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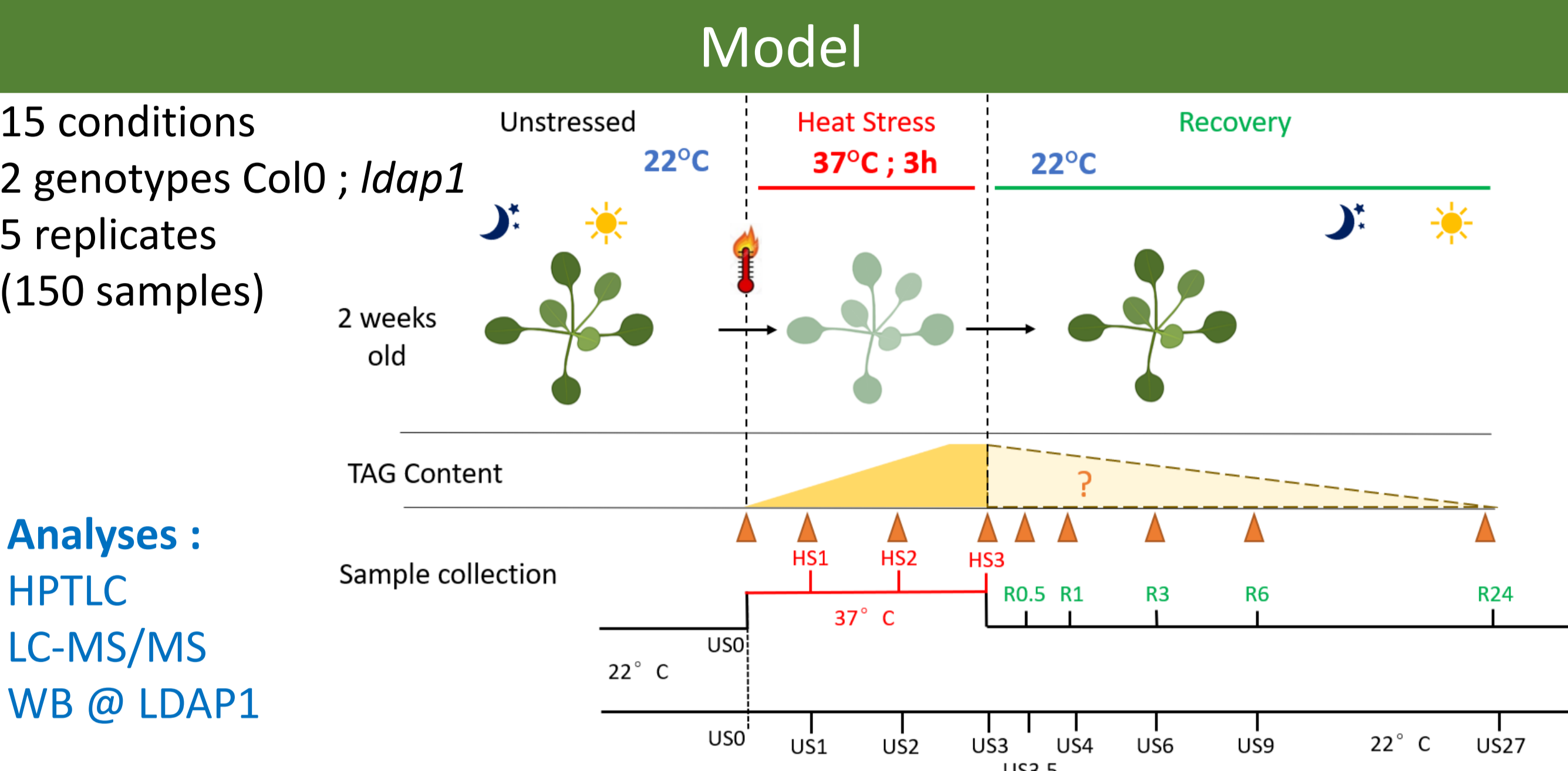
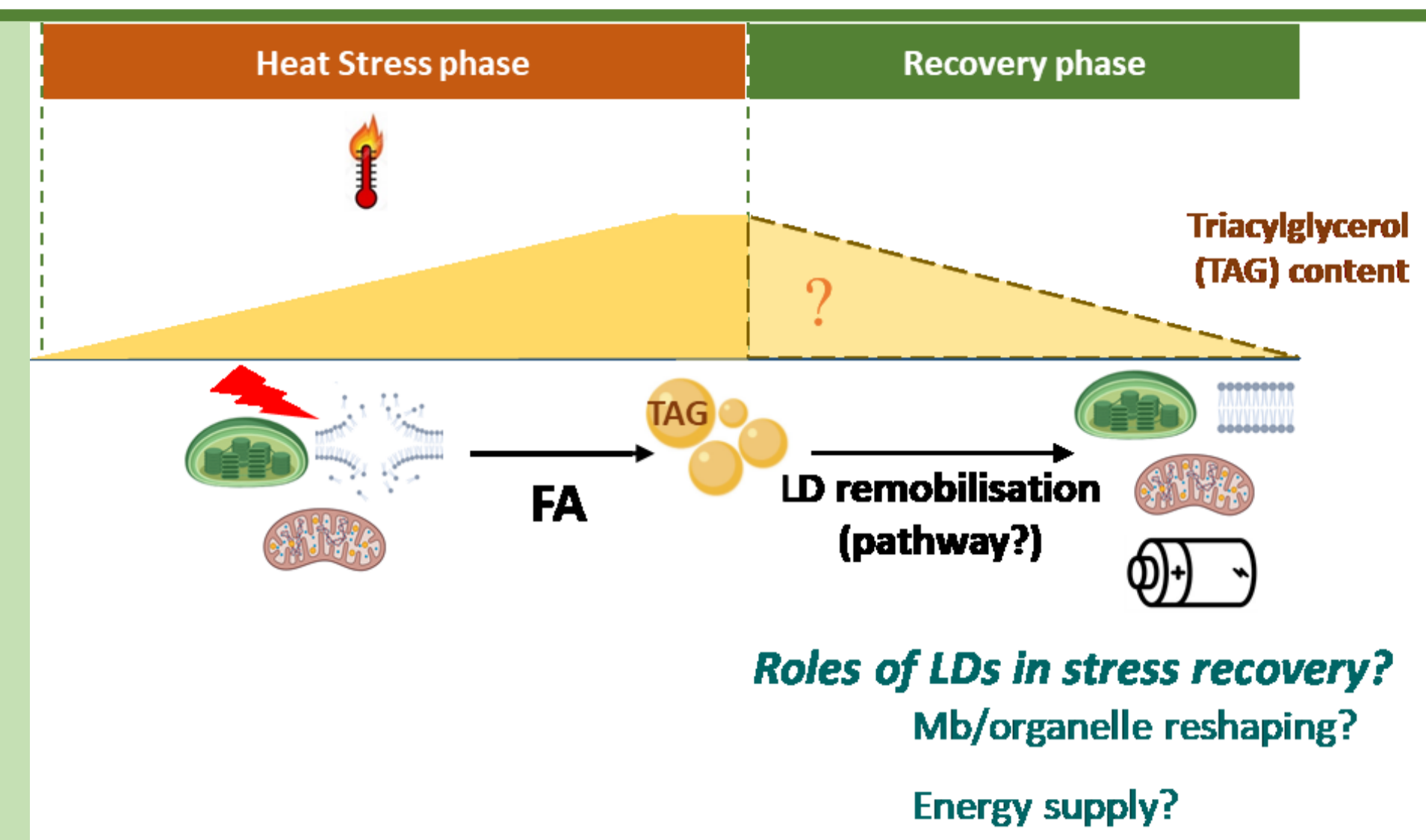
Deciphering the function of Arabidopsis LDAP1 in lipid droplet turnover induced by heat stress

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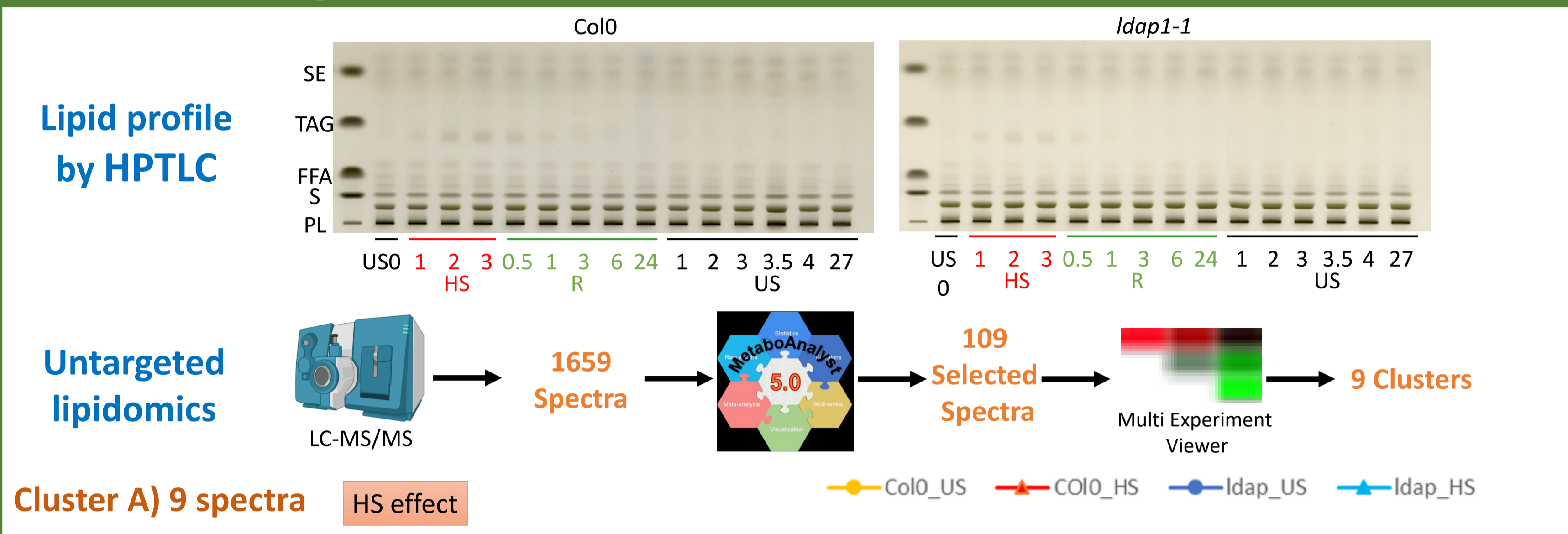
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Background : Lipid droplets (LDs) are lipid storage organelles composed of a neutral core of triacylglycerols (TAGs) and sterol esters surrounded by a monolayer of phospholipids with associated proteins, including structural proteins of the Lipid Droplet Associated Protein (LDAP) family. Heat stress (HS) was shown to trigger the expression of *LDAP1*, one of the 3 *LDAP* in *Arabidopsis thaliana* [1], and to induce TAG accumulation [2], leading to the formation of LDs which are subsequently remobilized during the recovery phase. How the stress-induced LDs are degraded and contribute to cell homeostasis after returning to normal growth conditions remains completely unknown.

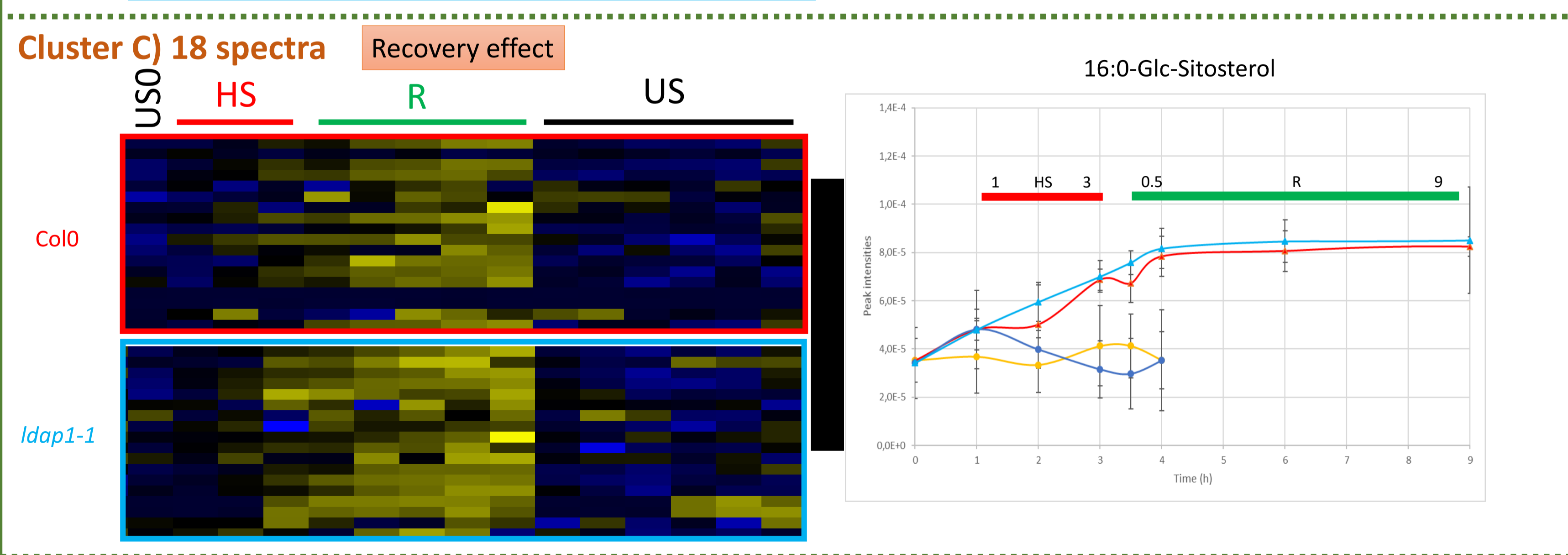
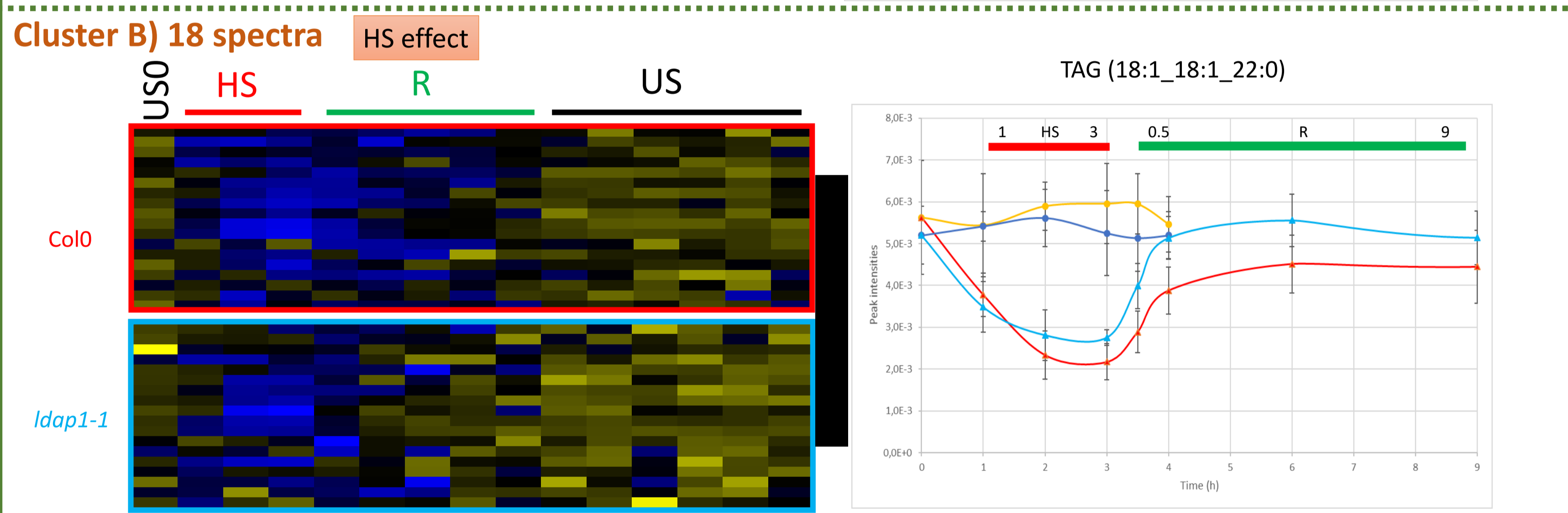
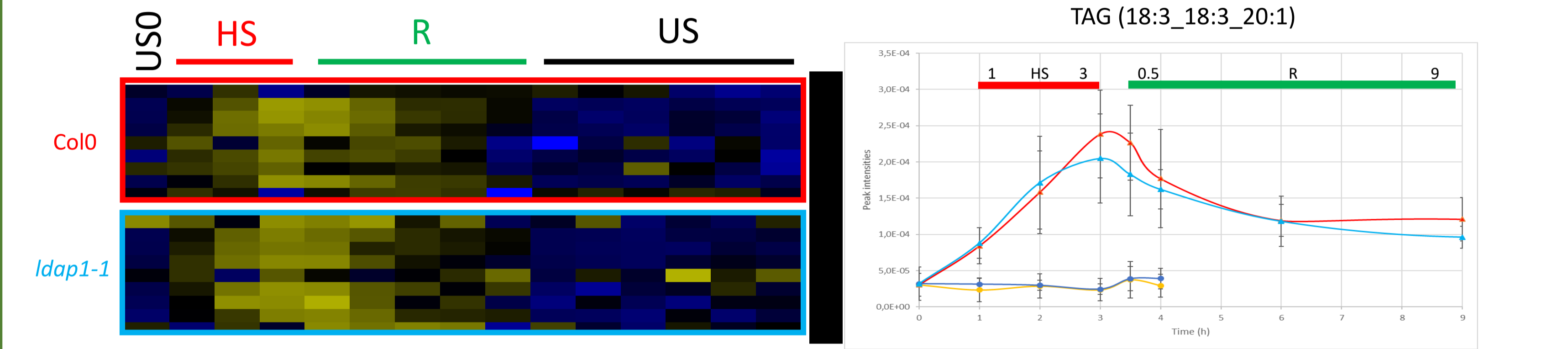
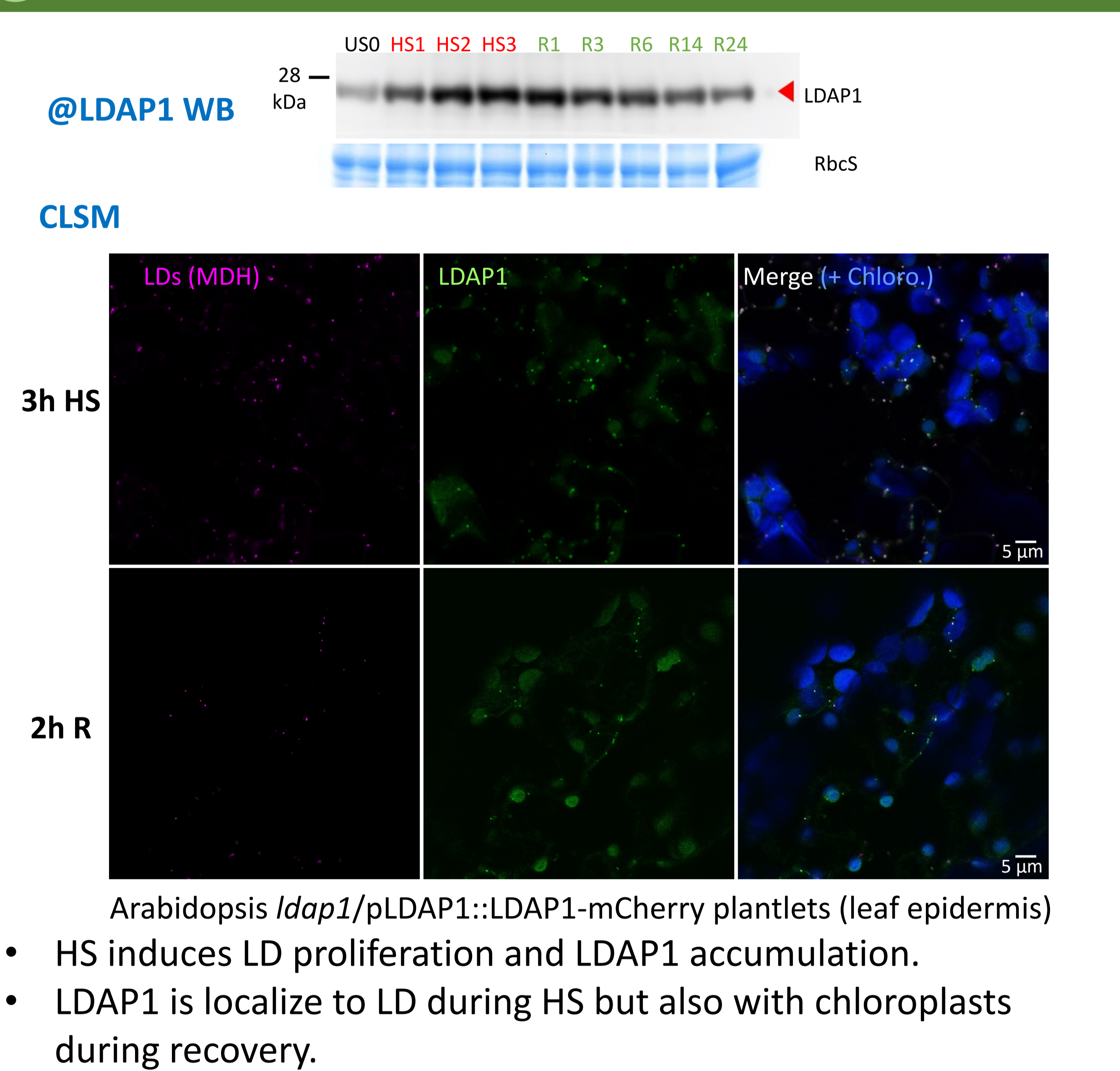
Objectives : Deciphering the role of LDAP1 in LD dynamics in response to HS and during the recovery phase ; assessing LDAP1 function in plant tolerance to HS.



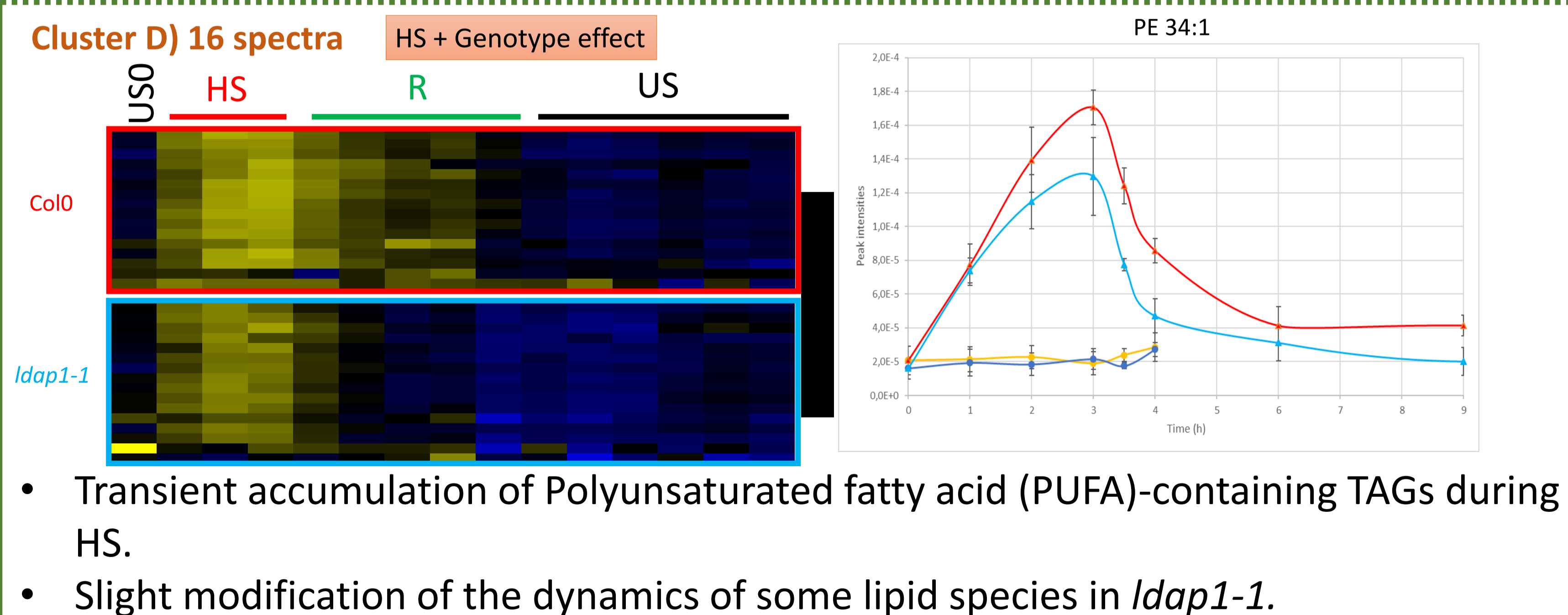
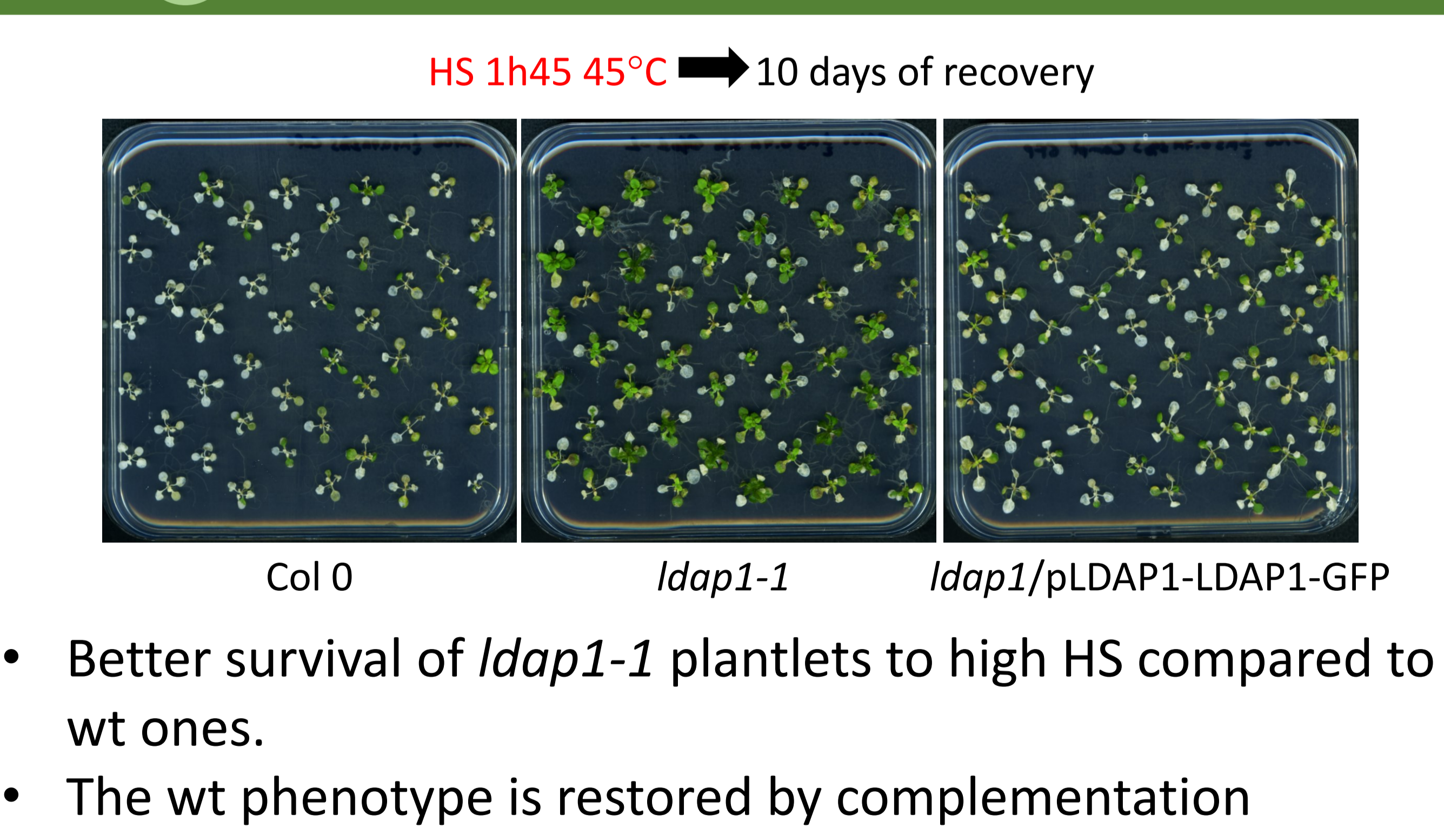
2 Lipidome dynamics during HS and recovery



1 Transient accumulation of LDAP1 and LD in response to HS



3 HS tolerance of *ldap1* mutant



Conclusion : TAGs and LDAP1 accumulate during HS and are degraded upon return to normal growth conditions. TAGs show a higher degradation rate than LDAP1 during the recovery phase. In-depth analysis of lipidome adaptation during and after HS confirms previous observation such as the accumulation of PUFA-containing TAGs and a decreased in the unsaturation index of membrane lipids [3]. Furthermore, LDAP1 deficiency is associated with a slower degradation rate of some lipid species during the recovery phase, without blocking TAG accumulation or degradation.

[1] Gidda, S.K., Park, S., Pyc, M., Yurchenko, O., Cai, Y., Wu, P., Andrews, D.W., Chapman, K.D., Dyer, J.M., and Mullen, R.T. (2016). Lipid Droplet-Associated Proteins (LDAPs) Are Required for the Dynamic Regulation of Neutral Lipid Compartmentation in Plant Cells. *Plant Physiol.* 170: 2052–2071.

[2] Mueller, S.P., Unger, M., Guender, L., Fekete, A., and Mueller, M.J. (2017). Phospholipid:Diacylglycerol Acyltransferase-Mediated Triacylglycerol Synthesis Augments Basal Thermotolerance. *Plant Physiol.* 175: 486–497.

[3] Shiva, S. et al. (2020). Leaf Lipid Alterations in Response to Heat Stress of *Arabidopsis thaliana*. *Plants* 9: 845.

