PS10: 2

Model interface for pathogens detection systems

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The prevention of food-borne illness has become a very important factor in public health that stimulated development of new technologies for pathogen detection. Biosensing systems can circumvent the limitations of conventional techniques, such as time consuming, requirements of appropriate laboratory conditions and expensive techniques. Recently, there has been an extensive work undertaken towards the development of diagnostic biosensor devices for on-site detection of biological threats that explore a diversity of transduction mechanisms and bio-recognition elements. In particular, the environmentally robust filamentous phages have been successfully used as an alternative to fragile antibodies in wireless biosensor system for real-time pathogen detection. However, one of the challenges in using of these phages as biorecognition elements is creation a uniform coating to improve the detection system. Filamentous phage can aggregate forming bundles of fibers that cannot cover completely the sensor's interface leading to the decrease in sensor's performance. Moreover, in detection system they can give some false positive result due their availability to detect *Escherichia coli.* Therefore, in this work was developed a new interface for wireless magnetoelastic biosensors by a new form of phage, which we called "nano-phage". "Nano-phage" comprises nanoparticles composed of self-assembled fusion major coat protein of landscape phages selected against the target analyte. For proof-of-concept, we investigated interfaces formed by a model phage selected from landscape libraries as a streptavidin binder. The major goal of this effort was the evaluation of the nanoparticles in different conditions in order to improve the affinity to the target of interest. The method developed can be in future applied for the detection of food pathogens and help the developing of biosensors with increased performance.