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Using the INTACT method to study *PICKLE* in individual cell types

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ABSTRACT

Cell differentiation is an essential part of development in multicellular organisms. Cells with identical genomic DNA are able to differentiate into a variety of tissues due to selective expression and repression of genes. This tissue-specific gene expression is enabled in part by proteins called chromatin remodelers, which can move, remove, or restructure histone proteins to restrict or allow physical access to genomic DNA. *PICKLE* (*PKL*) is a member of the CHD family of ATP-dependent chromatin remodelers that promotes cellular identity in the plant model organism *Arabidopsis thaliana*. *PKL* promotes cell identity by silencing embryonic genes during seed germination by promoting the repressive epigenetic modification trimethylation of lysine 27 on histone H3 (H3K27me3). However, the contributions of *PKL* to H3K27me3 and gene expression have only been studied on an organism-wide scale. Due to the wide variety of tissues that comprise a plant, the specific role of *PKL* in a given cell type cannot be determined by examining levels of gene expression and epigenetic modifications as averaged across the organism. Through use of the INTACT (isolating nuclei tagged in specific cell types) method, nuclei of two different cell types will be tagged and purified from both wild-type *Arabidopsis* and *Arabidopsis* lacking functional *PKL*. Isolating nuclei from one cell type at a time will allow us to study the function of *PKL* at a much higher resolution. This will provide both a better understanding of *PKL* function and a precedent for studies of how CHD chromatin remodelers regulate gene expression in other organisms.

KEYWORDS

Cell differentiation, epigenetics, chromatin remodeling