

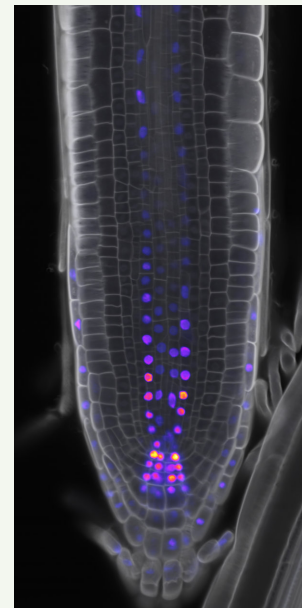
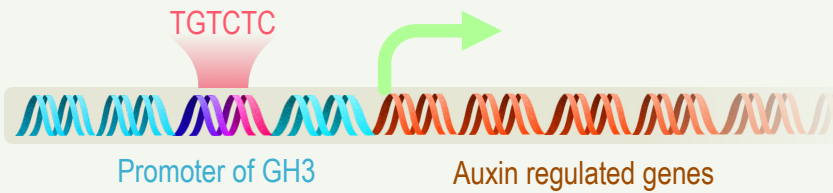


Auxin reporter: DR5, DR5rev and DR5v2

CEITEC Dr. Helene Robert Boisivon group

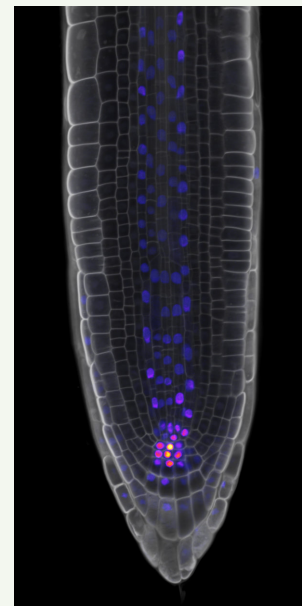
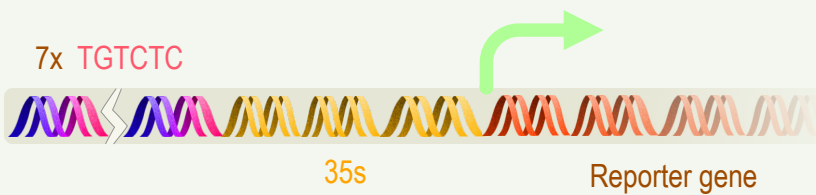


GH3



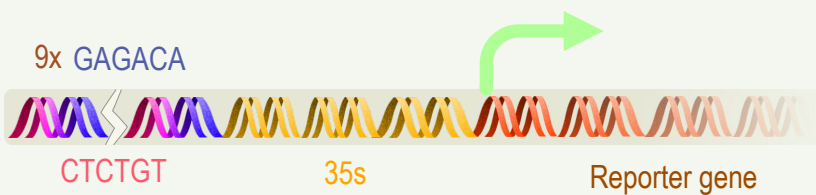
Arabidopsis root expressing venus fluorescent protein under **DR5** promoter

DR5

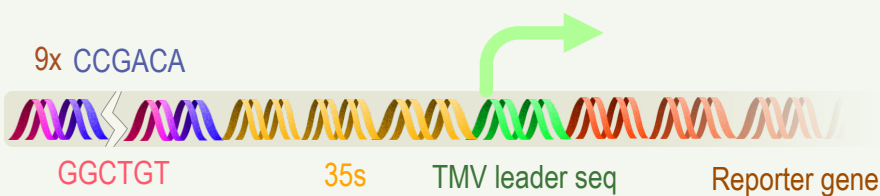


Arabidopsis root expressing GFP under **DR5v2** promoter

DR5 rev



DR5v2



Auxin reporters: DR5, DR5rev and DR5v2

A small sequence of 6 nucleotides (TGTCTC, Auxin response element AuxRE) has been identified on promoter of the GH3 genes from soybean, responsive to the hormone auxin (Ulmasov et al, 1997). This sequence was used to create a synthetic auxin response promoter referred to as DR5. The DR5 promoter consists in 7 repeats of a 11-nucleotide sequence, including the TGTCTC element and a minimal 35S promoter (Sabatini et al, 1999; Ulmasov et al, 1997). Later, a variant of this promoter, the DR5rev was constructed by combining 9 repeats of the AuxRE in inverse orientation (DR5rev) with the minimal 35S promoter (Friml et al, 2002). Driving the expression of reporter genes, such as GUS, luciferase, fluorescent proteins, these promoters monitor the transcriptional output to the presence of auxin in one cell.

Following the crystallization of the DNA binding domain of ARFs (Auxin Response Factors), the transcription factors binding to the AuxRE relaying the auxin signal at the transcriptional level, the canonical TGTCTC DR5 motif has been improved to a TGTCGG auxin response element. This motif is the preferred binding sequence of ARF1 and ARF5 (Boer et al, 2014). And a synthetic promoter composed of 9 TGTCGG inverted repeats was found to be of higher affinity to ARF proteins, leading to an increased sensitivity of the DR5v2 reporter line toward auxin (Liao et al, 2015).

Boer, D.R. et al., 2014. Structural Basis for DNA Binding Specificity by the Auxin-Dependent ARF Transcription Factors. *Cell*, 156(3), pp.577–589.

Friml, J. et al., 2002. AtPIN4 mediates sink-driven auxin gradients and root patterning in *Arabidopsis*. *Cell*, 108(5), pp.661–673.

Liao, C.-Y. et al., 2015. Reporters for sensitive and quantitative measurement of auxin response. *Nature methods*, 12(3), pp.207–210.

Sabatini, S. et al., 1999. An auxin-dependent distal organizer of pattern and polarity in the *Arabidopsis* root. *Cell*, 99(5), pp.463–472.

Ulmasov, T. et al., 1997. Aux/IAA proteins repress expression of reporter genes containing natural and highly active synthetic auxin response elements. *The Plant cell*, 9(11), pp.1963–1971.



@R_Boisivonlab