

# 3D X-ray histology for detection of metastasis in whole lymph node specimens

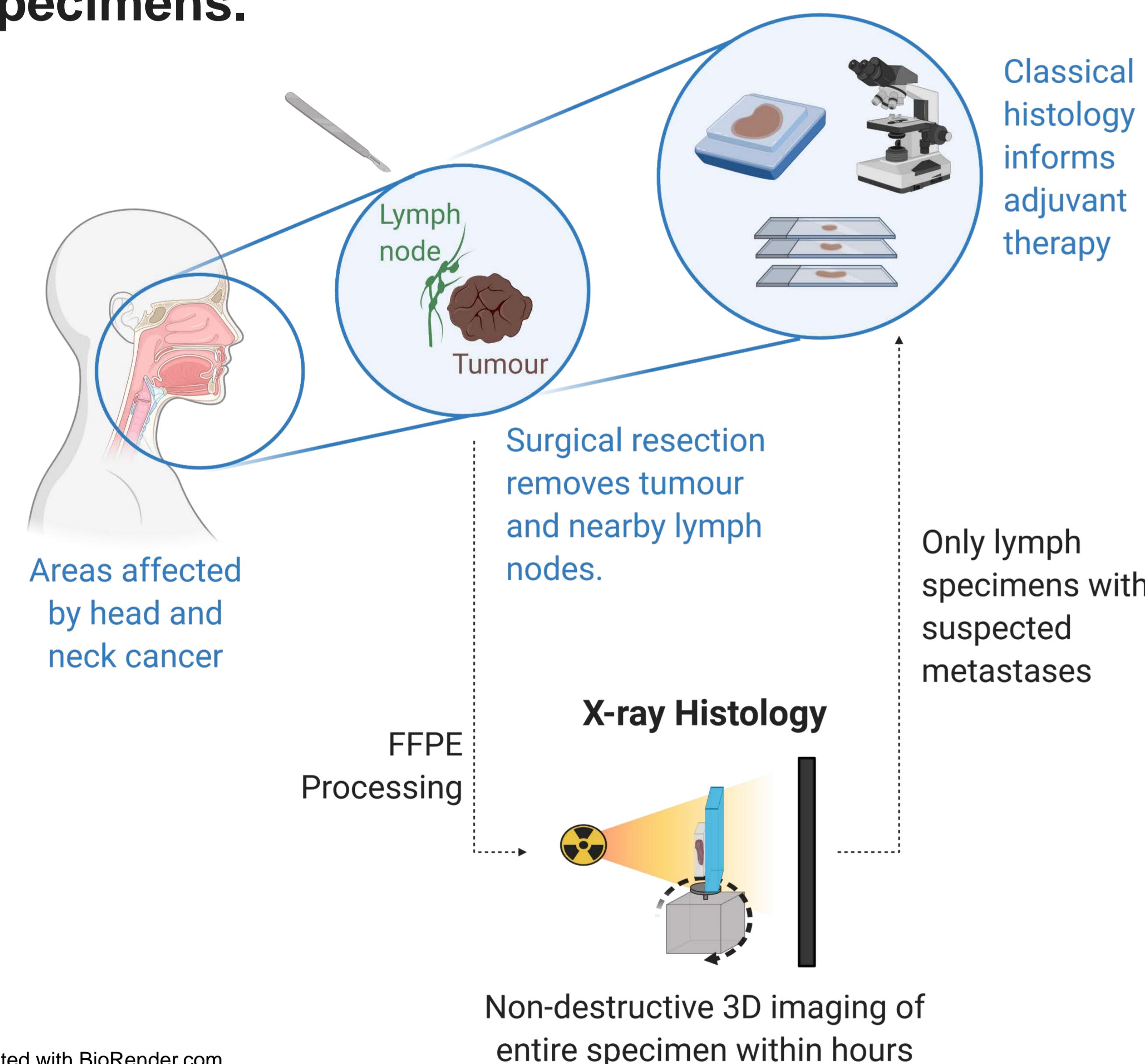
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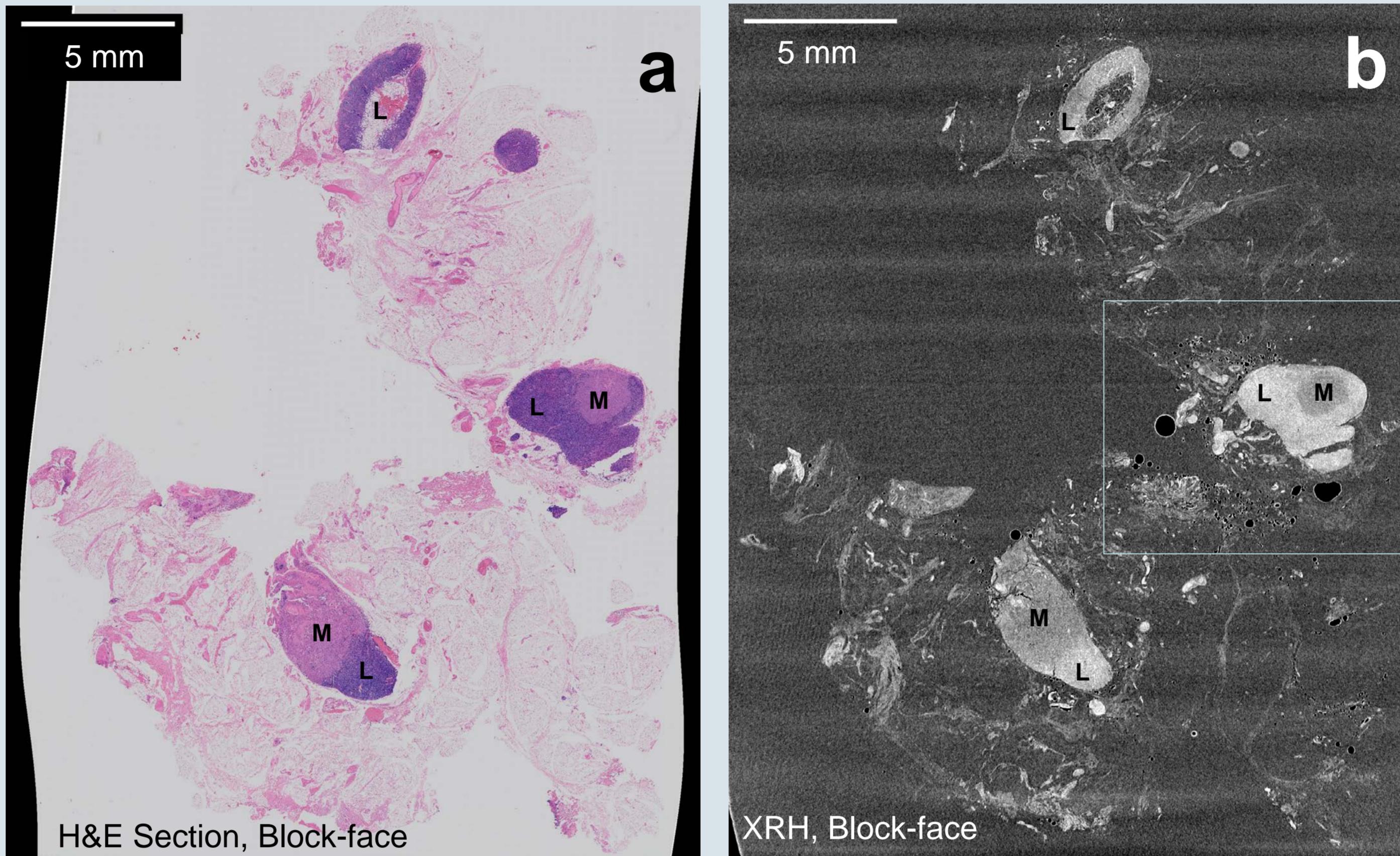
## Introduction

- Major surgical resection is performed in 49% of head and neck cancer cases in the UK (1).
- Metastasis in resected lymph nodes is detected with thin-section histology, which informs adjuvant therapies.
- Prepared histology slides might not sample regions of metastasis or extracapsular spread.

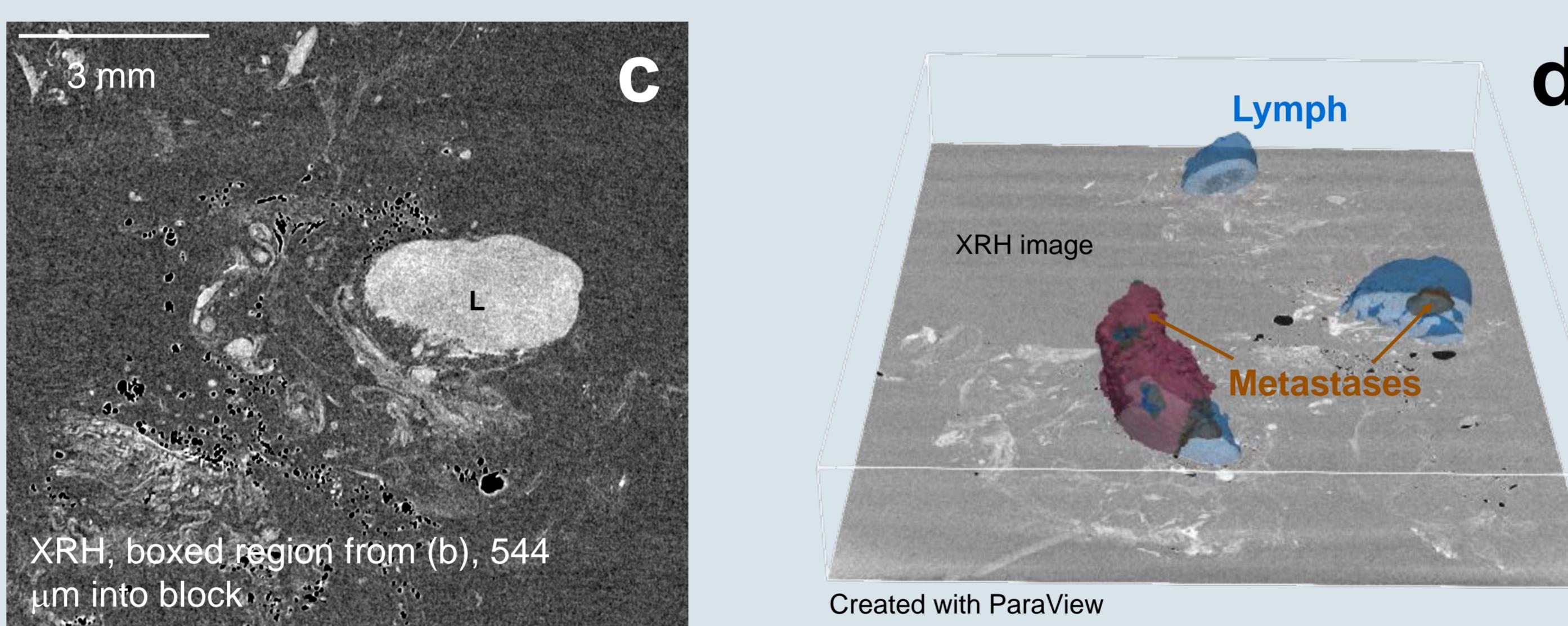
We propose using X-ray histology (XRH) to non-destructively detect metastasis in formalin-fixed paraffin-embedded (FFPE) lymph node specimens.



## Results



Metastases (M) and lymph nodes (L) are visible in both XRH and histology (haematoxylin & eosin) sections.



Metastases at the block-face do not continue throughout the specimen, and **could be missed** if metastatic regions are not sampled.

Get involved, get in touch with the XRH-team!

We are always **looking for collaborations** to explore the full potential of the technology, and **can provide open access to the technique for proof-of-concept studies** with qualitative inspection and quantitative image-based characterisation of the tissue.

We are particularly interested in stimulating and supporting novel and exploratory projects, introducing 3D X-ray Histology to the wider biomedical research and clinical pathology community and identifying application-specific imaging needs.

## Methods

### Obtaining specimens

- Archival FFPE lymph specimens from head and neck tumour resection surgeries were obtained with full ethical approval (09/H0501/90)

### XRH Imaging

- Specimens were scanned with XRH (Nikon Metrology, UK) (2) at 12 μm voxel size within 2.5 hours.

### Analysis

- XRH images were processed in Fiji/ImageJ (3) and compared to digitised histology slides taken prior to XRH scanning.
- 3D segmentation of metastases and lymph nodes from XRH was performed with Ilastik (4).

## Conclusion

**XRH non-destructively produces virtual sections of entire formalin-fixed paraffin-embedded soft tissue specimens within hours, without additional sample preparation.**

## References

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