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EFFECTS OF STRESS MUTATION ON BARRIERS TO INTERKINGDOM HORIZONTAL GENE TRANSFER

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Genes known for their role in DNA damage repair and recombination, the mismatch repair (MMR) genes, are highly conserved in organisms from bacteria to humans. When one or more of the MMR functions fail, either because of mutations in a gene or because of physiological changes resulting from stress, the mutation rate of the organism increases. Concomitantly, these organisms acquire genes from other species at higher rates because MMR normally inhibits interspecies recombination. Whereas the evidentiary link between horizontal gene transfer (HGT) and mutation rates has so far been confined to laboratory experiments involving HGT between species of bacteria, there are hints that it may occur in plants, too. DNA does transfer from bacteria to eukaryotes, eg, yeast, plants and humans, by bacterial conjugation, and can recombine with the DNA in the recipient organism. Does interkingdom conjugation have the effect of promoting mutation in eukaryotic organisms as it does in prokaryotes? We have used conjugation as a test of the effects of MMR on interkingdom DNA transfer to eukaryotes and will report our findings.