



THE NUCLEAR ENVELOPE: A TOLLBOOTH FUNCTION FOR SPLICING FACTORS

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AIM

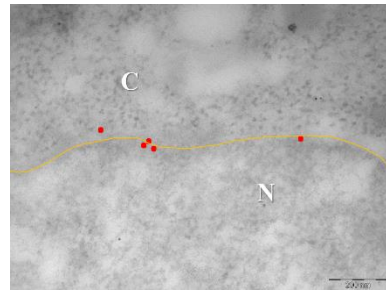
Pre-mRNA processing factors access to the nuclear compartment is a fundamental aspect at the very basis of transcription regulation. Elucidating which proteins may be involved in promoting this molecular movement could evidence new outcomes and strategies for multiple diseases. For these reasons, we assessed how pre-mRNA processing factors traffic is affected during thermal insult and the possible activity of heat-shock proteins as nuclear envelope molecular chaperones.

METHODS

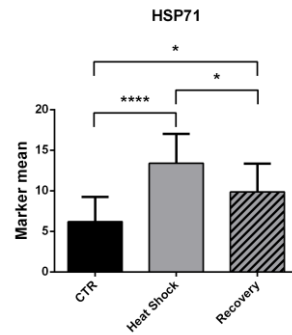
Immunocytochemistry for transmission electron microscopy has been performed. We targeted SC35 and the Sm antigen, being markers of mRNA splicing, and the Heat-Shock Protein 71 (HSP71).

RESULTS

Our analysis showed that HSP71 interacts with the nuclear envelope with a significantly higher frequency during the heat shock stress rather than in the recovery condition and the control, that quantitatively shows the lowest of the values.

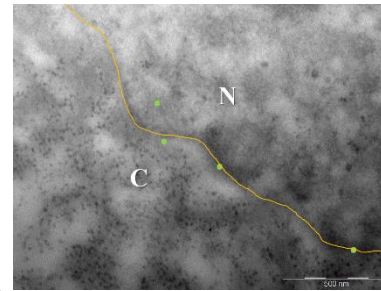


• Red spot: HSP71

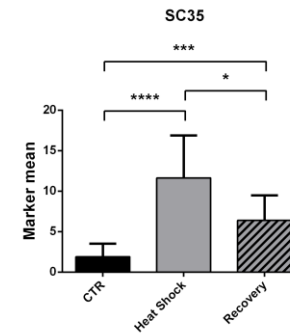


RESULTS

In parallel, we found a significantly increased presence of the Sm antigen on the nuclear envelope during the thermal stress. Its lowest level is again found in the control case. Remarkably, SC35 shares the Sm antigen localization and distribution.

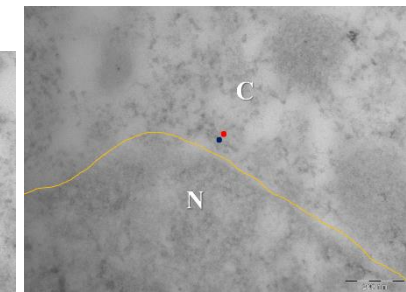
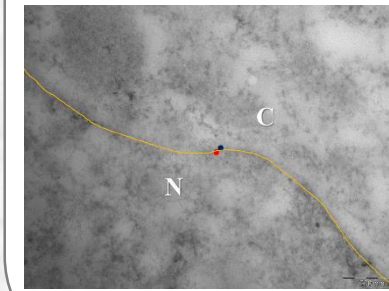


• Green spot: SC35



RESULTS

Moreover, we performed double labelling, that granted us the possibility to verify a hypothesized colocalization of HSP71 with both the pre-mRNA processing factors at the level of the nuclear envelope.



• Red spot: HSP71

• Blue spot: Sm antigen

CONCLUSION

The increased presence of HSP71, SC35 and Sm antigen in the nuclear envelope surroundings during the thermal shock may be considered as an attempt carried out by the cell to overcome the damages caused by high temperature, which is correlated to degradations of high amount of proteins. Evaluating whether other enzymes share the same condition as cargo molecules and if this situation is kept also during different type of cell stresses or treatments, for instance chemicals or drugs, may represent a valid implement to overcome many diseases that hold their roots in dysregulations at the level of transcription.