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SEXUAL REPRODUCTION IN FLOWERING PLANTS

2.2.1 Stamen, Microsporangium and Pollen Grain

Figure 2.2a shows the two parts of a typical stamen – the long and slender stalk called the **filament**, and the terminal generally bilobed structure called the **anther**. The proximal end of the filament is attached to the thalamus or the petal of the flower. The number and length of stamens are variable in flowers of different species. If you were to collect a stamen each from ten flowers (each from different species) and arrange them on a slide, you would be able to appreciate the large variation in size seen in nature. Careful observation of each stamen under a dissecting microscope and making neat diagrams would elucidate the range in shape and attachment of anthers in different flowers.

A typical angiosperm anther is **bilobed** with each lobe having two theca, i.e., they are **ditheca** (Figure 2.2 b). Often a longitudinal groove runs lengthwise separating the theca. Let us understand the various types of tissues and their organisation in the transverse section of an anther (Figure 2.2 a). The bilobed nature of an anther is very distinct in the transverse section of the anther. The anther is a four-sided (tetragonal) structure consisting of four **microsporangia** located at the corners, two in each lobe.

The microsporangia develop further and become **pollen sacs**. They extend longitudinally all through the length of an anther and are packed with pollen grains.

Structure of microsporangium: In a transverse section, a typical microsporangium appears near circular in outline. It is generally surrounded by four wall layers (Figure 2.2 b) – the epidermis, endothecium, middle layers and the tapetum. The outer three wall layers perform the function of protection and help in dehiscence of anther to release the pollen. The innermost wall layer is the **tapetum**. It nourishes the developing pollen grains. Cells of the tapetum possess dense cytoplasm and generally have more than one nucleus. *Can you think of how tapetal cells could become bi-nucleate?*

When the anther is young, a group of compactly arranged homogeneous cells called the **sporogenous tissue** occupies the centre of each microsporangium.

Microsporangiosis: As the anther develops, the cells of the sporogenous tissue undergo meiotic divisions to form microspore tetrads. What would be the ploidy of the cells of the tetrad?

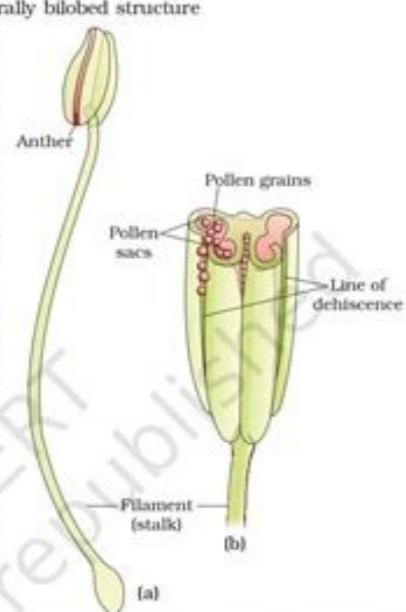


Figure 2.2 (a) A typical stamen; (b) three-dimensional cut section of an anther

THE HISTORY OF CELL BIOLOGY

DISCUSS/DEBATE/REVIEW Discuss the following topics:

1. ...
2. ...

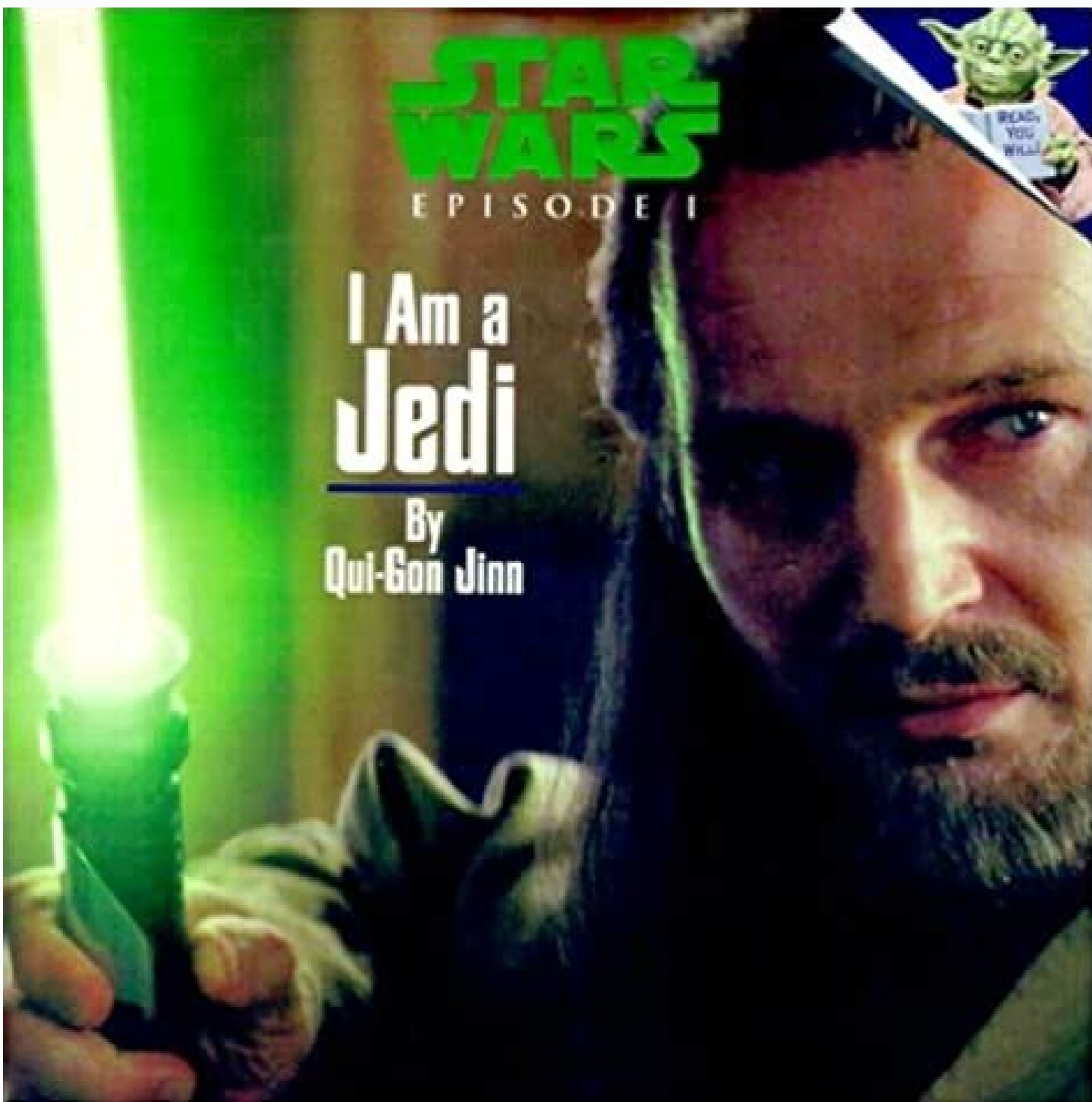
ANSWER THE FOLLOWING QUESTIONS. Use a suitable letter for the correct answer.

1. The cell wall of a plant cell is made up of cellulose. It is made up of ...
 - a. cellulose
 - b. lignin
 - c. pectin
 - d. hemicellulose
2. The ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...
3. ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...
4. ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...
5. ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...
6. ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...
7. ...
 - a. ...
 - b. ...
 - c. ...
 - d. ...

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Class X	Chapter 12 – Organic Chemistry	Biology
(d) Methanol from Isobutane. Solution 2(2005): (a) Ethane from sodium propionate $C_3H_7COONa + NaOH \xrightarrow{\Delta} Na_2CO_3 + C_2H_6$ (b) Ethene from isobutane $C_4H_{10} \xrightarrow{KOH} C_2H_4 + KI + H_2O$ (c) Ethyne from calcium carbide $CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$ (d) Methanol from isobutane $C_4H_{10} + NaOH \rightarrow CH_3OH + Na$		
Question 1(2006): Give the correct IUPAC name and the functional group for each of the compounds whose structural formulae are given below: $\begin{array}{c} H & H & O \\ & & \\ H & H & H \\ & & \\ H & H & H \\ & & \\ H & H & H \end{array}$ (a) $H-C-C-C-H$ $\begin{array}{c} H & H \\ & \\ H & H & H \\ & \\ H & H & H \end{array}$ (b) $H-C-C-C-OH$ $\begin{array}{c} H & H & H \\ & & \\ H & H & H \end{array}$ Solution 1(2006): (a) IUPAC name: Propanol Functional group: -CHO (b) IUPAC name: Propanol Functional group: -OH		
Question 2(2006): (a) Write the equation for the preparation of carbon tetrachloride from methane. (b) Draw the structural formula of ethyne. (c) How is the structure of alkenes different from that of alkanes? Solution 2(2006): (a) Preparation of carbon tetrachloride from methane:		



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