Structural and functional analysis of the interaction between gelsolin and the chaperonin CCT

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Cell motility is dependent on actin cytoskeleton rearrangements, therefore regulation of these processes is of great importance for understanding the development of cancer cell metastasis. Actin folding is assisted by CCT, a molecular chaperone composed of two back-to-back rings of eight distinct, albeit homologous subunits. However, CCT has functions beyond protein folding, among others the interaction with the actin capping and severing protein gelsolin. Gelsolin is a six-domain protein that severs actin filaments when in its Ca^{2+} active conformation [1]. Immunoprecipitation and mass spectrometry identified gelsolin as a CCT binding protein, and gelsolin domain 4 was shown to interact with CCT oligomer (Brackley and Grantham, 2011). Comparisions of CCT:actin and CCT:gelsolin binding interactions suggest that gelsolin is not a folding substrate of CCT [2]. Gelsolin binds to CCT in its Ca^{2+} active conformation and the actin severing mechanism of gelsolin can be inhibited by CCT [3]. We have used electron microscopy and fluorescence microscopy to provide information about the CCT:gelsolin interaction and where these interactions occur in the mammalian cell.

References

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