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Transcriptomic Changes during Germination in Hypoxia of Maize (*Zea mays* L.)

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[Introduction]

Maize (*Zea mays* L.) is very sensitive to hypoxic stresses induced by waterlogging and flooding. Dramatic yield losses due to rainfall occasionally occurs in maize cultivation. Such hypersensitivity on hypoxia is specifically significant at early growing stages such as germination and seedling stages and restrict cultivation area of maize.

[Materials and Methods]

Two inbred lines, B73 and Okcheon Chal-1 (OkC), were used for this study. Seeds were imbibed at 15°C for two days and moved to 25°C on petri-dish with wet filter paper or in 50 ml conical tube filled with water for 1 days which represent air or hypoxic condition, respectively. By comparing transcriptome changes of the seeds in aerobic and hypoxic condition, we found possible reasons for failing to germinate in hypoxic condition.

[Results and Discussion]

For the first day of germination in aerobic and hypoxic condition shows very similar transcriptomic changes in terms of glycolysis, TCA cycle, and pentosephosphate pathway. At the same time there were critical difference including genes related with fermentation, phytohormone regulation, and transcriptional regulations. Such differences are highly correlated with each other and showed hierarchical response to the survival at the hypoxic condition. The information acquired in this study may help to understand basic mechanism and to establish possible strategies developing water logging tolerant maize cultivars.

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