

## *In-silico* Analysis of the *Bacillus Anthracis* Virulence Plasmid pXO1

## Ariel, N., Zvi, A. and Shafferman, A.

Department of Biochemistry and Molecular Genetics, Israel Institute for Biological Research

Bacillus anthracis is the causative organism of the potentially fatal disease anthrax. Fully virulent forms of B. anthracis carry two large virulence plasmids – pXO1 and pXO2. So far, only few of the putative virulence factors encoded by these plasmids were identified. These include the toxin components Protective antigen (PA), Lethal factor (LF) and Edema factor (EF), encoded by pXO1; and the anti-phagocytic capsule encoded by pXO2.

Bioinformatics analysis of pXO1 plasmid, aimed at identifying potential B. anthracis specific vaccine/drug targets, was carried out. This analysis may also provide better understanding of the involvement of pXO1 in B. anthracis pathogenesis. The previously defined 143 open reading frames (ORFs) sequenced and partially annotated by Okinaka and co-workers (Okinaka et. al., J. Bact. 181: 6509) were subjected to extensive similarity searches (against the nr (non-redundant) and unfinished microbial genome databases, NCBI), motif analysis (PROSITE and E-motif), cellular location (PSORT, SignalP, gram-positive anchoring signal analysis, TMPRED) and domain analysis (CDD, Pfam, Smart). Genes common to related bacilli (B. subtilis, B. halodurans, B. cereus ATCC 14579 and the pBTOXis plasmid of B. thuringiensis israeliensis) were removed. This comprehensive analysis resulted in a significant increase in the number of ORFs with clues as to their function (from the previously reported 34 ORFs to 85 ORFs). Based on the above, a set of 30 ORFs, consisting mostly of secreted or cellanchored proteins and proteins with function or motifs typical of documented virulence determinants, were targeted for experimental evaluation of their immunogenic potential.