

Owner: Wuertz, Stefan

June 17., 11:45

EVALUATION OF *EYFP* AS A DETRIMENTAL GENE IN
ACINETOBACTER SP. BD413: EVIDENCE FOR MAINTENANCE OF A
DISADVANTAGEOUS GENE IN BACTERIAL COMMUNITIES

Hendrickx Larissa¹, Hausner Martina² and Wuertz Stefan¹

¹Department of Civil and Environmental Engineering, University of California,
Davis, One Shields Avenue, Davis CA 95616, USA

²Institute of Water Quality Control and Waste Management, Technical
University of Munich, Am Coulombwall, 85748 Garching, Germany

Acinetobacter sp. BD413 was highly sensitive to the expression of *eyfp* (enhanced yellow fluorescent protein) and viability was limited to 2 to 20 days depending on the mode in which pure transgenic cultures were grown. The detrimental character of *eyfp*-expression combined with the fluorescence properties of *eyfp*, which resided on the heterologous, self-replicating tetracycline selective plasmid pGAR2, allowed an evaluation of the effects of a detrimental gene on a sensitive host. Both the viability of the compromised strain and the persistence of the disadvantageous gene by horizontal gene transfer were investigated in suspended cultures and in biofilms. While pure culture growth of BD413(pGAR2) could not be maintained, BD413(pGAR2) survived at least 4 times longer when grown in tight proximity of strains exhibiting normal growth. Suspended culture experiments resulted in lowest conjugation frequencies but highest transformation frequencies, as determined by viable selective plate counts, compared to those obtained with the same plasmid vector carrying other fluorescent protein genes. In contrast, transformation frequencies as observed by quantitative confocal laser scanning microscopy (CLSM) and computation of cell biovolumes, were lowest when pGAR2 was used in biofilm experiments. No transformants were detected in parallel experiments with the same plasmid using standard selective plating methods. The occurrence of transfer of an undesirable gene, detectable *in situ* in biofilms, and the maintenance of the host sensitive to this gene in the presence of uncompromised cells, suggest that disadvantageous genes might not disappear as quickly from a microbial population as previously thought.