

## Synthesis of an Unusual Alpha-Zein Protein is Correlated With the Phenotypic Effects of the *floury-2* Mutation in Maize Endosperm.

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The soft, starchy endosperm of the maize *floury-2* (*fl2*) mutant is associated with a reduction in zein mRNA and protein synthesis, and enhanced levels of a 70-kD protein shown to be the maize homolog of the chaperonin BiP. We found an unusual alpha-zein protein of 24-kD to be consistently associated with the storage protein fraction from *fl2* mutants. Although this protein is larger than the common 19- and 22-kD alpha-zeins, its NH<sub>2</sub>-terminal sequence is that of a 19-kD, while its amino acid composition is more like that of a typical 22-kD alpha-zein. Increases in accumulation of this novel alpha-zein protein correlated with increases in BiP accumulation and decreases in storage protein deposition. In addition, synthesis of this protein is regulated by *Opaque-2* (*O2*). Double mutants *o2fl2* do not manifest the *fl2* phenotype. The synthesis of an abnormal alpha-zein protein in *fl2* could explain many features of the mutant, such as abnormal protein body morphology, BiP induction and hypostasis to *o2*. Although we cannot yet prove that accumulation of this protein is responsible for the *fl2* phenotype, we were able to detect an RFLP with a 22-KD alpha-zein probe that is unique to *fl2*. We also found that the transcription of most zein families is reduced in the mutant. We hypothesize that the generalized reduction in storage protein gene transcription found in *fl2* could be a response to accumulation of a defective protein that causes a severe impairment of secretory protein synthesis.

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