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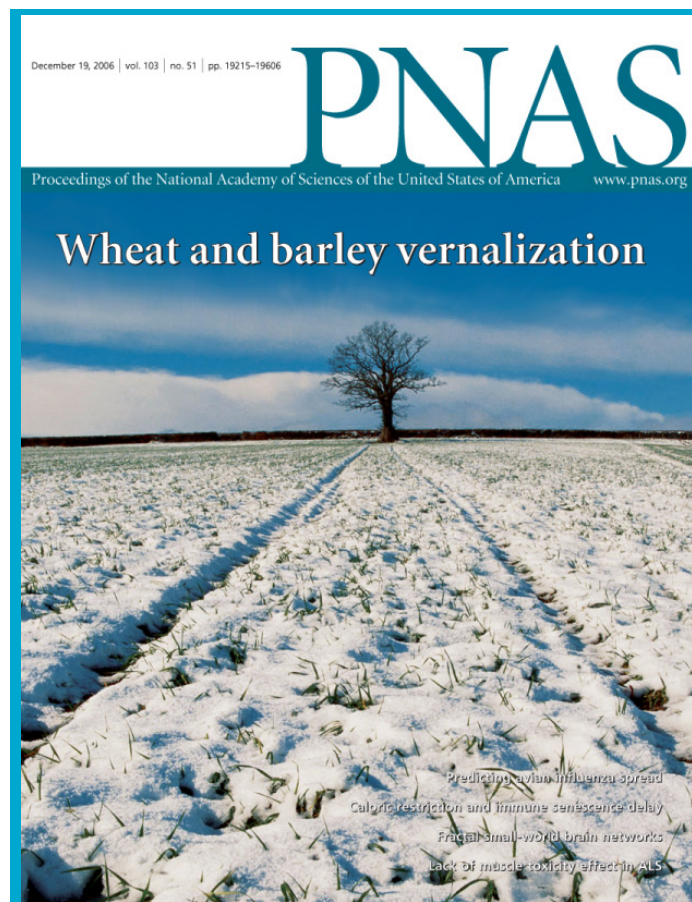
Yan, L., D. Fu, C. Li, A. Blechl, G. Tranquilli, M. Bonafede, A. Sanchez, M. Valarik, and J. Dubcovsky. 2006. The Wheat and Barley Vernalization Gene *VRN3* is an Orthologue of *FT*. *Proc. Natl. Acad. Sci.* 103: 19581-19586.

One of the critical differences that help wheat and barley adapt to different environments is the existence of winter and spring forms. Winter wheat and barley varieties are planted in the fall, but wait until the winter weather passes before flowering. This long-term exposure to low temperatures required to accelerate flowering is called the “vernalization requirement”. In contrast, spring wheat and barley varieties do not have this vernalization requirement and can be planted in the spring. A team of scientists cloned the vernalization gene *VRN3* responsible for these differences, which are essential for the adaptation of these species to different climates. This gene is similar to the Arabidopsis *FLOWERING LOCUS T* (*FT*) and its induction in the leaves results in a transmissible signal that promotes flowering. The researchers determined that wheat and barley plants carrying the dominant *VRN3* alleles for early flowering have higher *FT* transcript levels than the plants carrying the recessive *vrn3* alleles for late flowering. To confirm that they had identified the correct gene, the researchers transformed the winter wheat variety, Jagger, with the *VRN3* allele from the spring variety, Hope. The genetically modified plants showed the early flowering characteristic of the spring wheat varieties, whereas the control non-transgenic plants failed to flower in the absence of vernalization. This result confirmed that the gene cloned by this research team was correct. The study also shows that variation in the wheat and barley *FT* genes is responsible for natural variation in vernalization requirement, providing additional sources of adaptive diversity to these economically important crops. The *VRN3* mutation discovered in the wheat variety Hope can now be used to accelerate flowering time of other wheat varieties. In addition, the *VRN3* molecular markers developed in this study will help breeders to detect the mutations present in their breeding lines and to study their effects on the adaptability of wheat and barley varieties to their particular environments.

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