Phenotype and gene analysis of a cellular slime mold slugger mutant R1

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SUMMARY

In the mutant library constructed using the methods of restriction enzyme-mediated insertion (REMI) mutagenesis in cellular slime mold *Dictyostelium discoideum*, we isolated strain R1, which shows a considerable delay in the transition of migrating slugs to fruiting bodies. In fact, R1 was found to be genetically disrupted in a novel gene, *dwwb,* containing a C2 domain in N-terminus and a single WW domain in the middle portion of the coding sequence. The C2 domain is known as a Ca^{2+} dependent membrane-targeting module, although the WW domain has been reported to be responsible for protein–protein interactions. Therefore, DWWB protein might change its intracellular distribution depending on intracellular Ca^{2+} concentrations. With RT-PCR, the *dwwb* gene expression was found to be totally lost in R1 cells. When R1 cells were mixed with wild-type cells marked with YFP, R1 cells were predominantly sorted into the anterior prestalk region in migrating slugs. Based on these findings, the DWWB protein is suggested to be involved in the developmental regulation in the multicellular bodies of *D. discoideum*.