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Evolution and diversification of alcohol dehydrogenases in the monoterpene indole alkaloid pathway of *Catharanthus roseus*

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Monoterpene indole alkaloids are a diverse family of compounds, some of which are of economic importance as drugs for use in the clinic. The medicinal plant *Catharanthus roseus* (Madagascar periwinkle) produces more than 100 monotepene indole alkaloids and is the source for two anti-cancer alkaloids vinblastine and vincristine. Biosynthesis of these alkloids is long and involves >20 enzymatic steps and multiple tissues and cell compartments, which have complicated the discovery of the biosynthetic enzymes necessary for production of these useful alkaloids. The central intermediate for generation of the various monoterpene indole alkaloid scaffolds is strictosidine, which can be found in many plants, primarily of the Apocynaceae and Gelsemiaceae families. This alkaloid is deglycosylated and the resulting compound is reactive and unstable. Monoterpene indole alkaloids with various backbones can be obtained from this precursor and are found in different species. Recently we discovered the first enzyme which can take this reactive precursor and reduce it to form a heteroyohimbine backbone (Tetrahydroalstonine synthase). This discovery completes the biosynthesis of an alkaloid found in many plant species which produce strictosidine such as *Rauvolfia serpentina*. I will present our recent work on the elucidation of this dynamic branch of the monoterpene indole alkaloid pathway. Using the information we have gained about the system (gene expression, protein interaction, localization, enzyme specificity) we propose an integrated hypothesis for the evolution of the heteroyohimbine biosynthetic enzymes in the medicinal plant *Catharanthus roseus*.

Biography

Anna K Stavrinides has completed MSc in Plant Genomics and Crop Improvement and she is currently undertaking PhD in the Lab of Prof Sarah O'Connor both at University of East Anglia and the John Innes Centre. She has Bachelors degree in Molecular Biology from the Université Montpellier 2. Her interests are focused around plant abiotic stress resistance and plant/environment interactions.

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