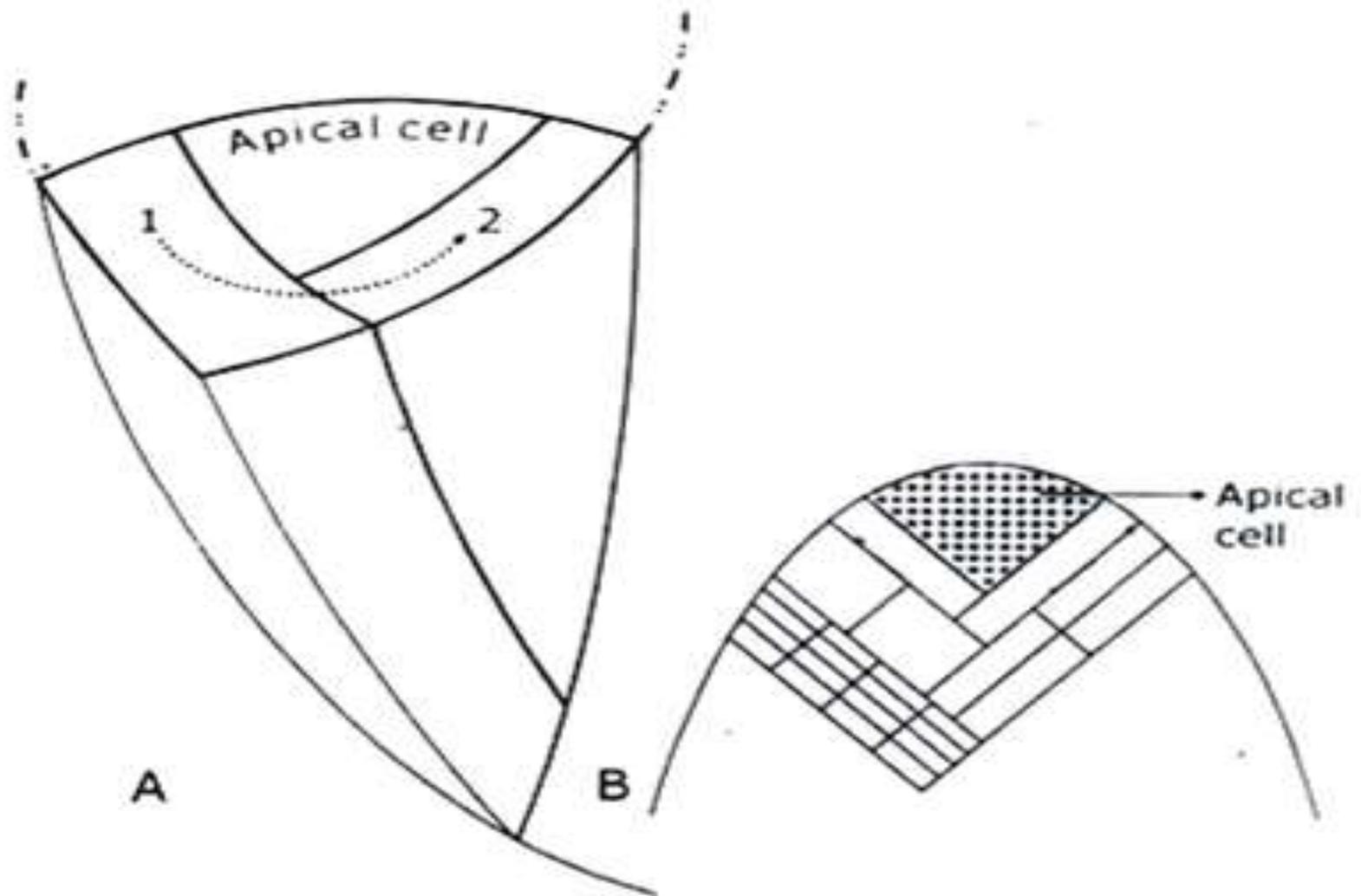


Figure 7.7

A. Diagram showing an apical cell of leptosporangiate fern and its derivatives that are formed in helical succession. The new cells are numbered as 1 & 2.
B. Diagram showing a packet of cells formed by an apical cell by division and subdivision.



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Histogen Theory

- Henstein in 1868 a divided the shoot apex into various zones consisting of a group of initial cells and called Histogen or a tissue builder
- The major histogens of the stem and roots are
 - (a) the dermatogen, a meristematic external layer
 - (b) the plerome, a central core and
 - (c) the periblem, the region between the two



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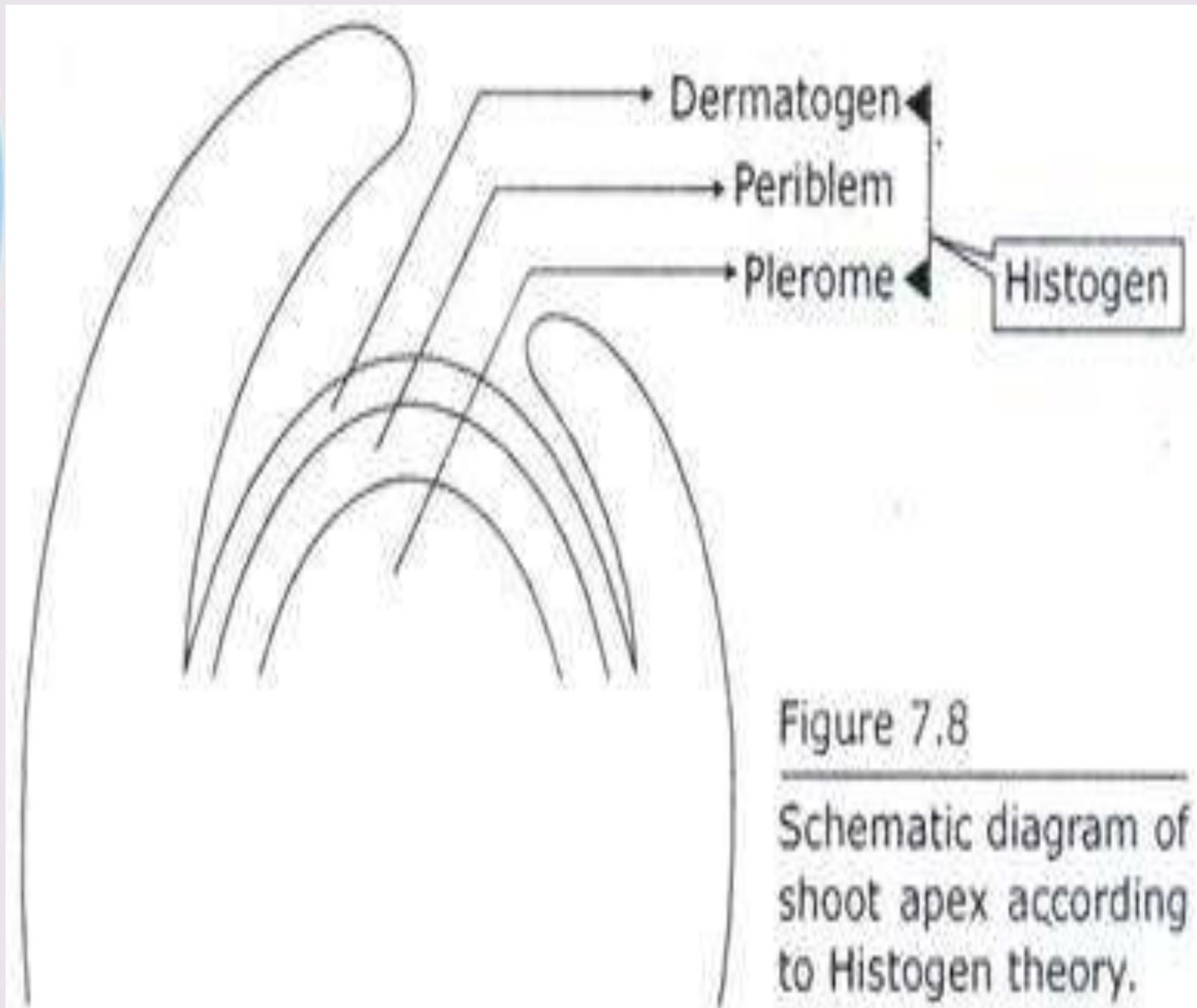


Figure 7.8

Schematic diagram of shoot apex according to Histogen theory.



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■ The dermatogen (meaning in Greek= Skin) gives rise to the epidermis, the periblem (means clothing in Greek) develops into the cortex and the plerome (In Greek meaning that this fills) to the primary vascular bundles

Draw back:

- i. But in gymnosperm and angiosperm there exists no clear distinction between periblem and plerome.
- ii. The respective roles of the three histogens cannot be demonstrated.



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Tunica Corpus Theory

- Proposed by Schmiedt in 1924
- According to this the shoot apex can be differentiated into two regions of unlike structure and appearance

Acentral core: the corpus with larger dividing cells results in volume growth

Outer enveloping layer the tunica: are smaller and divide anticlinically resulting surface growth



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Draw back:

- (1) The tunica layers are variable in number in various taxon
- (1) Tunica corpus organization is absent in some cases
- (3) applicable only to shoot apex and not to root



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Thank You