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## 近期发表论文

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### Functional divergence of two duplicated Fertilization Independent Endosperm genes in rice with respect to seed development

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#### Abstract

Fertilization Independent Endosperm(FIE) is an essential member of Polycomb Repressive Complex 2(PCRC2) that plays important roles in the developmental regulation of plants. *OsFIE1* and *OsFIE2* are two FIE homologs in the rice genome. Here, we showed that *OsFIE1* probably duplicated from *OsFIE2* after the origin of the tribe Oryzaeae, but has a specific expression pattern and methylation landscape. During evolution, *OsFIE1* underwent a less intensive purifying selection than did in *OsFIE2*. The mutant *osfie1* produced smaller seeds and displayed reduced dormancy, indicating that *OsFIE1* predominantly functions in late seed development. Ectopic expression of *OsFIE1*, but not *OsFIE2*, was deleterious to vegetative growth in a dosage-dependent manner. The newly evolved N-terminal tail of *OsFIE1* was probably not the cause of the adverse effects on vegetative growth. The CRISPR/Cas9-derived mutant *osfie2* exhibited impaired cellularization of the endosperm, which suggested that *OsFIE2* is indispensable for early seed development as a positive regulator of cellularization. Autonomous endosperm was observed in both *OsFIE2*<sup>+/-</sup> and *osfie1/OsFIE2*<sup>+/-</sup> but at a very low frequency. Although *OsFIE1*-PCRC2 exhibited H3K27me3 methyltransferase ability in plants, *OsFIE1*-PCRC2 is likely to be less important for development in rice than is *OsFIE2*-PCRC2. Our findings revealed the functional divergence of *OsFIE1* and *OsFIE2* and shed light on their distinct evolution following duplication.

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