

Initiation of *gamone1* transcription by sudden food deprivation in *Blepharisma japonicum*

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SUMMARY

Conjugation in *B. japonicum* is induced by specific cell-cell interactions between complementary mating-type cells I and II. Conjugation-inducing substances, called gamones, are key molecules for this interaction. The glycoprotein gamone 1, secreted by type I cells, triggers conjugation, including cell rounding and pair formation. We isolated the *gamone 1* gene previously, and showed that gamone 1 was not expressed constitutively and that its expression was regulated by various intra- and extra-cellular stimuli at the transcription level. Nutrient deprivation is one of the essential factors that induces *gamone 1* expression. In this study, we examined whether *gamone 1* expression is induced by sudden food deprivation in proliferating cells. Although proliferating cells never expressed the *gamone 1* gene under food-rich conditions, once the cells were exposed to nutrient-deprived conditions, they started to transcribe the *gamone 1* gene within 1.5 hours and secreted active gamone 1 within 3 hours; the expression of the gene was then gradually enhanced. We also examined the timing of the initiation of *gamone 1* expression in individual cells. Almost all individual cells that were in the logarithmic growth phase started to secrete gamone 1 within 24 hours after being exposed to nutrient-deprived conditions, and the secretion was enhanced when starvation was excessive. These results suggest that proliferating cells start transcribing the *gamone 1* gene shortly after they are deprived of food, and that nutrient deprivation is not only the essential factor but also the enhancing factor for *gamone 1* transcription.