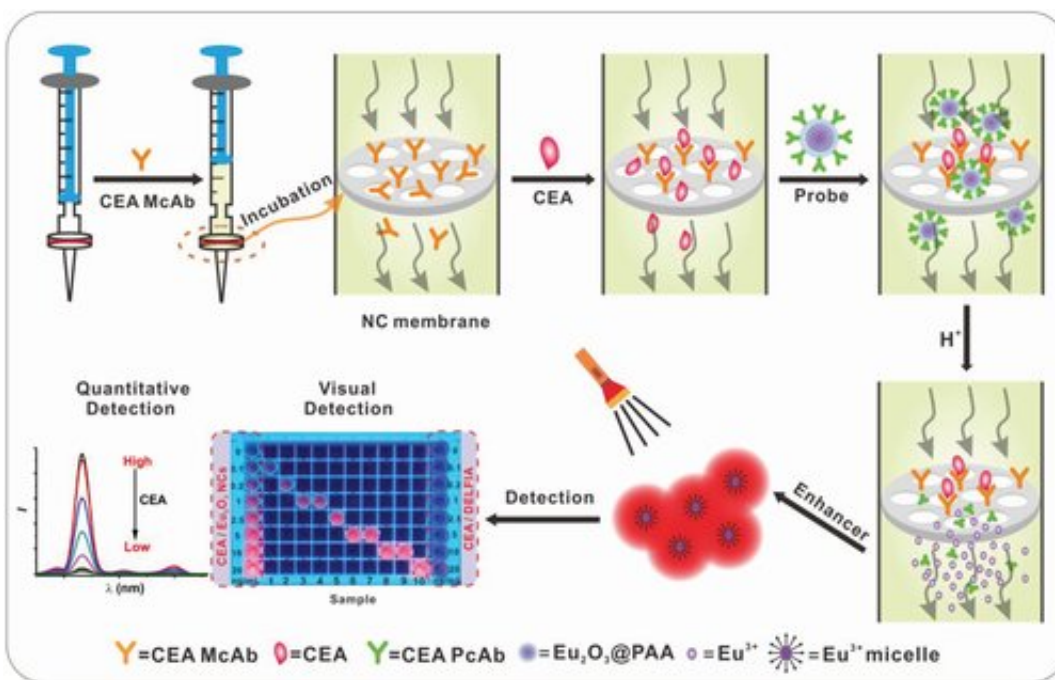


# Point-of-care test developed for tumor marker in human saliva based on lanthanide nanoprobe

January 21 2021, by Liu Jia



Schematic illustration of CEA detection in saliva. Eu<sub>2</sub>O<sub>3</sub> NCs and disposable syringe filter equipped with nitrocellulose membrane are employed as nanoprobe and bioassay platform, respectively. The whole assay can be carried out within 10 min, including incubation, labeling, and washing procedures, which allows both quantitatively time-resolved (TR) and qualitatively visual detection of CEA. *Advanced Science* (2021). DOI: 10.1002/advs.202002657

Salivary assay, emerging as a non-invasive alternative to blood assay in

clinic analysis, holds great promise for early-stage cancer diagnostics with advantages of low cost, easy collection and facile processing. Therefore, point-of-care (POC) detection of tumor markers in the saliva is urgently demanded.

However, the salivary assay has been severely hindered by the limitation of inadequate sensitivity in current commercial assay kits because of the much lower level of [tumor](#) markers in [saliva](#) than in human serum.

In a study published in *Advanced Science*, a research group led by Prof. Chen Xueyuan from Fujian Institute of Research on the Structure of Matter (FJIRSM) of the Chinese Academy of Sciences developed a unique lab-in-syringe strategy for rapid and ultrasensitive detection of tumor markers in saliva based on lanthanide nanoprobcs.

The researchers employed  $\text{Eu}_2\text{O}_3$  nanocrystals as bioprobcs, which can be easily dissolved in acidic enhancer solution and transformed into a large number of highly luminescent  $\text{Eu}^{3+}$  micelles. Meanwhile, they utilized a disposable syringe filter equipped with nitrocellulose membrane as bioassay platform, which facilitated the accomplishment of detection process within 10 min.

By ingenious integration of dissolution enhanced luminescent bioassay strategy and the miniaturized detection device, the researchers demonstrated the feasibility and reliability for the direct quantitation of tumor marker like carcinoembryonic antigen (CEA) in patient saliva samples with a detection limit down to 1.47 pg/mL (7.35 fM).

More importantly, by virtue of such an excellent luminescence-amplification strategy, the researchers can visually detect the photoluminescence intensity change above 0.1 ng/mL (0.5 pM) of CEA by naked eyes to qualitatively evaluate its level in saliva. The whole detection process is easy to operate, which is highly beneficial for cancer

diagnostics by ordinary people at home.

These findings revealed the great potential of the proposed general strategy in practical home self-monitoring of trace amount of tumor markers in saliva, which may accelerate the exploitation of lanthanide nanoprobe for POC bioassay of diverse disease markers in complex biological fluids.

**More information:** Shanyong Zhou et al. Ultrasensitive Point-of-Care Test for Tumor Marker in Human Saliva Based on Luminescence-Amplification Strategy of Lanthanide Nanoprobes, *Advanced Science* (2021). [DOI: 10.1002/advs.202002657](https://doi.org/10.1002/advs.202002657)

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