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From strain anisotropy of plant cell wall to growth anisotropy: a theoretical study.

The emergence of such complex shapes, as leaves and flowers, results from the integration at the organ level of inhomogeneous anisotropic growth at the cell level. Though flowers are the most beautiful examples of vegetal organs, recent attempts to go from one scale to the other have led to poorly robust models. Focusing on much simpler organisms, the internodes of corticated *characeae*, gigantic cylindrical algal cells (2 cm) surrounded by smaller cells, this theoretical training aims to understand how the individual spiral growth of cells coupled through adhesion determines global growth and provoke the spiral growth of the whole internode.

Departing from pressure inside the cell, generating anisotropic cell wall strain, the growth will be modeled using the framework of elastic growth. The role of the cortication geometry, the anisotropy of the cell wall and the adhesion between the cells will be peculiarly investigated. The training student is expected to have basic skills in programming.

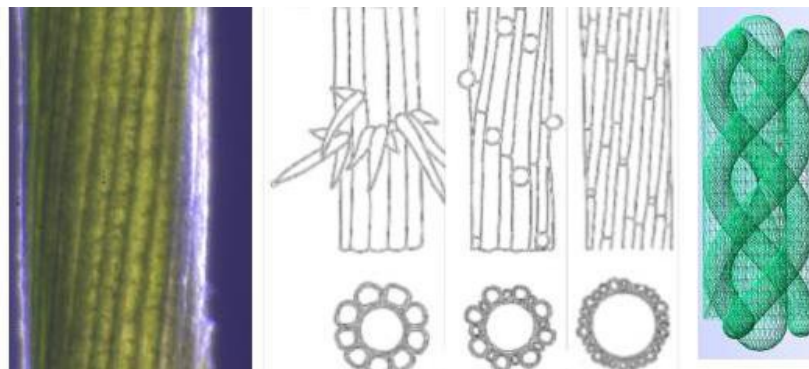


Figure. (Left) Corticated internode of *C. globularis*. (Center) *Characeae* with cortications: *C. canescens*, *C. contraria*, *C. fragilis*. (Right) Mesh with some cortications