

Random antibody adsorption

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Abstract

Monolayer particle deposition has been successfully described by the theory known as random sequential adsorption (RSA). Within this framework, we propose a few models in order to calculate how the concentration of correctly oriented molecules (active site exposed for subsequent reactions) evolves during the deposition process. The motivation for this work is optimising fluorescent sandwich immunoassays, where capture and label antibodies are immobilized on planar or spherical substrates. It has been suggested by experimental studies that high concentrations will decrease the assay performance, due to molecule denaturation and obstruction of active sites. We therefore attempt to predict the coverage which yields the maximum expected concentration of active molecules and hence the highest signal. This work is a collaboration with Eilis Kelly (PhD student) and researchers at the Biomedical Diagnostics Institute, DCU.