

**Titel:** LACS4, a key player in fatty acid metabolism, is affecting fertility, morphology and development

**Autor(en):** Dirk Jessen<sup>1</sup>, Bettina Gumbrecht<sup>1</sup>, Zuzanna Nowakowska<sup>1</sup> and Martin Fulda<sup>1</sup>

<sup>1</sup>Albrecht von Haller Institut für Pflanzenwissenschaften, Abt. Biochemie der Pflanze, Georg August Universität Göttingen

**Zusammenfassung:**

Very long chain lipids are vital to plant development. They are important components of the plant cuticle which establishes the boundary surface of aerial organs. In addition, these lipids were detected in the extracellular pollen coat (tryphine) where they play a crucial role in appropriate pollen-stigma communication. Furthermore they can affect membrane architecture and a variety of metabolic processes.

Plants involve a large number of different enzymes and pathways for the synthesis of very long chain lipids. LACS activity is essential to the production of these components since it catalyzes the activation of fatty acids to acyl-CoA thereby providing the essential precursor for all these pathways.

In this work it has been shown that multiple LACS mutant lines lead to sterility, reduced wax loads, and dramatic changes in morphology. In addition, significant changes in membrane composition have been detected. This was postulated already for a long time for LACS mutants in general but has never been shown before. The results suggest strongly overlapping functions of different members of the LACS enzyme family since the observed phenotypes were revealed only in multiple mutants but not in single mutants. Certain combination of mutant alleles turned out to be synthetically lethal providing further support for the essential role LACS activity in the metabolism of plants. It can be concluded that the importance of LACS metabolism was so far underestimated, since our data indicate that LACS activity indeed influences all developmental stages of Arabidopsis.