Use of FLUMIAS to reveal dynamic cellular changes initiated by statolith movement in *Arabidopsis thaliana* root cells: first observations from parabolic flight campaign

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Plants ability to orient their growth with respect to external stimuli such as gravity. In plant roots, gravity sensing cells called statocytes, contain starch-filled plastids (statoliths). These organelles which sediment following gravity vector change, are involved in gravity sensing as position sensor. At the end of the signaling pathway, the localization of PIN auxin efflux carrier proteins (e.g. PIN3), become repolarized leading to redirected auxin flux to the lower side of the root columella. However, the mechanisms how statoliths displacement triggers the relocalisation of PIN has not yet been elucidated. Recently, we performed an experiment using the FLUMIAS spinning disc microscope and its unique spatial and timely resolution. It enabled us to study for the first time the gravity sensing phase during parabolic flights. Namely the simultaneous *in vivo* monitoring of (1) the dynamics of statoliths mouvement and of (2) fluorescent markers of cell organelles such as the actin cytoskeleton, and fluorescent auxin transport proteins such as PIN3::GFP were managed. Successive parabolas during parabolic flight campaign exposed *Arabidopsis thaliana* seedlings grown in the RootChip chamber to multiple successive gravistimuli (0.25g, 0.5g, 0.75g).

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