

Immune response

The **immune** response is how your body recognizes and defends itself against **bacteria**, **viruses**, and substances that appear foreign and harmful.

The **immunosuppressive microenvironment** in **glioblastoma** (Glioblastoma) prevents an efficient antitumoral **immune response** and enables tumor formation and growth.

The ability to rapidly assess and monitor patient immune responses is critical for clinical diagnostics; vaccine design; and fundamental investigations into the presence or generation of protective immunity against **infectious diseases**. Recently; findings on the limits of antibody-based protection provided by **B-cells** have highlighted the importance of engaging pathogen-specific **T-cells** for long-lasting and broad protection against **viruses** and their emergent variants such as in **SARS-CoV-2**. However; low-cost and point-of-care tools for detecting engagement of T-cell immunity in patients are conspicuously lacking in ongoing efforts to assess and control population-wide disease risk. Currently available tools for human T-cell analysis are time and resource-intensive. Utilizing multichannel silicon nanowire field effect transistors (Si-NW-FET) compatible with complementary metal-oxide-semiconductor (CMOS); Nami et al. developed a device designed for rapid and label-free detection of human T-cell immune responses. We demonstrate the generalizability of this approach by measuring T-cell responses against melanoma antigen MART1; common and seasonal viruses CMV; EBV; flu; as well as emergent pandemic coronavirus; SARS-CoV-2. Further; this device provides a modular and translational platform for optimizing vaccine formulations and combinations; offering quick and quantitative readouts for acquisition and persistence of T-cell immunity against variant-driven pathogens such as Flu and pandemic SARS-CoV-2 ¹⁾.

¹⁾

Nami M, Han P, Hanlon D, Tatsuno K, Wei B, Sobolev O, Pitruzzello M, Vassall A, Yosinski S, Edelson R, Reed M. Rapid Screen for Anti-viral T-cell Immunity with Nanowire Electrochemical Biosensors. Adv Mater. 2022 Feb 14:e2109661. doi: 10.1002/adma.202109661. Epub ahead of print. PMID: 35165959.

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