

Abstract Submitted
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Interaction forces and surface morphology of microtubule-associated protein tau KENNETH ROSENBERG, University of California, Santa Barbara, JENNIFER ROSS, University of Pennsylvania, ERIC FEINSTEIN, STUART FEINSTEIN, JACOB ISRAELACHVILI, University of California, Santa Barbara — The microtubule-associated protein tau exists in six isoforms due to alternative mRNA splicing and is localized in the axons of neuronal cells. These isoforms differ by the inclusion of 3 or 4 microtubule-binding imperfect repeat regions (31 aa each) at the C-terminal end of the protein or by 0, 1, or 2 N-terminal end inserts (29 aa each). Using a surface forces apparatus (SFA), we have measured the interaction forces as a function of distance between two symmetric layers of tau protein (all six isoforms) adsorbed onto mica. By comparing the interaction forces between the different isoforms, it is clear that the tau protein forms a brush-like layer on the mica surface which swells upon increasing ionic strength. Additionally, we have looked at an asymmetric system with one surface of tau opposite bare mica. In the asymmetric system of tau and an opposing mica surface, there is a $>10^2$ increase in the magnitude of this adhesive force suggesting that the tau-mica interaction is much more adhesive than the tau-tau interaction. These data clearly show that tau adsorbed onto mica acts as a spacer and due to the cross-bridging between the mica surfaces, provides a strong adhesion, as has been observed in vitro with microtubules.

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