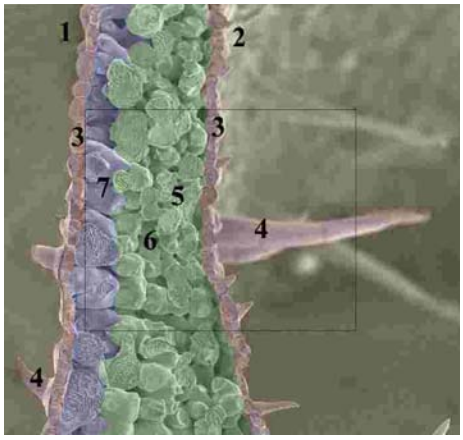
Virtual field emission scanning electron microscope (fesem)

Hairy leaf of *Coleus*: under epidermis

Source: http://www-vcbio.sci.kun.nl/eng/fesem/applets/epidermis

Surf to the source to use the fesem simulator on this and other objects, to download a high resolution image or to view information on the principles of the microscope.



Material: a piece fresh leaf material was frozen with slush nitrogen at - 95° C. In order to observe the inner part of single cells, this small piece of tissue was fractured using with a special knife in the cryo-unit of the FESEM.

Overview image: In this view the upper side (adaxial side; 1) of the leaf is positioned at the left, while the under side (abaxial side; 2) of the leaf is located at the right. Both the outermost upper and lower surface of the leaf are delimited by a layer of epidermal cells (3; epi = upon, dermis = skin). In Coleus both epidermal layers carry hairs (4; trichomes). Just along the underepidermis one can see sponge parenchyma cells (5; roundish cells) that are separated by intercellular cavities (6). The upper epidermis is bordered by cylindrical cells, so-called palisade parenchyma cells (7). Sponge and palisade parenchyma cells constitued together the chlorenchym. Both cell types contain organelles involved in photosynthesis: chloroplasts. (Watch detailed views of a chloroplast in another applet; look in the list for leaf chloroplast).

Zoom image (see webpages): The under epidermis is mainly constituted by a joint layer of parenchyma cells that bear a thick cell wall but lack chloroplasts. Guard cells with stomata are scattered in the under epidermis, as well as multicellular hairs (watch detailed views in another applet; look in the list for leaf hair-stoma). The epidermis cells give the leaf protection against physical and chemical impacts as well as dessication. The stomata, which are connected to the intercellular cavities, play a role in the exchange of gasses (carbon dioxide and oxygen involved in photosynthesis) between the chlorenchym and the atmosphere. For further information on leaf anatomy see under virtual lessons (in Dutch and English):
www-vcbio.sci.kun.nl/eng/virtuallessons/leaf

People and copyright
Manager of the cryo-FESEM: Huub Geurts
Technical specialist Jeol: Rob Fase
Development of the FESEM simulator: Jeroen van Beurden
Web development: Remco Aalbers
Initiation + funds application virtual FESEM project: Jan Derksen
Imaging-tutorials: Elisabeth Pierson
Contact: hpmg@sci.kun.nl or epierson@sci.kun.nl