Bacterial adhesion on nanostructured surfaces

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Bacterial biofilm formation reduces the effect of antibiotics, which is one of the main reasons for the mandatory removal of infected implants from the body. Therefore, the prevention of biofilm formation or material specifications that result in the death of adhering bacteria without vitiating somatic cells is considered key in medical implant development. Our experiments aim at characterizing bacterial adhesion strength and viability of *S. aureus*. As the subsurface composition causes distinct changes in the adhesion forces due to a variation of the long-range van der Waals force, the adhesion on surfaces with varying nano-roughness but constant surface chemistry can be reduced to geometry constraints. Comparing hydrophobic and hydrophilic substrates of identical roughness reveal the influence of short-range, e.g. hydrophobic, forces on bacterial adhesion. The influence of roughness and hydrophobicity on cell viability was evaluated after each single cell AFM force spectroscopy and flowchamber experiment conducted.