Swimming of bacteria near surface in the presence of chemoattractants and chemorepellents in microfluidic channel.

Asma Braham*[1], Laurence Lemelle , Romain Ducasse , Eleonore Mottin , Vincent Calvez , and Christophe Place

[1]Laboratoire de Géologie de Lyon - Terre, Planètes, Environnement [Lyon] – LGL-TPE, Ecole Normale Supérieure de Lyon – France

Résumé

Bacteria can travel long distances thanks to flagellar appendages that allow them to move. When a motile bacterium approaches a surface, it undergoes hydrodynamic interactions that result in a directed circular motion of its trajectory that confines it to the surface. However, the trajectory of a bacterium is marked by reorientations and stops that are the result of a change in the direction of rotation of the bundle of flagella. This change of direction occurs periodically, about every 1s, for 100ms for the bacterium *E. coli.* The random reorientation of the bacteria near a surface allows the trapped bacteria to abruptly extract to the volume and reorient to explore their environment.
Bacterial chemotaxis, which takes advantage of a frequency bias in reorientation, allows the redistribution of a bacterial population. We study the effects of known chemorepellent and chemoattractant substances such as Ni2+ and Mg2+ cations, on bacterial redistribution. For this purpose, we conduct experiments in dark field video microscopy by varying the sources of chemical agents in microfluidic channels
Here, I will describe a protocol to apply dark-field video microscopy and post-processing of the bacterial tracks to decipher the main physico-chemical laws that prevail between an individual bacterium and the reactive surface will be specified. This work should also establish a documented reference of the collective behavior of a population of bacteria near reactive surfaces.

*Intervenant