

Through the grapevine: Molecular mechanisms behind Pinot berry color variation

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Variations in the color of grapevine berries within the Pinot family result from naturally-occurring genetic mutations that selectively shut down the genes responsible for the synthesis of red pigments, called anthocyanins. This has led to the emergence of Pinot blanc and Pinot gris from Pinot noir. Frédérique Pelsy and her colleagues, from the "Grapevine Health and Wine Quality" research unit at INRA Colmar, France, published these findings in *PLOS Genetics* on 2 April 2015.

The vine stocks used in viticulture are obtained by grafting; therefore, for any given variety, all stocks are identical...or almost all. Spontaneous events in the genomes of some vines lead to differences between individual plants. In this study, the researchers reveal the molecular mechanisms that underpin the change of berry color in greater detail. This was done by studying a collection of 33 clones of Pinot noir, Pinot gris and Pinot blanc. For the first time, they have shown that large-scale exchanges between homologous chromosomes, sometimes associated with deletions, selectively shut down the genes that induce the biosynthesis of anthocyanins. These [somatic mutations](#), which occur in a cell, propagate to form a distinct cell layer, leading to chimeric plants. This is how chimeric Pinot gris arises from Pinot noir: a Pinot noir skin surrounds internal cells that have mutated to Pinot blanc. Subsequently, Pinot blanc can emerge from Pinot gris as a result of cellular rearrangements that spread the mutations throughout the plant.

In this study, berry color was used as a model trait to shed light on the driving forces behind the genetic drift of clones and the evolution of the grapevine genome. Similar molecular and cellular mechanisms may impact other vegetatively propagated plants, creating clonal diversity.

More information: Pelsy F, Dumas V, Bévilacqua L, Hocquigny S, Merdinoglu D (2015) Chromosome Replacement and Deletion Lead to Clonal Polymorphism of Berry Color in Grapevine. *PLoS Genet* 11(4): e1005081. [DOI: 10.1371/journal.pgen.1005081](https://doi.org/10.1371/journal.pgen.1005081)

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