Investigating the regulation of the vindoline biosynthetic pathway in the *Catharanthus roseus* plant

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*Catharanthus roseus* (common name Madagascar periwinkle) is a widely studied plant due to the unique terpenoid indole alkaloid (TIA) compounds it naturally produces. Much work has been done on understanding how their biosynthesis is regulated. The eventual goal of these studies is to overproduce the chemotherapeutic agents vinblastine and vincristine, which can be as low as 0.0005% by dry weight in the plant. This work focuses on the regulation of the biosynthesis of vindoline, the limiting precursor to vinblastine and vincristine. By quantitatively measuring gene expression of the five known enzymatic steps and monitoring changes with different environmental factors, the necessary elements for vindoline production and enhancement can be better understood. Additionally, possible co-regulation of the steps in the vindoline biosynthetic pathway will be investigated by overexpressing ‘master regulators’, known as transcription factors.

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