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5th European Congress on LASER, OPTICS AND PHOTONICS

July 15-16, 2024 | Amsterdam, Netherlands

Relevance of photonics in healthcare sector

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Recent advancements in photonics (defined as "physical science of light waves") have potential benefits for the healthcare sector. The author of this paper argues that photonic-based methods have significantly contributed to developments in the area of public health. Objective of this paper is to present discussion on (potential) benefits and relevance of photonics for the stakeholders involved with the healthcare sector. Secondary data been used in this work. Data are largely 'qualitative' in nature; they were collected from secondary sources. Scoping review of relevant was undertaken by the author for the purpose of data collection.

Analysis of data in this paper indicates that relevance of photonics in the healthcare sector is reflected in the form of developing 'rapid', 'cost-effective', and 'personalized' interventions. The author of this work argues that these methods have advantages (benefits) due to two factors, namely, (1) high-speed movement of optical photons, and (2) ability of light waves to penetrate various biological barriers without causing unwanted interactions.

Further, it has been found that photonics technologies in healthcare envisages interaction of "light (or electromagnetic) radiation" with "living organisms (or biological components)". Importantly, this phenomenon is known as 'biophotonics'. It is pertinent to note that this interaction depends (primarily) on (a) energy or wavelengths of light, and (b) optical properties of cells. Furthermore, the entire range of light wavelengths is termed as "electromagnetic spectrum".

Most importantly, application of photonics in disease diagnosis is of utmost importance. The author, this context, makes a point that photonics technologies, over the decades, have been used for the purpose of 'rapidly', 'sensitively', and 'selectively' detect disease-specific biomarkers (including metabolites and metabolic biomarkers). These developments have enabled healthcare scientists (better) understand (a) pathogens; and (b) disease-specific changes. This paper briefly concludes that several novel biophotonic cancer therapies (including endoscopy-assisted surgery) are under research investigations.

Biography

Santosh Kumar Mishra is an Independent Researcher (Scholar) retired (in 2020), as Technical Assistant, from the Population Education Resource Centre, Department of Lifelong Learning & Extension, S.N.D.T. Women's University, Mumbai, India. I underwent training in demography, with award of Government of India Fellowship, during 1986-1987 from the IIPS, Mumbai. Also, I acquired Ph. D. from University of Patna in 1999. My other qualifications include Post-Master's Diploma in Adult & Continuing Education, Certificate Course on Hospital and Health Care Management, and Diploma in Human Resource Development. I have authored (some co-authored) 5 booklets, 4 books, 23 book chapters, 97 journal articles, 2 monographs, 7 research studies, & 56 papers for national & international conferences (some with bursary). I have been awarded Certificate of Excellence in Reviewing for 2017, 2018, 2021 & 2022. I have been conferred with the Excellence of Research Award for outstanding contribution & recognition in the field of agriculture in 2021.