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Interaction of bacteria and a chemically patterned surface[1]
MARYAM JALALI, MEHDI MOLAEI, JIAN SHENG, Texas Tech University — We are investigating the mechanisms involved in the interactions between bacteria and chemically patched oil-water interface. Using micro-fabrication and soft-lithography, we have engineered a chemically patterned solid surface to mimic the real interfacial environment. Arrays of 2D geometries whose characteristic size ranges from 10μm to 100μm are patterned onto a glass substrate and subsequently functionalized using Octadecyltrichlorosilane (OTS). The photoresist covering geometries is further removed after functionalization. Consequently, a chemically patterned surface with alternating hydrophobic and hydrophilic regions is produced as the substrate for microfluidics. The effects of this surface on bacteria attachment and detachment are evaluated *in-situ*. The growth rates of biofilm are quantified by measuring the morphology of bacterial colony. To elucidate hydrodynamic mechanism involved, bacteria swimming characteristics, such as swimming velocity, angle, tumbling frequency and dispersion, is measured within a microfluidics with a patterned substrate using 3D digital holographic microscopy. Comparative studies on smooth swimming and tumbling capable strains over such surfaces will also be presented.

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Jian Sheng
Texas Tech University

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