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CONTROL OF HORIZONTAL GENE TRANSFER AND GENETIC VARIABILITY IN *RALSTONIA SOLANACEARUM*

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Horizontal gene transfer plays a major role in genetic adaptation of bacterial populations to environmental conditions with a strong contribution to both microbial evolution and speciation. However, among mechanisms regulating gene acquisition by bacteria the Mismatch Repair System has a key role in preventing recombination with heterologous DNA, thus participating in maintaining genetic integrity and stability of bacterial genomes. Previous studies have shown that the naturally transformable bacterium *Ralstonia solanacearum* transformed efficiently only with its own DNA. In order to understand and overcome this limitation, the MRS system was inactivated in *R. solanacearum* after the *mutS* gene was cloned, characterized and disrupted. Inactivation of *mutS* resulted in an increase in spontaneous mutation frequencies in this bacterium. Moreover, strains lacking *MutS* exhibited higher frequencies for natural transformation with DNA from other *R. solanacearum* strains than the wild type strain *R. solanacearum* GMI1000. By using plasmids containing ribosomal sequences from various bacteria as homologous sequences for recombination, we also demonstrated that inter-species gene transfers could be enhanced in these mutators. These results suggest that the MRS is a genetic system which allows bacteria to control gene exchange and balance efficiently between generation of genetic diversity and stability. In addition, preliminary results concerning potential gene transfer from transgenic plants to these mutators will be presented.

Poster no: 15