DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Carboxylase /oxgenase ribulose-1,5-bisphosphate (RuBisCO) is the enzyme responsible for attaching atmospheric CO_2 to pentose. As a result of this reaction cycle, two molecules of 3-phosphoglycerate are formed, which is the starting compound for many anabolic pathways. RuBisCO is the only enzyme in nature that allows for incorporation of inorganic into organic matter for a large scale. Because it is an enzyme that is very slow and inaccurate, scientists have been looking for ways to improve its kinetic parameters.

The major obstacle to this venture is the complex RuBisCO biosynthesis process, which makes it difficult to test potential mutant kinase enzymes. The participation of chaperonin Cpn60 / Cpn20 / Cpn10 or its prokaryotic homologues is required to obtain the active Rubisco and as well assembly chaperones. It is also suggested that in the early stages of folding, this enzyme requires the involvement of specific homologues of DnaK and DnaJ proteins. The proposed project will mainly seek to identify and then characterize biochemically the specific homologue(s) DnaJ, responsible for the interaction with the large RuBisCO subunit (RbcL). The experiments will be carried out on homologues of DnaJ from *Synechocystis* sp. PCC 6803. RuBisCO from this cyanobacteria, unlike other cyanobacteria, does not fold in *E. coli*, suggesting a lack of specialized folding factor or insufficient homology of existing factors in this bacteria. *Synechocystis* sp. PCC6803 has encoded in the genome 7 homologues of the DnaJ protein.

The project will test the ability of all seven DnaJs to participate in RuBisCO's folding from this cyanobacteria in both *E. coli* and *in vitro*. In the case of identifying a specialized agent responsible for the binding of the RuBisCO, its biochemical characterization (determination of a fixed interaction with RuBisCO, identification of a recognized sequence) will be performed, and attempts will be made to determine its structure. The identification of a specialized agent responsible for the diagnosis of RuBisCO will let to achieve the expression of this enzyme from *Synechocystis* sp. PCC 6803 in *E. coli*, which has not yet been accomplished so far. The ability to express RuBisCO from this model cyanobacteria in a bacterial system will allow for further investigation of RuBisCO biosynthesis pathway.