

The Effect of *RAS2* Gene Mutation in Yeast Model

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Abstract: More than 30% of all human malignancies are brought about by mutation in RAS proto-oncogenes (HRAS, KRAS, and NRAS) that are greatly conserved in yeast (*RAS1* and *RAS2*). This makes yeast an efficient single-celled eukaryotic model organism to study their functions. In this current investigation, the null mutation of *RAS2* gene was analyzed to find out its deleterious consequences in yeast cells based on their ability to utilize glycerol as its respiratory substrate, mtDNA mutation rate, mtDNA abundance and distribution pattern. Mutant cells grown in YPEG plates demonstrated slight respiratory deficiency than the wild type. Erythromycin-resistant assay was carried out to analyze the spontaneous mitochondrial DNA mutation rate in *ras2* mutant and was found greater than the wild type. In addition, the mitochondrial DNA of both strains was also visualized under a fluorescence microscope using DAPI fluorescent stain. It was observed that mtDNA abundance was much lower than that of the wild type. Thus, the present investigation revealed that the deletion of *RAS2* gene resulted in mtDNA mutation and depletion.

Keywords: Mutation; RAS proto-oncogenes; *S. cerevisiae*; Mitochondrial DNA; Cancer