



BIOCDx EU project

A miniature **Bio-photonics Companion Diagnostics** platform for reliable cancer diagnosis and treatment monitoring.

BIOCDx project is an initiative funded by the European Union under the H2020 Programme, aiming to provide a Point-of-Care (PoC) device for early cancer diagnosis and treatment monitoring.

Current diagnostic options for cancer treatment monitoring rely on imaging techniques and cannot guarantee proper assessment of therapeutic response. This project aims to develop a disruptive Point of Care (PoC) device for cancer early diagnosis and treatment monitoring as a companion diagnostics tool. One of the scientific breakthroughs of this project is the development of a “cancer stem cells” detection platform by virtue of expression of the cancer stem cell-specific transcription factor TWIST1, which controls the expression of the bloodstream circulating biomarkers like POSTN. Cancer stem cells represent the most aggressive/tumorigenic cell compartment within tumors.








BIOCDx will combine advanced concepts from the photonic, nano-biochemical, micro-fluidic and reader/packaging platforms aiming to overcome limitations related to detection reliability, sensitivity, specificity, compactness and cost issues. BIOCDx will rely on ultrasensitive, photonic elements based on an array of 8 asymmetric MZI waveguides fabricated by TriPlex technology on silicon nitride substrates and will achieve a 100 fold improvement –with respect to current technologies- of sensitivity ($<10^{-8}$ RIU). BIOCDx will employ a smart concept of signal multiplexing for lowering the number of photodetectors required in multi-analyte detection and allowing for a substantial reduction of chip size. A sandwich assay, enhanced with nanoparticles, will be developed, based on the use of two antibodies per protein, to detect all three circulating proteins. This will enhance the limit of detection (LOD) close to femtomolar and the reliability. BIOCDx photonic, nano-biochemical, fluidics and packaging platforms will be integrated into a portable, desktop PoC device. Its validation in preclinical and clinical setting will be performed in three cancer types: breast cancer, hormone-independent prostate cancer and melanoma.



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The consortium

Partner Name	Short name	Country
1. Institute of Computer Science and Engineering	ICCS	 Greece
2. LioniX BV	LioniX BV	 Netherlands
3. LRE Medical GmbH	LRE	 Germany
4. CSEM Centre Suisse d' Electronique et de Microtechnique SA- Recherche et Développement	CSEM	 Switzerland
5. Biomedical Research Foundation Academy of Athens	BRFAA	 Greece
6. Future Diagnostics Solutions BV	FD Solutions	 Netherlands
7. Lead Pharma Holding BV	LPH	 Netherlands



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