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Microfluidic study of bacterial interactions and attachment to oil drops GABRIEL JUAREZ, ROMAN STOCKER, MIT — The swimming dynamics of bacteria are strongly influenced by interfaces. Motile bacteria often accumulate near solid-liquid and liquid-liquid interfaces and eventually attach. Attachment of bacteria to these interfaces is crucial for the formation of biofilms (liquid-solid), pellicles (liquid-air), and oil-degrading communities (liquid-liquid). However, the mechanisms of attachment by microbes to these surfaces are not well understood. We have investigated the effect of external flow on the probability of attachment of motile and non-motile marine bacteria to oil droplets in straight microchannels. We find that motility enhances the encounter rate between bacteria and drops leading to an increase in attachment. Characterizing these interactions in the presence of flow will promote an understanding of oil-microbe and particulate-microbe interactions in aquatic environments where the degradation rate of organic matter depends on the attachment and colonization by bacteria.

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