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Trafficking of a low molecular weight (LMW) glutenin subunit in durum wheat

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The low molecular weight (LMW) glutenin subunits are components of the highly cross-linked glutenin polymers and, like all gluten proteins, they are synthesised on polyribosomes attached to the endoplasmic reticulum (ER) and translocated into the lumen where the proteins fold and disulphide bonds are formed. Their subsequent fate, however, remained unclear. It has been suggested that, similarly to gliadins, LMW subunits might be transported via the Golgi apparatus to the vacuole, where they accumulate to form protein bodies, or that, like the HMW subunits, they may remain within the ER lumen to form a second population of protein bodies of ER origin.

Determination of the locations and trafficking of individual gluten proteins in developing wheat grain has been limited in the past by the complexity of the mixture and the lack of specific antibodies. We have overcome this by expressing a c-myc tagged LMW glutenin subunit in transgenic wheat. This has allowed the protein to be followed in the flour and dough and to be located in the cells of the developing grain. The latter has demonstrated that the protein is trafficked via two alternative pathways being both deposited within the ER and transported via the Golgi and vesicles to the vacuole.