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# **Infrared Nanoprobes: Advancing Cancer Vaccines and Real-Time In Vivo Immune Response Insights**

Researchers at Stanford have harnessed nanoprobes to longitudinally track immune system activation at a single-cell level, in response to immunotherapies.

Cancer immunotherapies present an exciting development within the oncology field. Both treatment based and prophylactic immunotherapies work through activating the body's own immune system to fight the cancer. Current technologies that measure the cellular mechanisms behind these therapies require tissue extraction, thus making temporal *in vivo* measurements difficult.

Now, by utilizing infrared emitting nanoprobes, the researchers have longitudinally mapped out their distribution *in vivo*, within the tumor microenvironment. The technology improves our understanding of the immune responses to cancer, enabling better development of novel therapies.

## **Stage of Development**

*in vivo*

## **Applications**

- Tracking immune activation *in vivo*
- Deep tissue *in vivo* imaging of vaccine trafficking

## **Advantages**

- Enables longitudinal tracking of immune activation *in vivo*

- Better temporal resolution of immune activation in the tumor microenvironment

## **Publications**

- Ren, F., Wang, F., Baghdasaryan, A., Li, Y., Liu, H., Hsu, R., ... & Dai, H. (2023). [Shortwave-infrared-light-emitting probes for the in vivo tracking of cancer vaccines and the elicited immune responses](#) . Nature Biomedical Engineering, 1-14.

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