‘*Cups, cucumbers, twins’* – auxin inhibition affects development of somatic embryos in *Larix decidua*

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The development of a proper mature embryo is closely linked to the formation of a fully functional shoot apical meristem (SAM). This in turn is the result of a precisely regulated process during embryogenesis in which auxin acts as a master regulator.
Though the role of auxin has been the subject of studies with angiosperms’ model organism; such as Arabidopsis, *Daucus* or *Brassica*, the transferability of functions to the evolutionarily distantly related conifer species remains a research area at large.
To study conifer embryogenesis under experimental conditions, somatic embryos of *Larix decidua* have been used. Focusing on the relevance of auxin for the meristem and cotyledon formation, polar auxin transport has successively been disrupted or restored by changing the culture medium, respectively. Thus testing the point in time, that is crucial for correct auxin transport and which are less affected by auxin flow disruption. In order to find a way of measure, the embryos were grouped into five morphological categories and analysed, using light and RE microscopy techniques.
Furthermore changes in expression levels in embryos continuously treated with NPA were analysed using qPCR for genes with relevance to embryogenesis and further apical-basal patterning.
NPA treated embryos develop two distinct morphologies, either forming embryos with a closed cotyledon ring – “Cups”, or a “Cucumber”-like embryo, with a pin-formed apex. Yet the later NPA was applied to the embryos, the lesser was the effect on its morphology. Whereas Embryos are to some extend always affected by an NPA application, the restoration to a normal morphology can hardly be observed, yet the NPA-compromised morphology is adjusted to mixed phenotypes.
The qPCR data indicate for embryogenesis related genes changes in the expression pattern between NPA-treated and untreated embryos throughout development.
We have demonstrated that the formation of a proper embryo apex depends on a regulated auxin flux, as the inhibition of the auxin transport affects the embryo patterning and further alters expression patterns at certain stages. The presented data are initial steps to study cause and effect of altered gene regulation and auxin flux on embryo formation.