

Abstract Submitted  
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**Interaction of bacterial wall with electrically charged solid substrate** VLADIMIR AJAEV, Southern Methodist University — Recent experimental studies indicate that the electrically charged substrates can exhibit antibacterial properties above a certain threshold value of the charge density. To explain these observations, we develop a mathematical model of interaction between a bacterial wall, described as a charge-regulating surface, and a charged solid substrate. Viscous flow in the aqueous film separating the two surfaces is described by a lubrication-type equation. Electrical charge transport is incorporated into the model and coupled to the flow. The complex interplay between charge transport, electrostatic interaction of the surfaces, and viscous flow leads to criteria for the critical charge density needed to achieve antibacterial properties for a range of different types of harmful bacteria.

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