

Development of novel methodologies to quantify turgor pressure levels in plant cells

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All plant cells are surrounded by cell walls. They form an exoskeleton that provides protection from the environment and support during growth and development. At the same time the (turgor) pressure in a plant cell is similar to the one in a car tire and is contained by the cell wall. By coordinating turgor pressure and cell wall composition / structure the plant cell regulates cell morphogenesis during development.

Recent novel unpublished data from our research group has shown that turgor pressure seems to also coordinate cell wall formation with cell cycle activity. The available evidence suggests that turgor pressure has a very important function in different biological processes and could be very dynamic. However the problem is that no methods exist to quantify turgor pressure levels in plant cells in vivo, non-invasively.

This project aims to develop novel methods to detect changes in turgor pressure and quantify their extent during development. The work will involve different wet lab activities like tissue culture, use of fluorescent reporters, confocal laser scanning microscopy, as well as computer modelling.

Literature:

Hamann T. Plant Cell Physiol. 2015 56(2): 215-23. The plant cell wall integrity maintenance mechanism-concepts for organization and mode of action.

Louveaux M, Hamant O. Curr Opin Plant Biol. 2013 16(6): 774-9. The mechanics behind cell division.

Students that have worked or are currently working in this project:

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