

Mitochondrial thermogenesis promotes protein oligomerization in live cells

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Temperature largely affects biochemical processes, such as enzymatic reaction rates and the equilibrium processes. Furthermore, the structures of proteins, nucleic acids, and lipid membranes can dramatically change according to temperature¹⁻³. However, currently, there has been no result demonstrating whether protein functions or their interactions can be regulated by “internally” generated heat in a living cell. In this work, we demonstrated that mitochondrial thermogenesis by uncoupler treatment can induce protein oligomerization in live cells with live cell fluorescence imaging experiments, we could observe protein oligomerization is dynamically regulated by mitochondrial thermogenesis conditions. Under the negative controls which inhibit mitochondrial thermogenesis, we also confirmed that the same protein oligomerization is largely inhibited. Overall, our result can be the first evidence which shows internally generated heat itself can be an important factor that can induce the protein structural change in a spatiotemporal way.

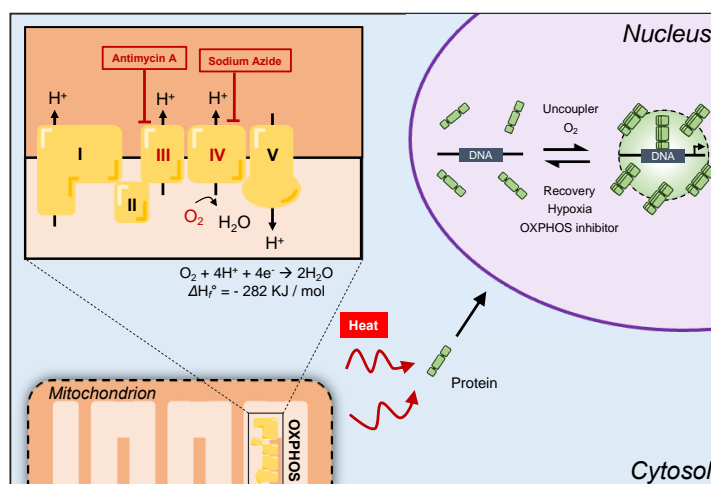


Figure 1. Schematic view of mitochondrial thermogenesis mechanism and protein oligomerization in live cells

References

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