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Although many reports have appeared on the nature of the attachment of bacteria to physical substrates, very little is known about the mechanism by which bacteria attach to other bacteria. In this report, 3 strains of bacteria were studied. KEMA 1,2, and 3 were isolated from a sludge community derived from a waste water treatment plant. These strains are Gram-negative, form large clumps with themselves, and settle very rapidly from suspension. When the cells are grown in nutrient medium (1% Bacto peptone, doubling time \pm 1.5 hours) they are motile rods with single polar flagellum. When grown on dilute medium (0.1% Bacto peptone, doubling time \pm 2:5 hours or a chemically defined medium containing 100 ppm glucose), all these strains form an extensive capsule which fuses with other cells to form large clumps. In this stage, the cells are hydrophobic. However, in the rich medium the motile cells do not demonstrate capsule formation, and are correspondingly non-hydrophobic. The ability to form clumps is destroyed upon heating the cells for 10 min. at 50°C, even when re-inoculated into dilute medium. Although the optimal growth is at pH 7.0, the clumps are not dispersed with high (10.0) or low (4.0) pH, detergents or chelators. Emulsan, a known capsule inhibitor for many bacteria, does not effect the clumping ability of these strains. Bacterial clumping, selected by the waste water treatment process appears to be complex set of interactions within and between strains of bacteria. Our studies reveal some of this complexity.

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