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Neubau Biologie H53



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Molecular Chaperones – the cellular machines of protein folding

Cells have developed a quality control system that ensures that the proteome folds correctly, keeps its native conformation and that unproductive side reactions are prevented. This is especially important under stress conditions such as high temperature when massive protein unfolding occurs or in the context of diseases when the cellular protein homeostasis is out of control.

The key elements of the cellular stress defense system are molecular chaperones. These cellular machines of protein folding share the remarkable ability of specifically recognizing non-native proteins and assisting their folding to the native state. There are several classes of molecular chaperones that evolved independently and are both structurally and mechanistically not related, such as the small heat shock proteins, Hsp70 and Hsp90. Progress in recent years based on a combination of different experimental approaches provided insight into the mechanistic principles of chaperones. With a view to define the key traits of different chaperone machines, we set out to reconstitute their mode of action using purified components. Our analysis reveals intriguing differences in the mode of action including sophisticated regulatory and control elements.

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