

Hidden message - nuclear mRNA storage in seed biology.

Seeds are the foundation of agriculture, yet their biology still holds many mysteries. Most people focus on the diverse storage materials accumulated in seeds, which makes them a perfect food source or on seed potential to germinate quickly and provide yield. However, to better use seeds, we must also learn about other aspects of their biology. mRNA production is a critical step in gene expression that is typically followed by their quick export from the cell nucleus and translation into proteins. It is well known that during maturation, seeds produce many mRNAs that are not immediately translated but are stored and used only during germination. These stored mRNAs help to accelerate germination and prepare the seed for suboptimal conditions. Despite the importance of seeds, the mechanisms by which those mRNAs are stored are largely unclear. Recent research has shown that mRNAs in seeds are stored in the cytoplasm and are bound by ribosomes, ready for translation. In my work, I have obtained preliminary results that may support an additional, new mechanism. I observed that mRNAs in dry seeds accumulate in the cell nucleus and that this accumulation is enhanced in mutants of *PAB* genes. *PAB* genes encode poly(A)-binding proteins, which are crucial for mRNA export from the nucleus, protection from degradation, and induction of translation. In my project, I propose to investigate nuclear mRNA storage in seeds and the role of PAB proteins in this process.