

In contrast to animals, plants are literally rooted in the earth and cannot run away from dangers. However, that does not mean that they are completely and utterly at their environment's mercy. Plants have developed unique defence strategies that rely on physical barriers like wood and thorns but also chemical compounds (toxins) to protect themselves against plant eating animals. One of the chemical defence systems in plants of the cabbage family (for example kale, Brussel sprouts and broccoli as well as the model plant *Arabidopsis thaliana* belong to this family) is the so-called endoplasmic reticulum body (ER body) system. ER bodies are spindle shaped organelles that have been originally identified in seedlings and roots of *Arabidopsis* and related plants of the same family. The organelles accumulate high amounts of enzymes (namely β -glucosidases). In seedlings and roots, these enzymes produce toxins (so-called isothiocyanates) which are responsible for the characteristic pungent smell and taste of cabbage family members. These toxins are part of a natural defence system against animals, bacteria and fungi. The genetic regulation of ER bodies is complex and while some of the key factors that control ER body formation in *Arabidopsis* have been identified, we are still missing the key players that regulate the appearance of ER-bodies in so-called giant cells.

Giant cells are a distinct cell type within the epidermis, the most outer cell layer of plants. As their name indicates, giant cells are large in their appearance and they have an enhanced amount of DNA in their nucleus which is due to a process called endoreduplication. Giant cells can be typically found at the leaf margins and above the midrib – at areas that are especially prone to be attacked by herbivores. In our project we are aiming to analyse the molecular regulation of ER body formation in giant cells in the model plant *Arabidopsis thaliana*. Our findings will be very useful in the development of new agricultural tools to enhance and support plants' own defence systems and even change the flavour of crops.