- **PROJECT-3 : A novel component of biological water stress - anhydrotic stress**

Traditionally, two components of biological water stress have been defined for each of which organisms have evolved distinct mechanisms of adaptation. These two components are designated as ionic (or salinity) stress and hypertonicity (or osmotic, or turgor) stress. The experimental distinction between the two is based on the fact that whereas the former is elicited only by ionic solutes (such as NaCl) and not by nonionic solutes (such as sucrose), the latter is elicited to equivalent extent by both ionic and nonionic impermeable solutes including NaCl and sucrose. Solutes that are freely permeable (such as glycerol and ethylene glycol) impose neither salinity stress nor hypertonicity stress.

We have recently identified a set of mutants each of which is affected not only by NaCl and sucrose but also by glycerol and ethylene glycol (*1*, and unpublished data). We believe that these mutants define a third and novel component of water stress for which we have coined the term anhydrotic stress. According to our hypothesis, (i) decrease in the absolute cytoplasmic water activity may also reduce bacterial growth rate and (ii) cells possess active adaptive mechanisms to counter such growth inhibition. Our studies *(1)* suggest a correlation between an increase in cytoplasmic L-ornithine levels and decreased tolerance to anhydrotic stress. Ongoing work is aimed towards elucidating the mechanism underlying this correlation, as well as towards genetic and molecular characterization of other loci identified in the anhydrotic stress-sensitive mutants.

1. UmaPrasad, G., and J. Gowrishankar. 1998. Evidence for the existence of a novel component of biological water stress (anhydrotic stress) in *Escherichia coli*. J. Genet. **77**: 1-11.
