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Microbial adhesion on Circular Obstacles: An Optimization Study¹ FRANCISCA GUZMN-LASTRA, Universidad Mayor, TAMARA FAUNDEZ, BASTIAN ESPINOZA, RODRIGO SOTO, Universidad de Chile — Microbial filtration has been revisited during the last years since numerical computation and experimental refinement are now available and possible, opening new questions and insights into microbes adhesion on complex surfaces and novel ways to control biofilm formation. In this work, we present a simple, non-hydro-dynamical model, using active Brownian particles with different swimming persistence, to study and enhance microbes adhesion on convex surfaces. By adding a short-range interaction between microswimmers and obstacle surface we can reproduce the experimental observed bacterial attachment and behavior over circular obstacles of different radius. Furthermore, by exploring different microswimmers activity and external flow we found a narrow velocity screen where microswimmers adhesion strongly changes and might determine microbes first adhesion to the surface, by changing the contact time between microbes and obstacle's surface. We expect that this detail study might help to improve in-vitro fertilization and bio-inspired chemical treatments in industry to optimize biofilm formation.

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