



HAL
open science

Two *Vitis vinifera* MATE proteins act as tonoplast acylated anthocyanin / H⁺ antiporters

Camila Gomez, Sandrine Vialet, Charles Romieu, Laurent Torregrosa, Markus Klein, Veronique Cheynier, Nancy Terrier, Agnes Ageorges

► To cite this version:

Camila Gomez, Sandrine Vialet, Charles Romieu, Laurent Torregrosa, Markus Klein, et al.. Two *Vitis vinifera* MATE proteins act as tonoplast acylated anthocyanin / H⁺ antiporters. 8. International Symposium on Grapevine Physiology and Biotechnology, Nov 2008, Adelaide, Australia. hal-01607862

HAL Id: hal-01607862

<https://hal.science/hal-01607862>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License

Two *Vitis vinifera* MATE proteins act as tonoplast acylated anthocyanin/H⁺ antiporters

Gomez Camila¹, Violet Sandrine¹, Romieu Charles², Torregrosa Laurent², Klein Markus³, Cheynier Véronique¹, Terrier Nancy¹, Ageorges Agnès¹

¹- UMR SPO, Campus SUPAGRO-INRA 2 Place Viala, F-34060 Montpellier, France

²- UMR DIAPC, Campus SUPAGRO-INRA, 2, Place Viala, F-34060 Montpellier, France

³- Zurich Basel Plant Science Center, University of Zurich, CH 8008 Zurich, Switzerland

E-mail : gomezca@supagro.inra.fr

Anthocyanin pigments are particularly important for red wine quality. Their extraction depend on their location in the berry and their solubility. In cells, anthocyanins are synthesised in the cytoplasm and accumulated inside the vacuole. However, little is known about the transport of these compounds through the tonoplast. Recently, the sequencing of *Vitis vinifera* genome allowed us to identify genes encoding proteins highly homologous to a putative anthocyanin permease described in tomato [1]. Two genes were selected as anthocyanin transporter candidates and named anthoMATE1 and anthoMATE3 since they contain conserved domains of the multidrug and toxic compound extrusion protein family (MATE). The expression of both genes was evaluated in order to define changes associated with anthocyanin biosynthesis. *AnthoMATE1* and *anthoMATE3* expression is essentially fruit-specific and concomitant with the accumulation of anthocyanin during berry development. In *Vitis* transformed roots cells, anthoMATE1 and anthoMATE3 are localized at the tonoplast (je pense encore que cette phrase manque de precision, the site at which anthocyanin transport occurs Yeast vesicles expressing anthoMATE proteins transported a mixture of acylated anthocyanins in the presence of MgATP. Inhibitor studies demonstrated that anthoMATE1 and anthoMATE3 proteins act *in vitro* as acylated anthocyanin /H⁺ antiporters. By contrast, anthoMATE proteins could not transport malvidin-3-O-glucoside (the major anthocyanin present in grape berry) or cyanidin-3-O-glucoside, this suggests that acyl residues are important determinants for transport. In a range of cultivars showing variable anthocyanin composition the expression of *anthoMATE3* is well correlated with acylated anthocyanins berry content. This is not the case with *anthoMATE1* suggesting that this protein may have additional function to anthocyanin transport.

1. Mathews, H., et al., *Activation tagging in tomato identifies a transcriptional regulator of anthocyanin biosynthesis, modification, and transport*. Plant Cell, 2003. **15**(8): p. 1689-1703.