Title: Does the Nucleotide Binding Domain of Torsin confer thermotolerance in yeast?

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Introduction: Conformational diseases, like Alzheimer´s and Parkinson´s, are caused by the aggregation of misfolded proteins. To combat this aggregates, molecular chaperones and heat shock proteins (Hsps) are part of the protein quality control, which is involved with proteostasis. Specifically, there is a class of chaperones involved in the recovery of the proteins from aggregates, and this class is named disaggregases. However, animals lack a specialized disaggregase, in contrast to others organisms that have conserved well-known disaggregases. Thus, it is possible that others proteins are involved with this function in animals. Our group is investigating the Torsin A protein, which have evidences in the literature to have chaperone activity. **Objective:** We aimed to define if torsins, in diverse constructions, were capable of induce thermotolerance in yeast. Also, we aimed to understand the function of torsins NBD in this mechanism. **Material and Methods:** To access the ability of torsins to induce thermotolerance in yeast, we used complete torsins (human and *C. elegans*), torsins NDB (Nucleotide Binding Domain), and chimeras in which the NBD2 of Hsp104 was substituted by the torsins NBD. **Results and Discussion:** We observed a difference between species, since *C. elegans* torsin A demonstrated better levels of thermotolerance compared to human torsin A. Also, we observed for the first time an activity of isolated torsins NBD, which demonstrated better levels of thermotolerance compared to complete torsins. **Conclusions:**These results suggest that the lack of the hydrophobic domain (in the case of the isolated NBD) is contributing to protein stability and also retention at the cytoplasm, where it is required for thermotolerance. Also, the higher proximity between *C. elegans* and yeast, compared to human and yeast, seems to be important for the protein function, contributing to better levels of thermotolerance.

Key-words: Torsin A, thermotolerance, NBD, Nucleotide Binding Domain, molecular chaperones.

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