J Biosens Bioelectron 2017, 8:2(Suppl)
DOI: 10.4172/2155-6210-C1-034

Aptamers and bio-sensing

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Synthetically derived single-stranded nucleic acid species, also known as aptamers, have been generated under *in vitro* conditions using a sequential enrichment and mutational approach referred to as systemic evolution of ligands by exponential enrichment (SELEX). Aptamers generated in this way have been shown to bind a variety of targets such as organic and in-organic molecules in addition to larger molecules such as proteins. Aptamers are now being used in a variety of medical and bio-sensing applications. However, despite significant advances in the bio-sensing platforms, the generation of highly sensitive and specific aptamers capable of binding small molecular weight compounds is still limited. Aptamers to small molecular targets were selected from a random library of nucleotide sequences using SELEX. The resulting aptamers are sequenced and binding affinities are characterized (binding affinity constants K^d) prior to application on sensing platforms. In addition, structural differences between an aptamer and its ligand give rise to the formation of a unique complex where a specific region of the aptamer is involved in binding to the ligand (known as the ligand binding domain, LBD). Utilization of the parent aptamer (e.g., 75mer) or the LBD-aptamer region (e.g., 38mer) influence the limit of detection (LOD) achieved when using platforms such as a gold nanoparticle (AuNP) or electron impedance spectroscopy (EIS) based system.

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Thermographic evaluation of the efficacy of immunomodulatory formulae for external use to promote tissue regeneration and wound healing

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One of the features of the signaling proteins (SP) is their immuno-modulating pro and anti-inflammatory properties – it has been shown in many clinical trials and publications in the world of medical and biochemical literature. Numerous studies have demonstrated the effect of SP and on IL-1, IL-6, IL-8, IL-6 Interleukins, IFN-γ interferon, TNF-α factor (tumor necrosis factor) and RFT (reactive oxygen species) as well as MIP-1α (macrophage inflammatory protein), MCP-1 (monocyte chemotactic protein), which can contribute to the course of inflammation in the wound. The inflammatory phase, which starts in the healing process right after the hemostatic phase, is basically an introduction to the proper healing process. However, an excessive inflammatory phase can lead to obstruction of the healing and the formation of wounds that heal. As mentioned above, SP can influence this healing phase by regulating it. However, the most important, from the point of view of the purpose of the work, is that any immune reaction, and in particular inflammation, is manifested by a change in the tissue temperature at which it occurs and this change in the parameter can be measured. The research worldwide aimed at creating a universal drug/dressing based on SP, the use of which would enable the application in every phase of the healing process. Pharmacokinetic and pharmacodynamics properties, as well as transport capacity, time of release of active substances, biochemical properties, etc., are investigated and adopted various methods of testing efficiency. Polish medical experiment, as part of these studies, is part of these efforts by proposing a solution based on the presented results and to measure the effectiveness of the use of medical imaging, specifically thermography. We planned and prepared for the implementation of a broad clinical trial of 120 people with double blind trials, which aims to demonstrate thermography methods in confirmation of efficiency of specific biochemical solutions. Presenting the legitimacy and recognition of the planned experiment is to show the practical side of the last stage of clinical trials aimed at standardizing the use of SP in the treatment and prevention of difficult to heal wounds.

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