Nanophotonics based label free detection mechanism for real-time monitoring of interleukin 6

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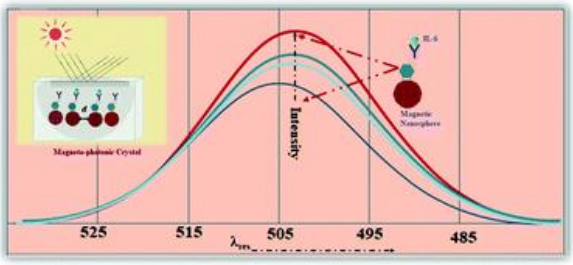
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I. Abstract Body

The Magneto-photonic crystals/MPCs are promising candidates for devising high-fidelity embedded biosensor systems which offer facile & real time detection of diagnostic proteins. Despite extensive use of magnetic nanomaterials for theranostic applications, the idea of exploiting its photonic response when assembled as a colloid inside a matrix remains unexplored. Herein, we report a novel label free method for quantitative detection of interleukin 6 which is a widely used prognostic marker for multiple pathological conditions. Cobalt ferrite/CoF and magnetite nanoparticles with Ms of 74.8 and 77 emu g^{-1} were assembled inside a hydrogel matrix with the application of an external magnetic field. Through the use of click chemistry, detecting antibodies were immobilized on their surface. The interaction of interleukin 6 with the antibodies produces a blue-shift in resonant wavelength and the reflectance intensity increases up to 50% and 44% when tested with CoF & magnetite based MPC respectively at a concentration of 50 pg ml^{-1}. The dynamic range of the sensor lies within the prognostic values of IL-6, and the integrated sensing mechanism proposed in this study provides an ideal platform for real-time management of sepsis in patients with higher degree burns.

II. Graphical Abstract



III. Reference:

2. Khan, M. A., Mujahid, M., Loo, S. C. J., & Chamundeswari, V. N. (2020). Nanophotonics based label free detection mechanism for real-time monitoring of interleukin-6. Nanoscale, 12(16), 9194-9207.

IV. Biography:

Dr. Munezza A. Khan has completed her PhD at the age of 31 years from National University of Sciences & Technology, Pakistan and has been a visiting research scholar at Nanyang Technological University, Singapore. She is the Chairperson of Biomedical Engineering Dept., BUETK, Khuzdar, Pakistan and also a founder of S7UDIO MAK, an independent training and RnD organization. She has 9 publications to her credit and has an h-index 4.

V. Presenting author details



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