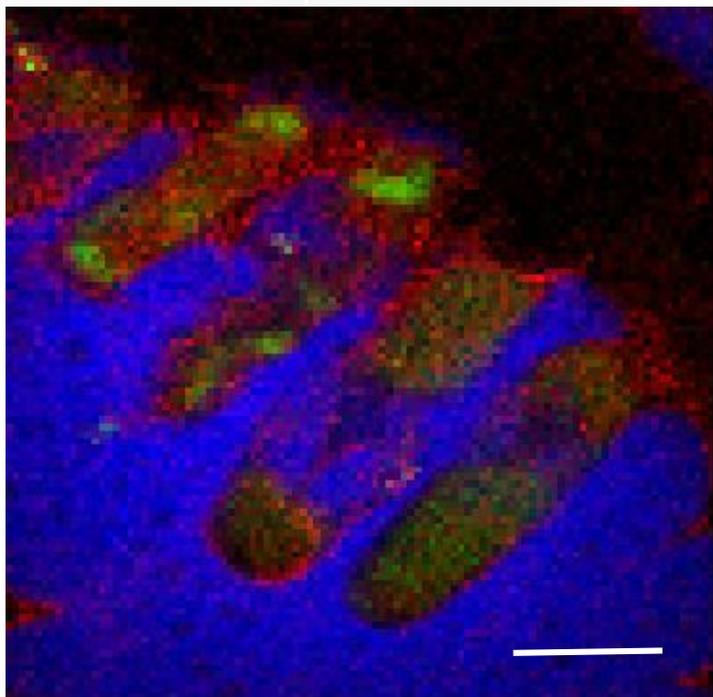


# First X-Ray Nanofluorescence Tomography of Single Bacteria



*X-ray fluorescence image showing the co-localization of Zinc (green), Chlorine (blue), and Calcium (red) distribution in four E. coli cells embedded in NaCl crystals. Scale bar is 1  $\mu\text{m}$ .*

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*Work was performed at Brookhaven National Laboratory*

## Scientific Achievement

The elemental distribution and nanostructure of single bacteria were co-localized simultaneously using X-ray fluorescence (XRF) nanotomography and ptychography with a sub-15 nm beam.

## Significance and Impact

This multimodal approach presents new possibilities in understanding subcellular biochemistry in individual organelles, which are usually analyzed at the population level.

## Research Details

- Bacteria were embedded in small NaCl crystals, which provided a non-aqueous matrix to retain the 3D cell structure while collecting data at room temperature.
- XRF nanotomography was simultaneously combined with ptychography using a sub 15-nm beam at the HXN beamline at NSLS-II.