

BIOSENSOR DEVELOPMENT FOR THE DETECTION OF LIVE *ESCHERICHIA COLI* CELLS

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Escherichia coli is a Gram-negative, facultative anaerobic, rod-shaped coliform bacterium of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms (endotherms) and is used as an indicator of faecal contamination in environment. Gold standards for the detection *E. coli* and other pathogens are microbiological culture-based tests. These tests are very robust for the detection of live pathogen cells, although it can take several days to get the results. A good alternative for the detection of *E. coli* in natural waters with classical microbiological method can be a biosensor. Although biosensor results can be obtained quickly, bacterial biosensors have commonly a major shortage – the sensors do not allow identifying whether the target cells are alive or dead. How to distinguish between live and dead cells? The development of a specific biosensor for live cells requires identification of a specific target (protein, lipoprotein etc.), which is present in high abundance and has relatively short half-life (can be found only from live cells). A specific biosensor, which reacts only for live cells has been developed for Gram-positive bacteria *Lactobacillus acidophilus* (Urmann, K, et al 2016). In this biosensor, specific recognition of live cells has been achieved by a focused target protein –a relatively unstable outer cell wall S-layer protein present only in live cells. The cell of Gram negative *E. coli* is different and has both cytoplasmic and outer membranes, the latter consisting specific outer membrane proteins (OMPs), (Molloy, M.P. et al 2000).. The outside exposed domains of outer membrane proteins OmpA and YitA could serve as initial candidates of outer membrane biosensor targets for the specific detection of live *E. coli* cells.

References

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2. Urmann K, Arshavsky-Graham S, Walter JG, Scheper T, Segal E. Whole-cell detection of live *Lactobacillus acidophilus* on aptamer-decorated porous silicon biosensors. *Analyst*. 2016 Sep 21;141(18):5432-40.

