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Lethal effect of denatured ribosome recycling factor at lag phase

Ribosome recycling factor (RRF) is an essential protein factor responsible for disassembly of the post-termination complex. Protein synthesis consists of four steps, initiation, elongation of peptide chain, termination and the ribosome recycling step. RRF catalyzes the fourth step of protein synthesis in bacteria. It was known that inactivation of temperature sensitive RRF (tsRRF) at lag phase resulted in lethal effect (Janosi, Mottagui-Tabar et al. 1998) while at log and stationary phase it has bacteriostatic effect. In this paper, we tried to elucidate the beginning of physiological and cellular changes due to the inactivation of RRF so that we have a glimpse of the possible mechanism of lethal effect of inactivation of tsRRF at lag phase only. We found under the condition where the lethal effect is observed that a large amount of 40S particles were formed containing 16S rRNA. Within hour of the appearance of this 40S particles cells start dying. Measures such as inhibition of protein chain elongation stopped the lethal effect of tsRRF at the non-permissive temperature. All such measures eliminated the appearance of the 40S particles. We conclude that the 40S particle is essential for lethal effect of tsRRF at the lag phase. Our proteomics data showed upregulation of alternate ribosome rescue factor (ArfA) at the non-permissive temperature provide evidence about RRF essentiality. Effect of various antibiotics on the formation of the 40S particles and on the lethal effect of tsRRF will be described.

Biography

Hideko Kaji has obtained her PhD from Purdue University. She had faculty positions at Vanderbilt School of Medicine, The Johns Hopkins Medical School, and Fox Chase Cancer Research Institute. Currently, she is a Professor of Biochemistry and Molecular Biology at Jefferson Medical college, Thomas Jefferson University.

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