

Influence of surface and subsurface modifications of a substrate on bacterial adhesion

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Numerous studies concentrate on finding conditions for preventing biofilms. However, its main constituents, proteins and bacteria, exhibit clever strategies to adhere to various surfaces. Our experiments aim at determining nature and strength of the involved forces by a judicious choice of substrates: Keeping the surface roughness and chemistry constant, differences in the subsurface composition cause distinct changes in the adhesion forces due to a variation of the long-range van der Waals force. Keeping the surface chemistry constant and changing the roughness only also influences bacterial adhesion due to geometry constraints. Comparing hydrophobic and hydrophilic substrates of identical roughness and nearly identical van der Waals forces reveal the influence of short-range, e.g. hydrophobic forces. We review our recent experiments of bacterial adhesion (e.g. *S. aureus*, *S. carnosus*, *Strep. oralis*, *Strep. mutans*) as determined by single cell AFM force spectroscopy.