

Abstract Submitted
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Monoclonal Antibodies Attached to Carbon Nanotube Transistors for Paclitaxel Detection WONBAE LEE, CALVIN LAU, MARK RICHARDSON, ARITH RAJAPAKSE, GREGORY WEISS, PHILIP COLLINS, Univ of California - Irvine, UCI, MOLECULAR BIOLOGY AND BIOCHEMISTRY COLLABORATION, UCI, DEPARTMENTS OF PHYSICS AND ASTRONOMY COLLABORATION — Paclitaxel is a naturally-occurring pharmaceutical used in numerous cancer treatments, despite its toxic side effects. Partial inhibition of this toxicity has been demonstrated using weakly interacting monoclonal antibodies (3C6 and 8A10), but accurate monitoring of antibody and paclitaxel concentrations remains challenging. Here, single-molecule studies of the kinetics of antibody-paclitaxel interactions have been performed using single-walled carbon nanotube field-effect transistors. The devices were sensitized with single antibody attachments to record the single-molecule binding dynamics of paclitaxel. This label-free technique recorded a range of dynamic interactions between the antibody and paclitaxel, and it provided sensitive paclitaxel detection for pM to nM concentrations. Measurements with two different antibodies suggest ways of extending this working range and uncovering the mechanistic differences among different antibodies.

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