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Protein adsorption at calcium oxalate monohydrate crystal surfaces. J. WESSON, Department of Veterans Affairs, X. SHENG, Abbott Laboratories, J. RIMER, New York University, T. JUNG, Seoul University, M. WARD, New York University — Calcium oxalate monohydrate (COM) crystals are the dominant inorganic phase in most kidney stones, and kidney stones form as aggregates of COM crystals and organic material, principally proteins, but little is known about the molecular level events at COM surfaces that regulate COM aggregation. We have examined the influence of polyelectrolytes on the force of adhesion between chemically modified atomic force microscopy (AFM) tips and selected COM crystal faces in saturated solution. In general, we found that polyanions bind to COM surfaces and block adhesion of a carboxylate functionalized AFM tip, while polycations had no measureable effect on adhesion force under the same conditions. We did observe a unique absence of interaction between poly(glutamic acid) and the COM (100) face compared to other synthetic polyanions, and some native urinary protein structures also exhibited unique face selective interactions, suggesting that simple electrostatic models will not completely explain the data.

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