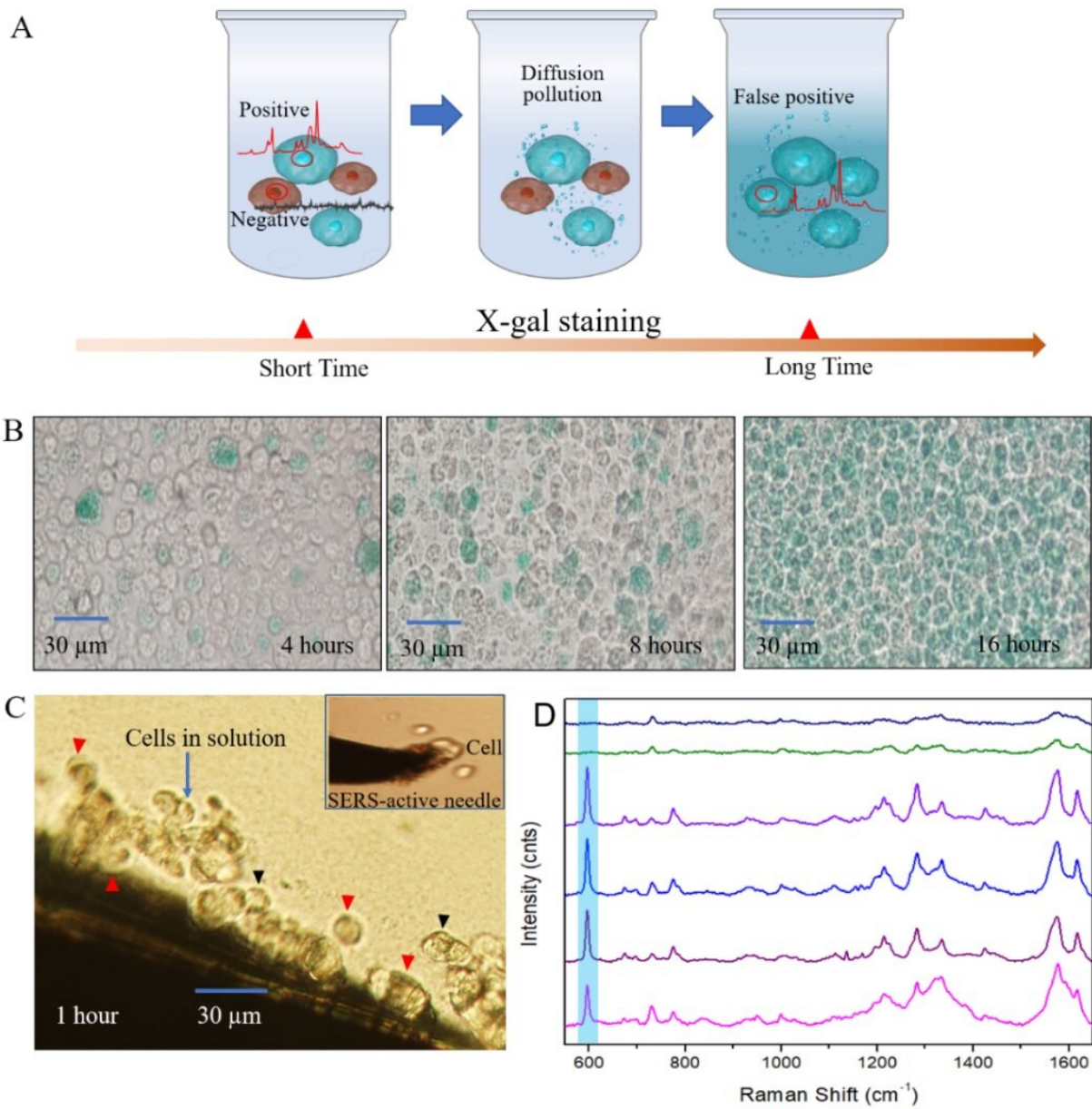


Novel SERS strategy developed for beta-galactosidase activity assay

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In-situ SERS readout strategy for individual cells. (A) The schematic of the strategy to improve the reliability by shortening staining times. (B) X-gal staining assay for cells. (C and D) In-situ SERS readout. The red and black triangles mark the positive and negative cells respectively. The blue band indicates the marker peak of X-gal hydrolysates. Credit: LI Shaofei

Recently, a research group led by Prof. Yang Liangbao from the Hefei Institutes of Physical Science (HFIPS) of the Chinese Academy of Sciences (CAS) developed in-situ Surface-enhanced Raman spectroscopy (SERS) readout strategy to improve the reliability of beta-galactosidase activity assay based on X-gal staining. Relevant research results have been published in *Talanta*.

Beta-galactosidase (β -gal) activity is closely related to senescence cells and aging-associated diseases. X-gal (5-bromo-4-chloro-3-indolyl- β -D-galactoside) staining is the most widely used and commercially available colorimetric assay with low-cost and not intensive equipment.

However, traditional readout of β -gal activity based on X-gal staining is limited to low sensitivity in short incubation times and [false positives](#) in long incubation times. It is difficult to achieve consistent positives in [cell proliferation](#) because the growth state of the cell is often not homogeneous.

In this study, the researchers revealed the potential role of insoluble X-gal hydrolysates in causing false positives. X-gal hydrolysates, causing diffuse diffusion pollution depending on organic medium, can guide the readout [strategy](#) as a universal evasion factor.

Consequently, they proposed the sensitive and rapid in-situ SERS readout strategy to identify and locate β -gal positive cells based on X-gal

staining.

This novel strategy was further proved to be necessary and feasible. It solved the challenges of traditional readout, and that will be of great significance in different applications such as age-related research and anti-aging therapy.

More information: Shaofei Li et al, In-situ SERS readout strategy to improve the reliability of beta-galactosidase activity assay based on X-gal staining in shortening incubation times, *Talanta* (2021). [DOI: 10.1016/j.talanta.2021.122689](https://doi.org/10.1016/j.talanta.2021.122689)

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