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Transcriptional regulation of monoterpenoid indole alkaloid biosynthesis in *Catharanthus roseus*

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Stellingen

Behorende bij het proefschrift

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1. Generation of overexpression lines of the MYC2^{D126N} mutant to study effects on MIA production is likely hindered by leakiness of the XVE inducible expression system and toxicity of the mutant protein.
This thesis
2. The F-box protein O2.51 may target ORCA2 and ORCA3 for degradation via the 26S proteasome.
This thesis
3. Knocking out CKI activity or use of ORCA mutants that are non-phosphorylatable by CKIs are possible strategies to enhance MIA production.
This thesis
4. The ORCA interactors O2.51 and CKI may function in the same pathway where phosphorylation by CKI is necessary for binding of ORCAs to O2.51.
This thesis
5. It is still possible to achieve unique and valuable results using traditional molecular biology tools (such as Northern blots).
This thesis
6. Hormonal signaling pathways, such as those involving jasmonates, auxins, cytokinins and gibberellins often overlap and modulate each other to fine-tune plant development, especially in complex responses to stress or developmental cues.
Jang et al. (2020) Int J Mol Sci 21: 1-15
7. The observation in the publication of Patra et al. (2018) that overexpression of BIS1 negatively affects CrMYC2-ORCA3-regulated genes contradicts the findings of Van Moerkercke et al. (2015).
Patra et al. (2018) New Phytol 217:1566-1581
Van Moerkercke et al. (2015) Proc Natl Acad Sci USA 112: 8130-8135
8. Although a single cell cannot fully represent the complex processes occurring within an entire organism, single-cell analyses can offer valuable insights into cellular behavior and gene expression.
Stuart T, Satija R (2019) Nat Rev Genet 20: 257-272
9. Direct regulation of the ORCA-regulated MIA genes Tryptophan Decarboxylase and Strictosidine Synthase by CrMYC2 would explain their cycloheximide-independent induction by methyl-jasmonate, but general acceptance of this regulatory mechanism suggested by Schweizer et al. requires additional supporting evidence.
Pasquali et al. (1992) Plant Mol Biol 18: 1121-1131
Schweizer et al. (2018) Metab Eng 48:150-162
10. The discovery of 7-deoxy-loganogenic acid raises questions about the evolution of this compound.
Sharma et al. (2018) Protoplasma 255: 1281-1294
Sharma et al. (2020) Biotechnol Lett 42: 11-23
11. The way that scientific research is presented often matters more than how proper and accurate it is conducted.

Mina Darehei
Leiden, January 15th, 2025