
Evolution of the NUDX1 gene in wild roses

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Abstract

Previously, a new enzyme involved in geraniol biosynthesis has been characterised in modern roses. This enzyme, named NUDX1, does not belong to terpene synthases but to Nudix hydrolases (Magnard et al. 2015 Science 349, 81-83). In other organisms like *Escherichia coli*, *Arabidopsis thaliana* and *Homo sapiens*, NUDX1 homologs are involved in cellular sanitization, hydrolysing 8-oxo-dGTP to avoid mutations. In modern roses, it hydrolyses geranyl diphosphate into geranyl monophosphate. This compound is then probably hydrolysed into geraniol by an unknown enzyme. To gain knowledge about this new function of NUDX1 and its evolution, we have begun the characterisation of *NUDX1* gene orthologs in wild species of roses and in other *Rosaceae*. We would like to know whether this function has appeared during domestication (30,000 cultivars created by growers since the XVIIth century), during evolution of the genus *Rosa* (120 species all around the world), or during the evolution of *Rosaceae* and closed families.

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