

The Effect of Phalloidin on Actin Filaments in Complex with ADP·BeFx

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The dynamic and conformational properties of actin filaments play central role in their biological function. These properties are often characterized in model systems in vitro using actin-binding proteins, peptides or nucleotides. The thermal stability of actin filaments described by differential scanning calorimetry correlated with their dynamic properties. Previous studies showed that the binding of a toxic hexapeptide - phalloidin - shifted the peak transition temperature of heat denaturation (T_m) of actin filaments from 67 °C to 79 °C. The T_m value was also shifted for filaments binding a nucleotide analogue - ADP·BeFx - (to 84 °C). In this study we characterized the heat denaturation of ADP·BeFx-actin filaments with bound phalloidin. The calorimetric results showed a T_m value of 95 °C, which was greater than the ones measured with either ADP·BeFx or phalloidin separately. These observations indicated that the effect of the nucleotide analogue and the toxic peptide was additive, suggesting that these ligands affect the stability of actin filaments using different molecular mechanisms.