SAMIGE / Sociedad Argentina de Microbiología General

VII CONGRESO ARGENTINO DE MICROBIOLOGÍA GENERAL "SAMIGE DEL BICENTENARIO"

"Dedicado a la presentación de trabajos de investigación básica sobre microorganismos (bacterias, arqueas, hongos y levaduras)"

SAMIGE

Sociedad Argentina de Microbiología General

18 al 20 de Mayo, Centro Cultural "Ing. Eugenio F. Virla"
Universidad Nacional de Tucumán,
San Miguel de Tucumán, Tucumán, Argentina
2011

PM P07. Regulation of Unsaturated Fatty Acid synthesis in Mycobacterium

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Unsaturated fatty acids (UFAS) are present in membrane phospholipids, mycolic acids, lypoglycans and triglycerides of mycobacteria. Double bonds are also substrate for cyclopropanation or modification by methoxy and keto-groups, which are all present in mycolic acids. Despite the relevance that double bonds have in mycobacterial physiology, biosynthetic pathways and regulatory mechanisms controlling desaturase expression are extremely scarce. Here we employed thin-layer chromatography and gas chromatography-mass sprectrometry to compare levels of UFAs of Mycobacterium smegmatis grown at different temperatures. We found that palmitoleic and oleic acids contents increased at low temperatures. M. smegmatis genome holds at least 7 desaturases. We selected three genes homologous to desA1, desA2 (both believed to be involved in mycolic acid biosynthesis) and desA3 (encoding an stearoyl desaturase) genes of M. tuberculosis to perform regulatory tests. Promoters corresponding to desA1 (M_SMEG5773), desA2 (M_SMEG 5248) and desA3 (M_SMEG1886) genes were cloned upstream of the *B*- galactosidase reporter gene. Transcription of these genes seems not to increase with lowering temperatures. To confirm this findings Northern blots were performed. Both results suggest that either other enzyme is involved in UFA increase at low temperature or that UFA increase is due to a post-transcriptional control of desaturase activity. Accordingly, a putative desaturase encoded by the gene M_SMEG1211 was considered for this role. When the desA3-1211 promoter was cloned and analyzed it showed a temperature- regulated expression. We also analyzed if desA3-1886 transcription was regulated by end-product by adding oleic acid to the growth medium, finding that its expression was repressed upon oleic acid addition. Interestingly, an inverted repeat was located in the promoter region upstream of the desA3-M_SMEG1886 gene, as well as upstream M_SMEG1885 gene encoding the associated oxido-reductase, and this pattern is conserved in M. tuberculosis. We are now studying the role of these putative regulatory sequences in the regulation of the expression of this pathway.

PM P08. UV-B resistance in a bacterial strain isolated from High Altitude Andean Wetlands: the pigment role

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In order to test UV-B radiation resistance of bacterioplankton communities from High Altitude Andean Wetlands, water samples were exposed 24 h to UV-B radiation (DOSIS: 166 kJ/m^2). A red bacterial strain related to Serratia sp. Vil 11, was able to resist more than 6 h under UV-B treatment. In this work, we analyze the photoprotective pigment role in Serratia sp. Vil 11 employing a wild type strain (red) and a non-pigmented mutant. In addition, we also performed the identification of the pigment content by HPLC and its cellular location by confocal microscopy.

In the absence of pigment production, Serratia sp. Vil 11 was significantly more susceptible to UV-B stress. Pigmented cells survived high UV-B exposure (DOSIS: 7 kJ/m^2), around 10 fold compared to the non-pigmented mutant cells. The HPLC analyses showed a sole peak corresponding to prodigiosine pigment and the confocal microscopy analysis showed an extracellular location of the pigment distribution suggesting that it would be play an important role in primary protection against UV-B radiation.

PM P09. GDH ACTIVITY AND GLUCONIC ACID PRODUCTION BY Burkholderia tropica

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Burkholderia tropica strains have been reported to posses the ability to solubilize insoluble phosphates. Mineral phosphate solubilization (MPS) activity is usually related with the expression of a periplasmic glucose dehydrogenase (GDH), responsible for the conversion of glucose into gluconate. In the present work it was checked the ability of B. tropica to express an active GDH under different culture conditions and their relation with MPS activity. Batch cultures were carried out with glucose as C-source and different phosphate and nitrogen sources. Cultures using tricalcium phosphate and under nitrogen fixation showed the highest GDH activity and gluconic acid production. Soluble phosphorous concentration in the media increased together with the gluconic acid. These results indicate that phosphate solubilization was due to acidification via GDH activity and it seems that this activity is regulated by phosphate starvation.

PM P10. High phosphate concentration impairs formation and stability of biofilm in Escherichia coli

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Biofilm is the prevailing microbial life-style in most natural environments and it often serves as a strategy to overcome stress. The amount and structure of biofilm could be modified by the culture conditions.

In several organisms, such as Escherichia coli, Pseudomona aeruginosa, Vibrio cholerae, Klebsiella aerogenes, Salmonella enterica serovar typhimurium, etc., inorganic polyphosphate (polyP) formation was shown to be critical for attributes such as motility, quorum sensing, biofilm formation, resistance to stress, and stationary-phase survival. PolyP is a chain of tens or many hundreds of phosphate residues linked by "high-energy" phosphoanhydride bonds. The main enzymes associated to polyP metabolism in E. coli are polyphosphate kinase (encoded by ppk) and exopolyphosphatase (ppx). We have previously shown that E. coli cells grown in media containing a critical phosphate concentration >37 mM maintained a high polyP level in stationary phase (up to 96 h) and enhanced the cellular