

In vivo robustness analysis of cell division cycle related genes in the fission yeast *S. pombe*.

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Amount of intracellular components should be optimized so that the cell can perform its function precisely and robustly. Gene over-expression technique is used to perturb the cellular system, to analyze the perturbed state of the cell (phenotype), and to reveal function of the gene over-expressed. However we barely know the limit of the over-expression to disrupt the cellular system, by which we can argue the robustness of the cellular system.

We have reported a genetics method named genetic Tug-Of-War (gTOW) by which we can determine the upper limit gene dosage (e.g. gene expression level) in the budding yeast *Saccharomyces cerevisiae* (Figure 1). The data set of 30 cell division cycle related (*CDC*) gene obtained by gTOW revealed the “robustness profile” of the cell division cycle in *S. cerevisiae*, and used to evaluate and improve computational model (reference 1).

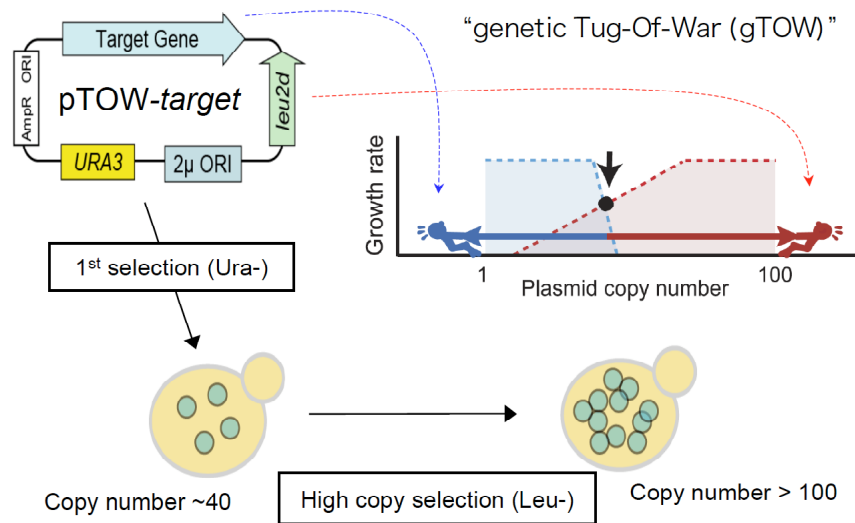


Figure 1: The experimental scheme and principal of gTOW method. See reference 1 for detail.

Here, we developed the gTOW method in the fission yeast *Schizosaccharomyces pombe* (*sp-gTOW*). In *sp-gTOW*, we can increase the plasmid copy number more than 200, and monitor the plasmid dosage among the cell population using GFP fluorescent. In an initial analysis, we determined the upper limit dosage of 30 *cdc* genes. We would like to discuss the similarity / difference of the robustness profiles of the cell division cycle in the distantly related yeasts.

Reference

1. PLoS Genetics, **2**: e111, 2006