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CROSS-TALK BETWEEN COLD RESPONSE AND FALOWRING TIME REGUATION

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Since the proper timing of flowering is pivotal for reproductive success in plants, flowering is regulated by complex genetic networks which are fine-tuned by endogenous signals and environmental cues. The flowering time gene *SOC1* (*SUPPRESSOR OF OVEREXPRESSION OF CO1*) is one of key floral activator integrating multiple flowering pathways as long day, vernalization, autonomous, and GA-dependent pathways.To elucidate the downstream targets of flowering pathway integrator, *SOC1*, we adopted microarray analysis using Affymetrix ATH1 chip. Here we show that *SOC1* is also a key regulator for cross-talk between cold response and flowering time regulation. The microarray analysis showed that *soc1* knock-out has increased expression of *COR15A*, a cold inducible gene, whereas *SOC1* overexpression line has decreased expression of *COR15A*, suggesting *SOC1* negatively regulated the expression of *COR15A*. In contrast, overexpression of *COR15A* caused late flowering and the decrease of *SOC1* expression through the increase of expression of *FLC*, an upstream negative regulator of *SOC1*. Such feedback loop allows plants to delay flowering while the incoming spring is cold yet, thus is an evolutionarily advantageous mechanism.