From 2D fluidic array screening to 3D bacterial capturing structures in a point of care system for sepsis diagnosis

A combined 2D microfluidic-microarray high throughput approach is reported to identify universal bacterial capturing ligands that can be tethered on the surface of 3D sponges fabricated by different methods for concentrating of bacterial targets in diagnosis devices. The developed platform allows for the first time the simultaneous monitoring of various ligands’ affinities to different bacteria species in a dynamic condition in vitro. Moreover, it has been feasible to recognize the effect of steric hindrance on the function of capturing motifs through immobilizing spacer molecules with different lengths between the solid surface and ligands. 3D sponges and micropillars are modified with the most potent capturing molecule to assess their bacterial capturing in real blood samples. Next, the 3D structures are placed into a chip with an immense potential to recognize bacteria through imaging and fluorescence intensity concept.

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