

Category	: International Rice Research Conference
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Title of Entry	: NF-YB1-YC12-bHLH144 complex directly activates Wx to regulate grain quality in rice (<i>Oryza sativa</i> L.)
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Abstract : Identification of seed development regulatory genes is the key for the genetic improvement of rice grain quality. NF-Ys are important transcription factors, but their roles in rice grain quality control and the underlying molecular mechanism remains largely unknown. Here, we report the functional characterization a rice NF-Y heterotrimer complex NF-YB1-YC12-bHLH144, which is formed by the binding of NF-YB1 to NF-YC12 and then bHLH144 in a sequential order. Knock-out of each of the complex genes resulted in alteration of grain qualities in all the mutants as well as reduced grain size in *crnf-yb1* and *crnf-yc12*. RNA-seq analysis identified 1496 genes that were commonly-regulated by NF-YB1 and NF-YC12, including the key granule-bound starch synthase gene *Wx*. NF-YC12 and bHLH144 maintain NF-YB1 stability from the degradation mediated by ubiquitin/26S proteasome, while NF-YB1 directly binds to the “G-box” domain of *Wx* promoter and activates *Wx* transcription, hence to regulate rice grain quality. In all, we revealed a novel grain quality regulatory pathway controlled by NF-YB1-YC12-bHLH144 complex, which has great potential for rice genetic improvement.

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