

Press release

For immediate release

## HKU Unveils Innovative Portable AI Optical Sensing Device for Rapid, Non-Invasive Cancer Risk Detection

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Cancer remains a critical health challenge globally. In 2023, the Hong Kong Cancer Registry recorded close to 38,000 new cancer cases and nearly 15,000 cancer-related deaths. Faced with the continuously rising number of cases, society's demand for detection solutions that can be used for early screening and long-term monitoring is also increasing accordingly. Currently researchers are developing a range of innovative detection approaches, aiming to complement current techniques and enable a more comprehensive framework for cancer detection, better supporting public health monitoring needs.

Figure 1. The appearance of the device

Professor Chi Ming Che, Zhou Guangzhao Professor in Natural Sciences and Chair Professor of Chemistry, Department of Chemistry, Faculty of Science, The University of Hong Kong (HKU), and the Laboratory for Synthetic Chemistry and Chemical Biology Limited (LSCCB), and Dr Wei Liu, Department of Chemistry, Faculty of Science, HKU, and LSCCB, have developed an innovative portable AI-enabled optical sensing device that enables rapid, non-invasive cancer risk detection using just a saliva sample. This innovative technology integrates advanced chemical sensing with artificial intelligence and was awarded a Gold Medal with Congratulations of the Jury at the 51st International Exhibition of Inventions of Geneva (2026), recognising its scientific excellence and strong potential for practical application.

Figure 2. This innovative technology was awarded a Gold Medal with Congratulations of the Jury at the 51st International Exhibition of Inventions of Geneva (2026)



## Non-Invasive, Fast and Accessible Detection

This newly developed device represents a major advancement in cancer detection by offering a non-invasive, fast and user-friendly alternative to traditional methods. Designed for portability and ease of use, the device allows individuals to conduct tests independently through a mobile application, without the need for specialised medical personnel or large-scale equipment. The detection process is completed in under 10 minutes.

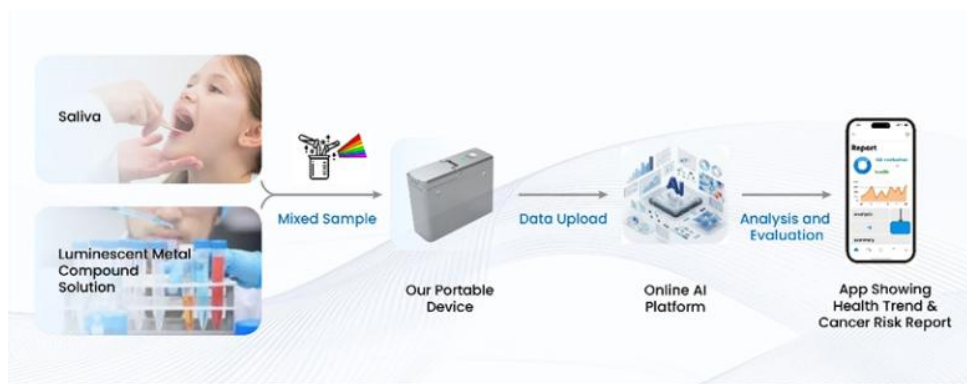


Figure 3. The schematic diagram showing the detection process of this innovative technology

Professor Che said, “Using saliva instead of tissue samples enables us to minimise discomfort while reducing the risks associated with invasive procedures. This makes it a promising early-stage auxiliary detection tool for hospital examinations. Its convenience makes it particularly suitable for high-risk individuals, including those with a family history of cancer and patients requiring regular follow-up after treatment.

## Innovative Luminescent Technology Meets Artificial Intelligence

At the core of this innovation is a novel class of luminescent metal complexes invented by Professor Che, which selectively bind to DNA damage sites – key indicators associated with cancer development. When bound to damaged DNA, especially mismatched DNA, the complexes exhibit a dramatic change in photoluminescence compared to normal DNA, enabling detection using a highly sensitive device. The optical signal is captured by a miniature spectrometer, engineered by Dr Wei Liu, and then translated into actionable insights through AI-powered analysis. The integration of advanced chemical sensing with artificial intelligence creates a powerful platform that bridges molecular diagnostics and digital health technologies.

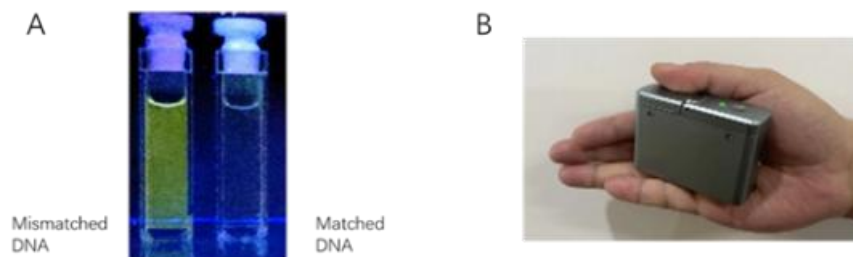


Figure 4. The innovative technologies: (a) The luminescent metal complexes that selectively bind to mismatched DNA, developed by Prof. Che; (b) The portable spectral device that captures the luminescent signal, developed by Dr. Liu.

## **From Laboratory Breakthrough to Clinical Impact**

Professor Che emphasised, “This device is not intended to replace clinical diagnoses, but rather to serve as a complementary tool for rapid detection and continuous monitoring.” Preliminary studies involving patients with breast cancer and nasopharyngeal carcinoma have demonstrated strong capability in distinguishing between healthy and affected individuals. The research team is currently collaborating with clinical oncologists across multiple hospitals to conduct larger-scale validation studies covering a broader spectrum of cancer types. This initiative reflects HKU and LSCCB’s commitment to translating cutting-edge scientific research into practical solutions that address pressing healthcare challenges and deliver meaningful societal impact.

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