

Abstract Submitted
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Interaction of spermatozoa with micro structured surfaces.¹

VASILY KANTSLER, University of Warwick, ANTON BUKATIN, St. Petersburg Academic University, ENKELEIDA LUSHI, New Jersey Institute of Technology, PETR DENISSENKO, University of Warwick — Spermatozoa navigation plays crucial role in the process of mammalian fertilization. Mechanical interactions in the heterogonous environment of the fertility such as surface scattering and rheotaxis are the key mechanisms in determining the sperm journey towards the ovum. Here we report an experimental study of interaction mechanisms for single human sperm cells scattering off solid surface boundaries of different curvature. The investigation is based on measuring the trajectories of the cells near convex and concave surfaces with 30 – 300 μm radii of curvature in a microfluidic device. By analysing several thousands of cells' trajectories we built the residence time dependences, concentration profiles the scattering distributions as a function of the surface curvature. For the concave objects, we have identified the surface curvature corresponding to the minimum of the cell residence time within the concave cavity, while in the convex case, we define a critical curvature that traps the cells. The results enable us to design a new type of microfluidic devices for rapid selection of motile cells in-vitro.

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