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NAT1, A HOST-ENCODED GENE IS REQUIRED FOR THE MAINTENANCE OF THE 2? PLASMID IN SACCHAROMYCES CEREVISIAE

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ABSTRACT

The stable maintenance of the 2? plasmid depends on its ability to overcome the maternal inheritance bias, which in *S. cerevisiae* normally results in failure to transmit the plasmid to daughter cells. In addition to the plasmid-encoded proteins Rep1p and Rep2p acting on the plasmid DNA locus STB, it has been shown that other chromosome-encoded yeast proteins are required. We have previously shown that chromosome-encoded chromatin remodeling protein, Rsc2p was essential for the stability of the 2? plasmid. Recently several chromosome-encoded chromatin remodelling genes *CST6*, *SBA1* and *NAT1*

have been found to affect the stability of chromosomes. These genes may also be important for the maintenance of the 2? plasmid. Hence, this study was carried out to determine if *CST6*

, *SBA1*

and

NAT1

are required for the stability of the 2? plasmid. It was found that an overexpression of *CST6*

, *SBA1*

or

NAT1

did not affect the stability of 2? plasmid. Interestingly, disruption of *NAT1*

was found to affect the stability of 2? plasmid. Disruptions of *CST6*

and

SBA1

affected the maintenance of the centromeric plasmid but not the 2? plasmid. Additionally, yeast mutagenesis produced three stable mutants, m1, m2 and m3 that lost the 2? plasmid rapidly.

The phenotype of mutant m3 was rescued by the wildtype

RSC2

gene, while mutant m1 was rescued by the wildtype

NAT1

gene, confirming the results that the two genes were essential for the maintenance of the 2 μ plasmid. Another mutant, m2 was not rescued by the presence of either

RSC2

or

NAT1

indicating that there is at least another unidentified chromosomal gene that is required for the maintenance of the 2 μ plasmid.

Key words: 2 μ plasmid maintenance, stability, gene disruption

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