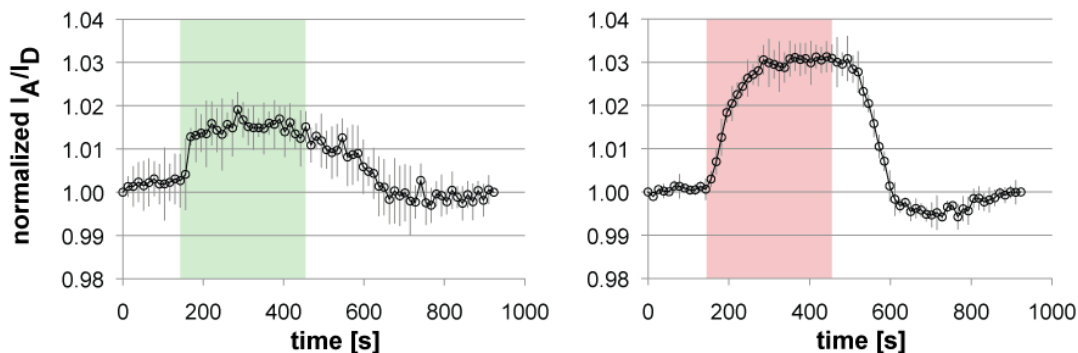
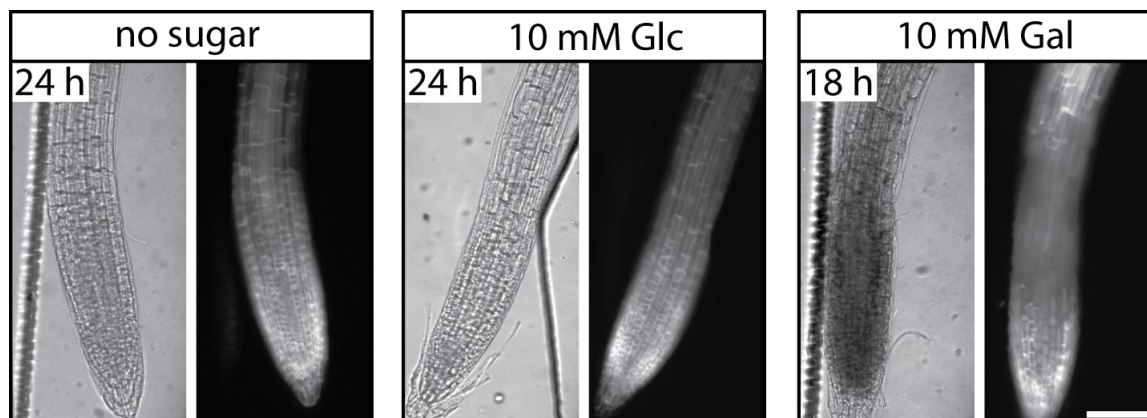


Supplemental Figure 1. Growth rate over 24 h under 16 h light, 8 h dark conditions. Standard deviation of the mean is indicated as dark-grey bars (n=8). The dark phase is depicted as light-grey shade (22:00 – 6:00). The observed initial increase in growth rate during the dark is in accordance with previously published results (Yazdanbakhsh et al., 2011).



Supplemental Figure 2. Quantification of sugar accumulation measured with the FLIPglu-600 μ glucose sensor in the RootChip.

The left and right graphs show the normalized FRET index change (I_A/I_D) of the glucose/galactose sensor measured in the root tip. Results are averaged over seven roots and bars denote for the STD. The green and red shaded bars indicate the perfusion with a square pulse of glucose and galactose, respectively. Relative FRET index changes between glucose and galactose resembled the finding in Figure 1D/E in the main text.



Supplemental Figure 3. Phenotype comparison.

Representative brightfield and fluorescence images of roots after 24 hours in the dark without sugar supply (left), after 24 hours with glucose perfusion within the hours 7-24 (middle), and after 18 hours with galactose perfusion during time points 7-18 hours (right).

Supplemental Movie Legends

Supplemental Movie 1. Fluorescence signal and ratiometric analysis of a growing root perfused with glucose and galactose.

Fluorescence (Citrine, left) signal and ratiometric analysis (right) of a growing root, perfused with square pulses of 10 mM glucose (Glc) and galactose (Gal), respectively. The image series was registered to maintain the position of the root tip and allow for analysis of defined regions of interest. Time format, hh:mm:ss; scale bar, 50 μ m.

Supplemental Movie 2. Time lapse imaging of roots growing in observation chambers of the RootChip. The time course includes a dark period between 12h and 20h.

Supplemental Movie 3. Brightfield imaging of root tip being exposed to galactose. The green time scale represents experimental time course; the red time scale indicates time after addition of 10 mM galactose. 5h after start of perfusion with galactose, medium was changed back to sugar-free hydroponic medium.

Supplemental Movie 4, Fluorescence time-lapse imaging of root being exposed to galactose. Time series of a growing root, being perfused with 10 mM galactose after 1h. Fluorescence (Citrine) and brightfield channels are merged. Asterisks indicate emerging root hairs that stop elongation in the presence of galactose. Scale bar: 100 μ m.

Supplemental Movie 5. Observation of root hair development. Arrow heads indicate emerging root hairs. Time interval between frames is 10 min.