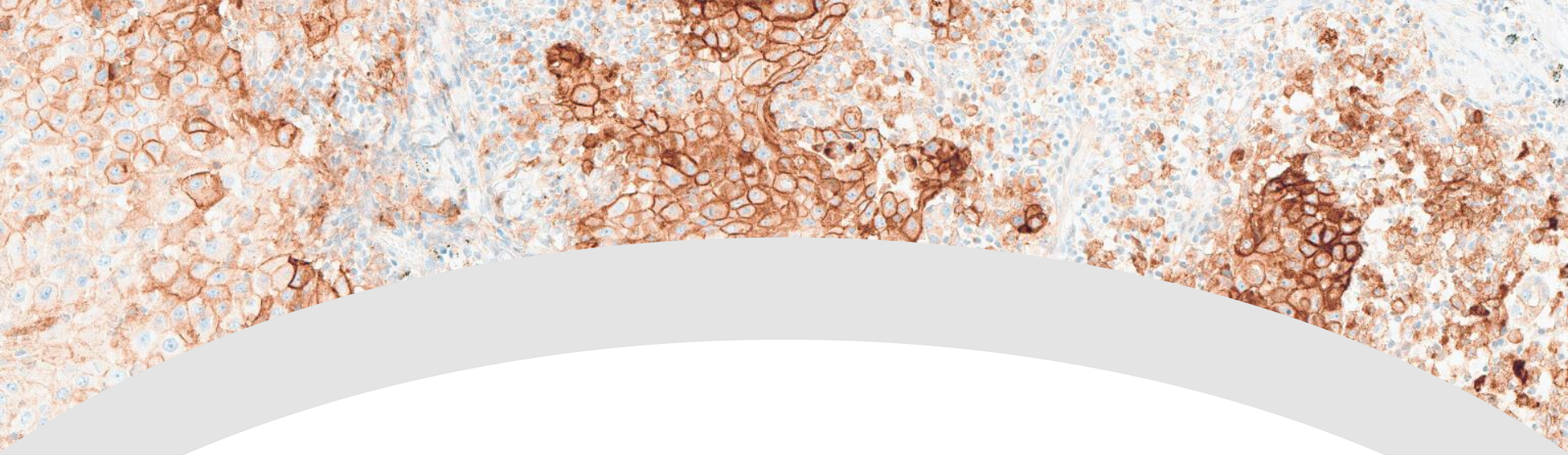

Development and Validation of an AI-Based PD-L1 Tumor Proportion Scoring Algorithm in Non-Small Cell Lung Cancer

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INTRODUCTION

Lung cancer is the leading cause of cancer-related mortality worldwide, with non-small cell lung cancer (NSCLC) accounting for over 80% of all cases.[1] Programmed death-ligand 1 (PD-L1) expression on tumor cells is a response predictor to immune checkpoint inhibitor therapy and has become a cornerstone of first-line therapy for patients with advanced NSCLC without targetable alterations.[2] However, poor inter- and intra-observer concordance when reporting PD-L1 expression might result in patients receiving suboptimal treatment.[3]

Here, we present an AI-based algorithm for the clinical scoring of tumor PD-L1 expression in NSCLC samples to support pathologists and increase scoring consistency.

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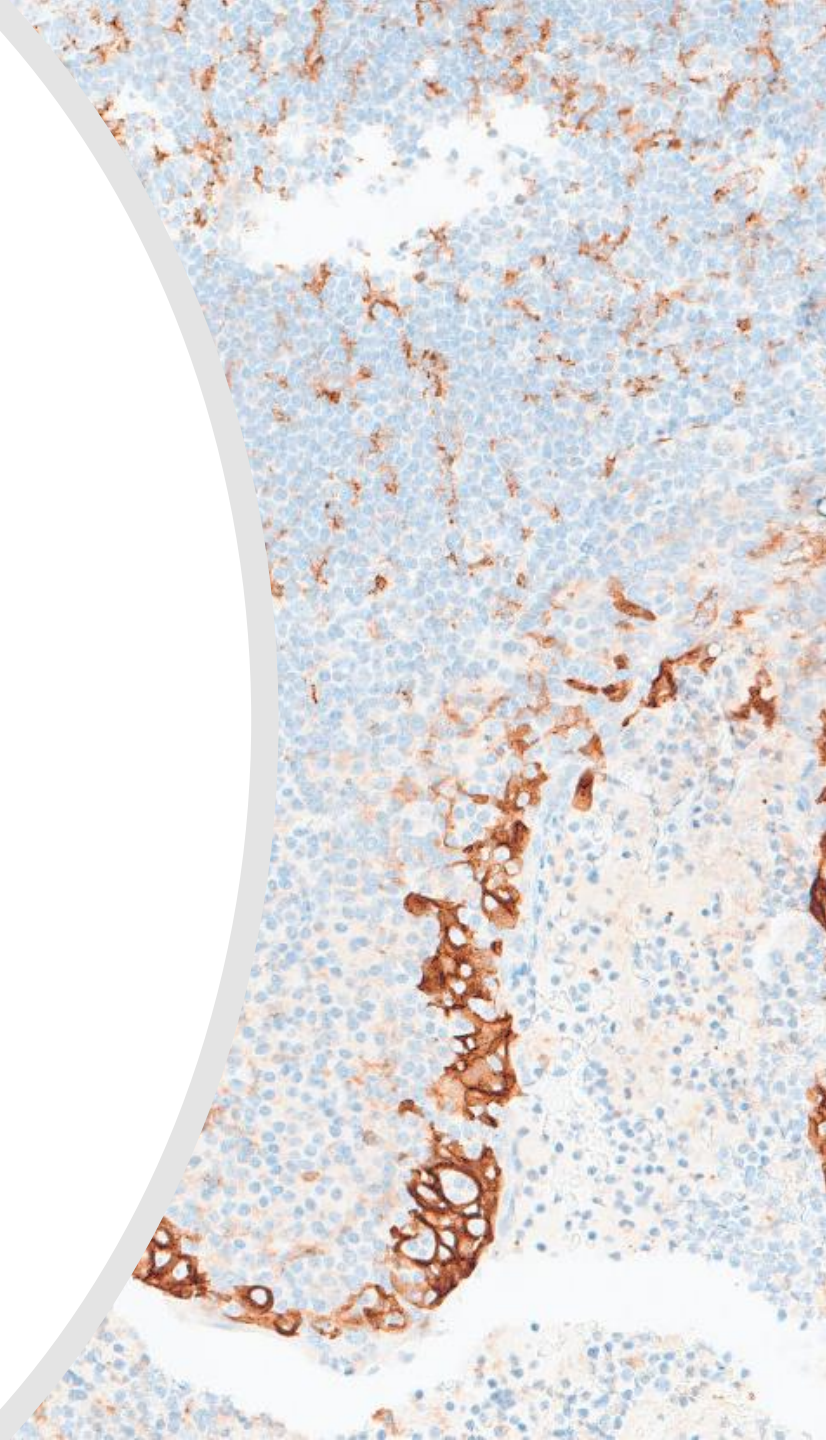
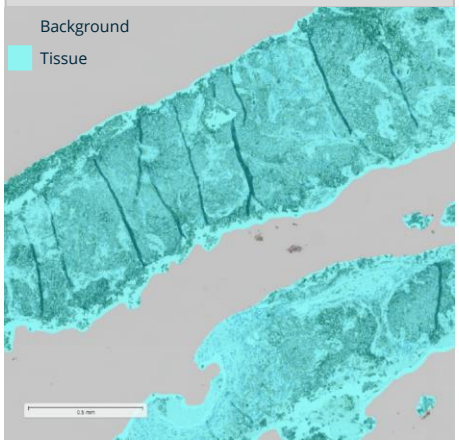
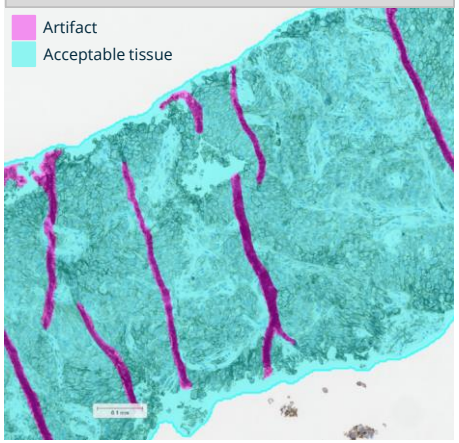


HALO PD-L1 LUNG AI – ALGORITHM SETUP

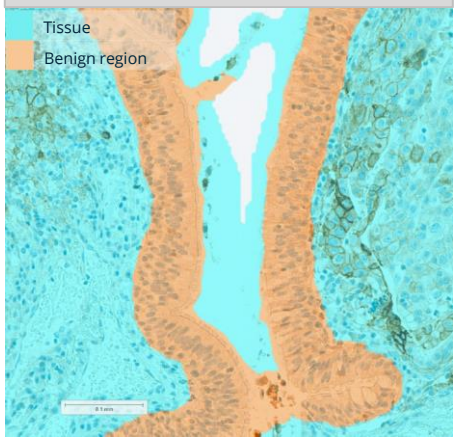
Tissue Detection



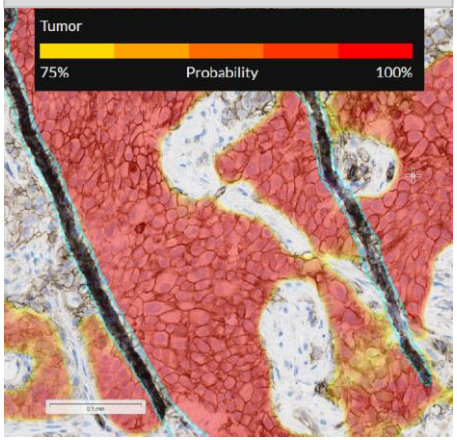
Artifact Exclusion



Benign Region Exclusion



Tumor Detection



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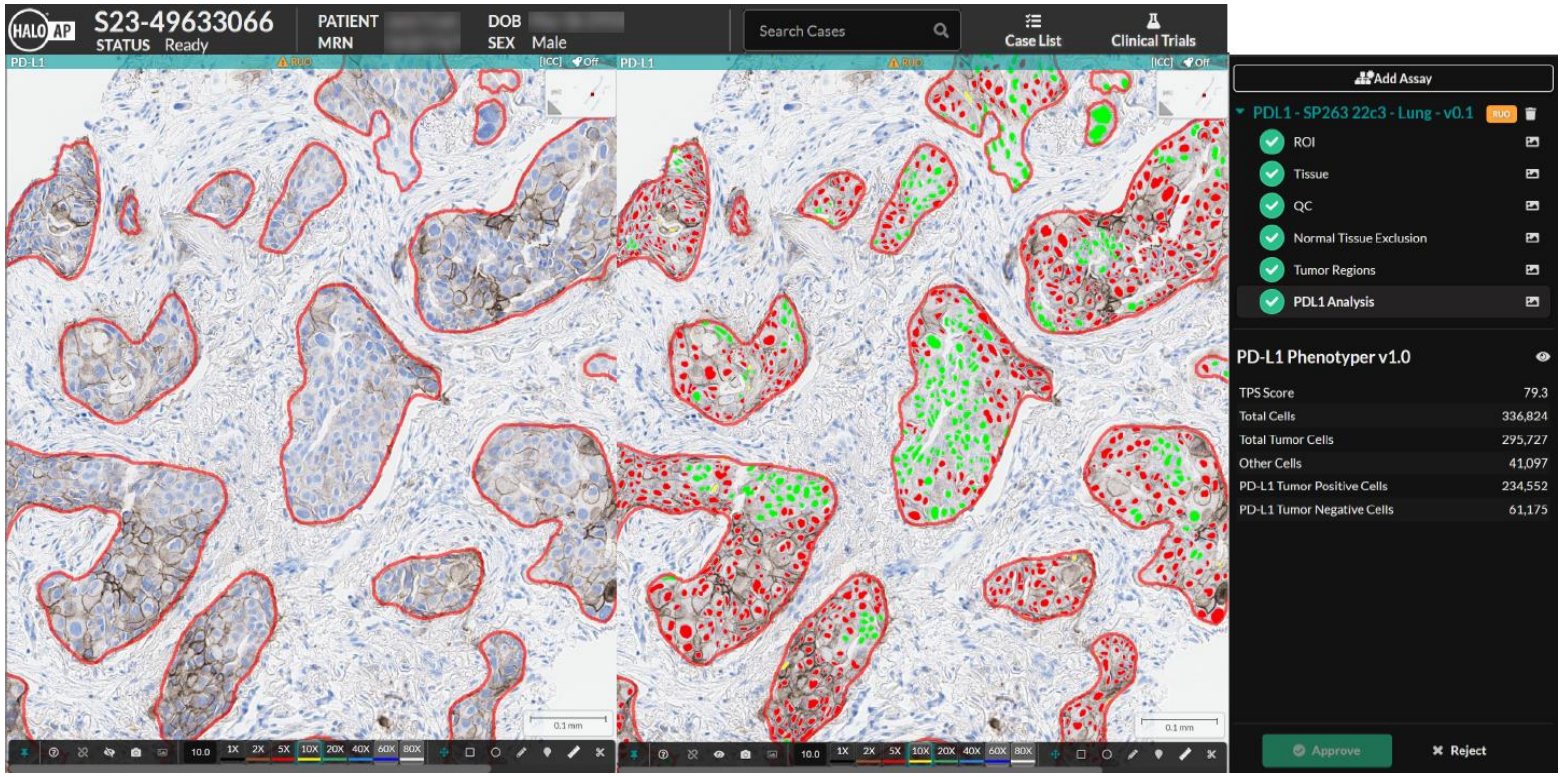
HALO PD-L1 LUNG AI – ALGORITHM SETUP



HALO PD-L1 Lung AI user interface within Indica Labs' HALO AP® software.

PD-L1 Tumor Negative PD-L1 Tumor Positive Other

PD-L1 Cell Classification: 146,984 training annotations - *Res-18 based network*

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VALIDATION – PD-L1 CLONE SP263

The algorithm was validated by comparing the tumor proportion score (TPS) from three pathologists with the TPS score obtained from HALO PD-L1 Lung AI on 203 whole slide images. HALO Link was used by the three pathologists for review and grading.

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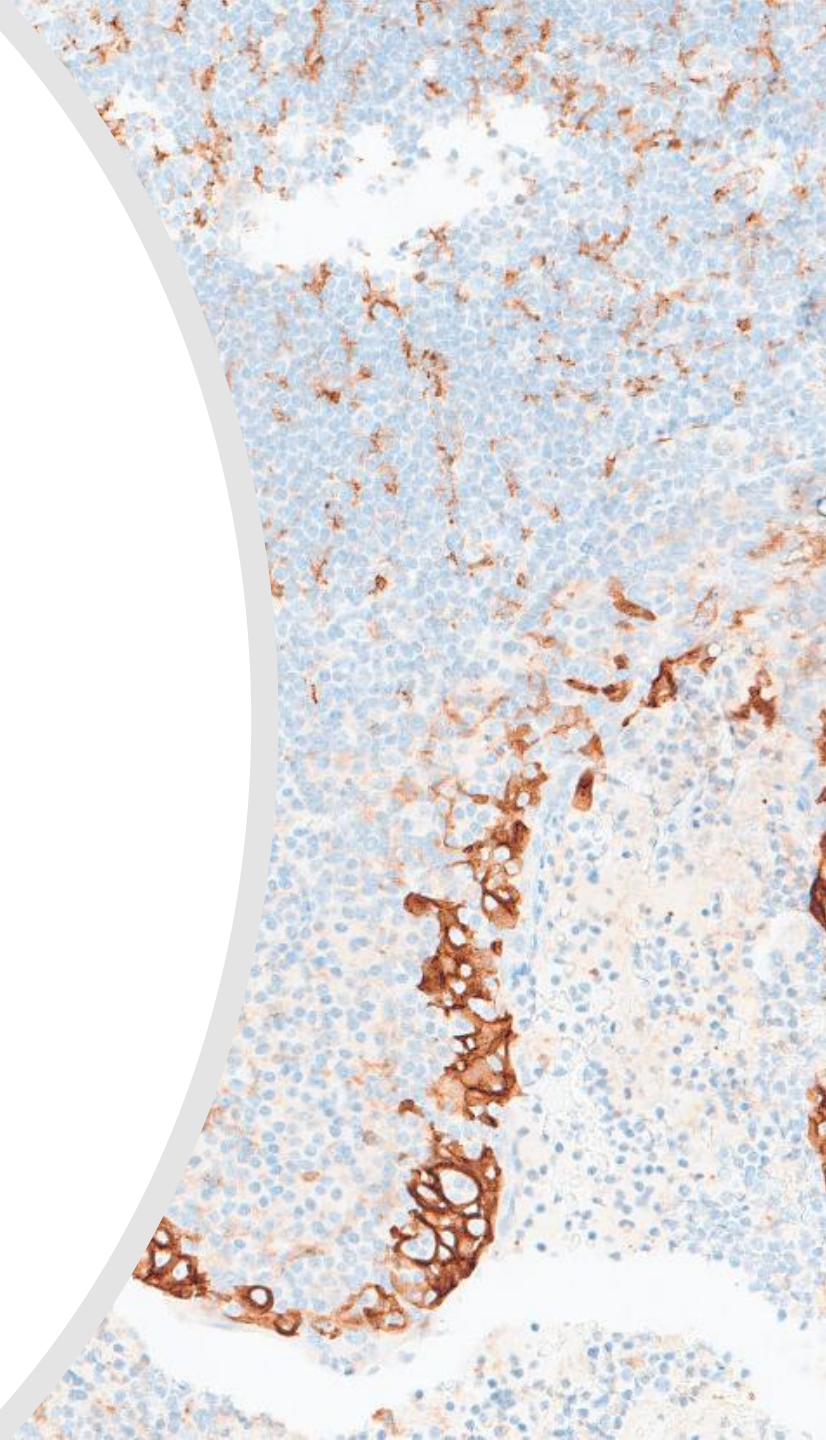
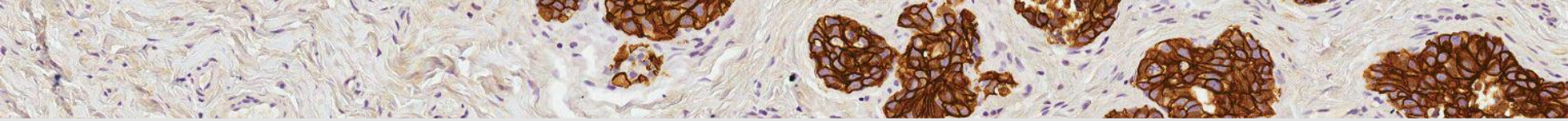
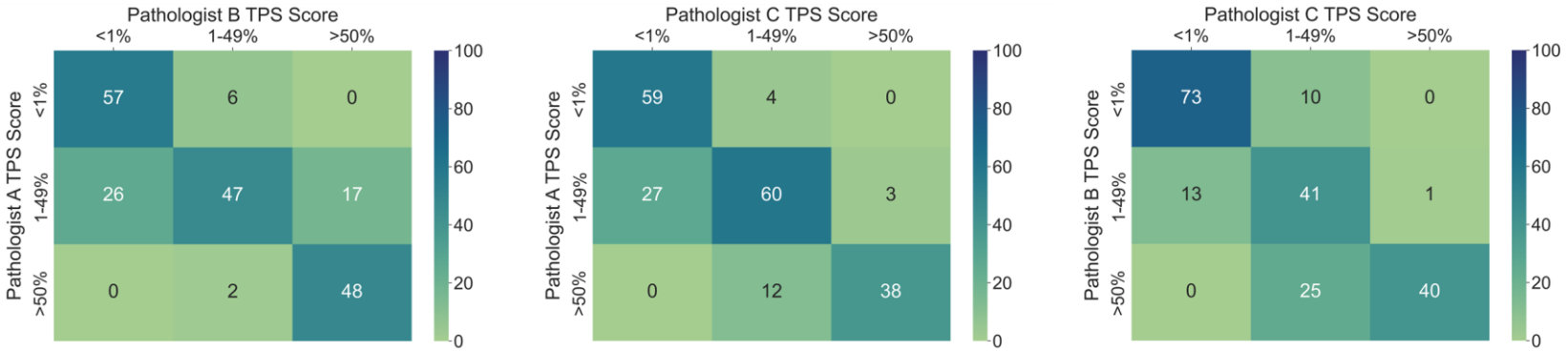




VALIDATION – SP263: INTEROBSERVER PERCENT AGREEMENT



Confusion matrix plots for the pairwise pathologist agreement.

Percent Agreement	
All Pathologists	**64.0**
Pathologist A *vs Pathologist B*	74.9
Pathologist A *vs Pathologist C*	77.3
Pathologist B *vs Pathologist C*	75.9

Inter-observer pathologist agreement.

The three pathologists were in complete agreement in 64.0% of the cases.

In pairwise comparisons, percent agreement ranged from 74.9% to 77.3%.

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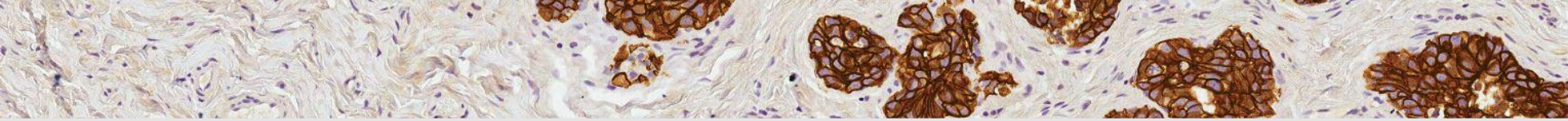
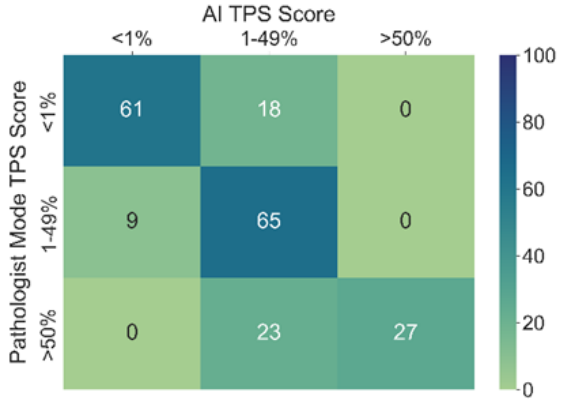


VALIDATION – SP263: PATHOLOGIST VS HALO PD-L1 LUNG AI

Percent Agreement	
Pathologist A *vs* *HALO PD-L1 Lung AI*	71.4
Pathologist B *vs* *HALO PD-L1 Lung AI*	66.0
Pathologist C *vs* *HALO PD-L1 Lung AI*	78.3
Pathologist Mode *vs* *HALO PD-L1 Lung AI*	**75.4**



Pairwise agreement between each pathologist and HALO PD-L1 Lung AI, and confusion matrix plot for the agreement between the pathologists' mode TPS score and HALO PD-L1 Lung AI.

Agreement of HALO PD-L1 Lung AI with the pathologists' mode was 75.4% overall (95% CI 0.69 – 0.81).
Agreement at the clinically relevant cut-offs ranged from 0.70 to 0.82.

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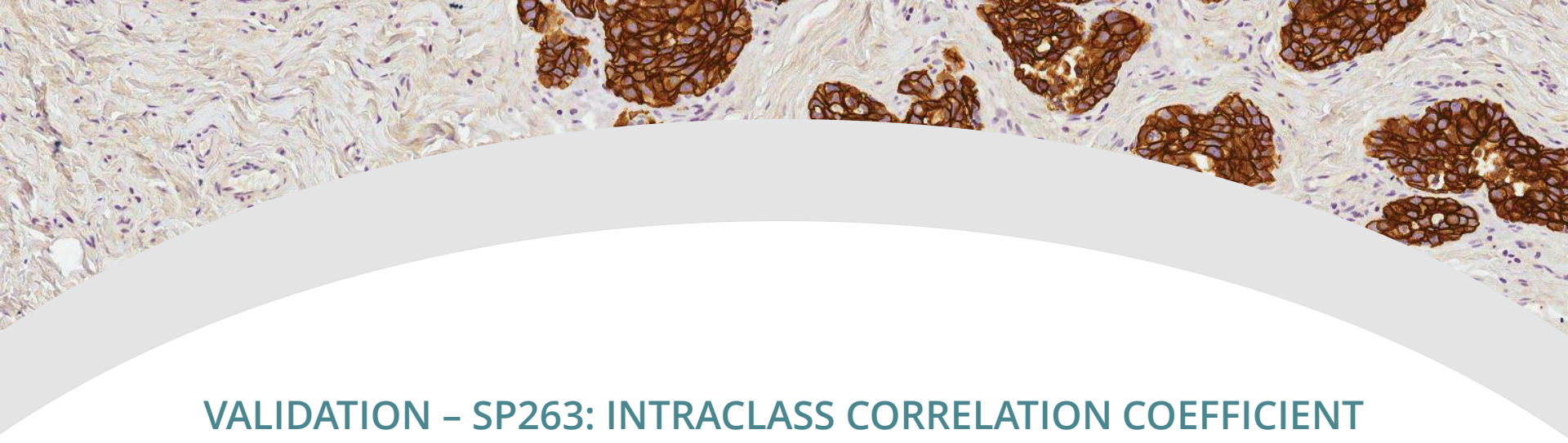


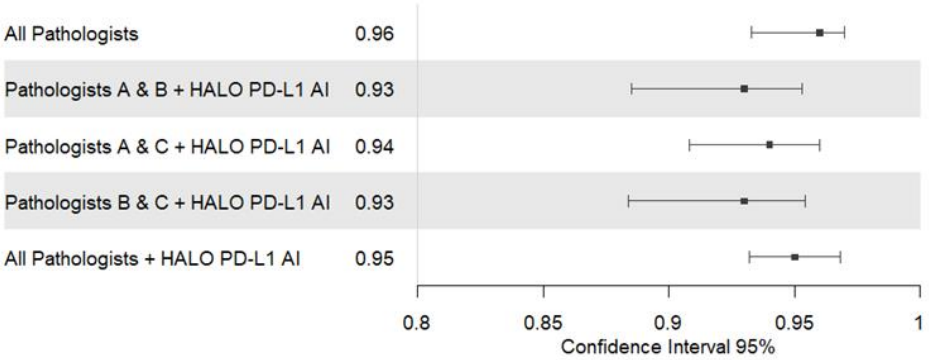
VALIDATION – SP263: INTRACLASS CORRELATION COEFFICIENT

ICC between the pathologists was 0.96

(95% CI 0.93 – 0.97).

ICC between the pathologists and HALO PD-L1 Lung AI was 0.95

(95% CI 0.93 – 0.97).



Confidence interval plot for the intraclass correlation coefficient.

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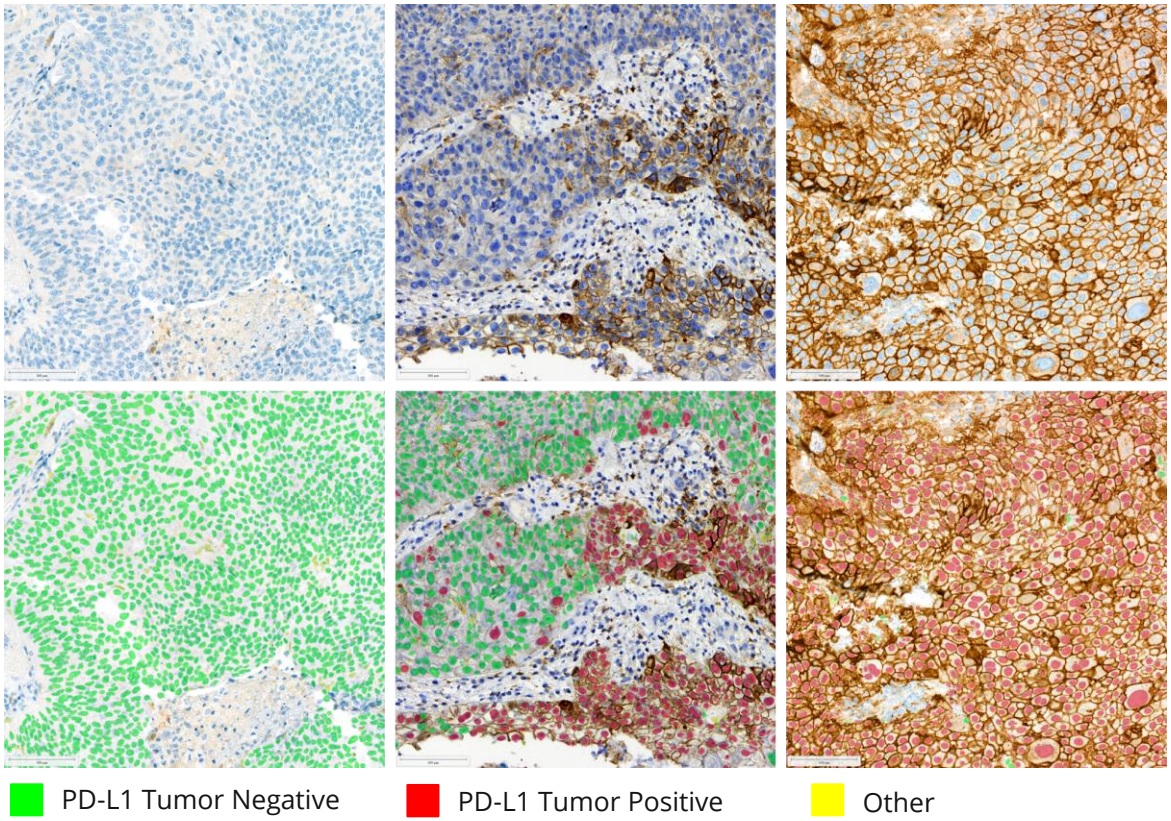
VALIDATION – SP263: IMAGE MARKUP



Representative markups of HALO PD-L1 Lung AI on SP263 stained slides.

PD-L1 Tumor Positive in red, **PD-L1 Tumor Negative** in green and **Other** cells (immune or stromal cells) in yellow.

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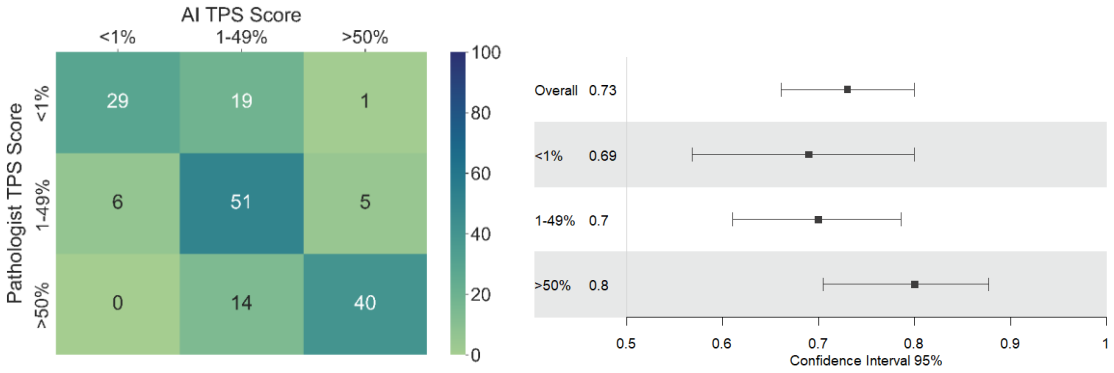
PRELIMINARY VALIDATION RESULTS – PD-L1 CLONE 22C3

Comparison of the algorithm TPS scores to the clinical patient report from an independent institute across 165 22C3-stained WSI.

Agreement of HALO PD-L1 Lung AI with the pathologist's TPS clinical report was 72.7% overall (95% CI 0.67 – 0.79).

ICC between the algorithm and the pathologist's reported TPS scores was 0.95 (95% CI 0.93 – 0.96).



Confusion matrix plot for the agreement between the pathologist TPS score and HALO PD-L1 Lung AI and confidence interval plot for the percent agreement overall and at the clinically relevant cut-offs between the pathologist TPS score and HALO PD-L1 Lung AI.

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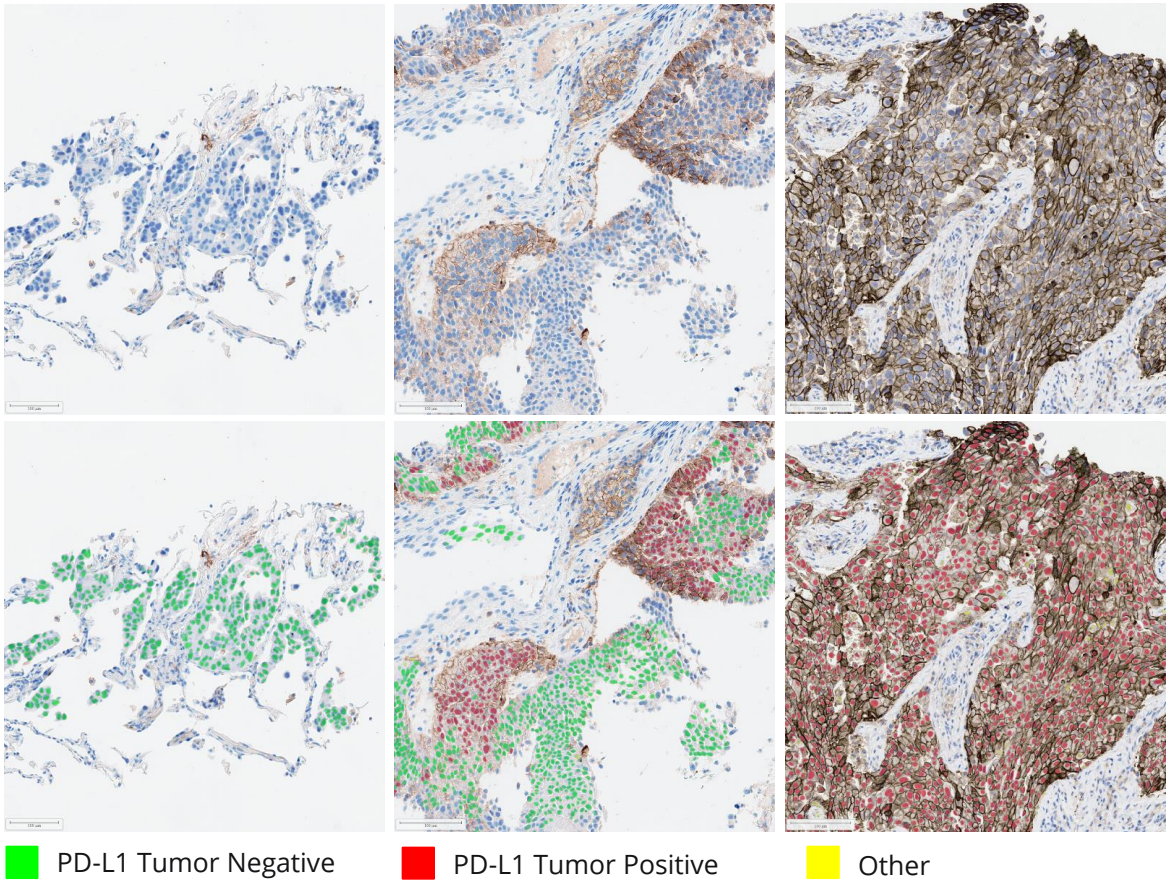
PRELIMINARY VALIDATION RESULTS – PD-L1 CLONE 22C3



Representative markups of HALO PD-L1 Lung AI on 22C3 stained slides.

PD-L1 Tumor Positive in red, **PD-L1 Tumor Negative** in green and **Other** cells (immune or stromal cells) in yellow.

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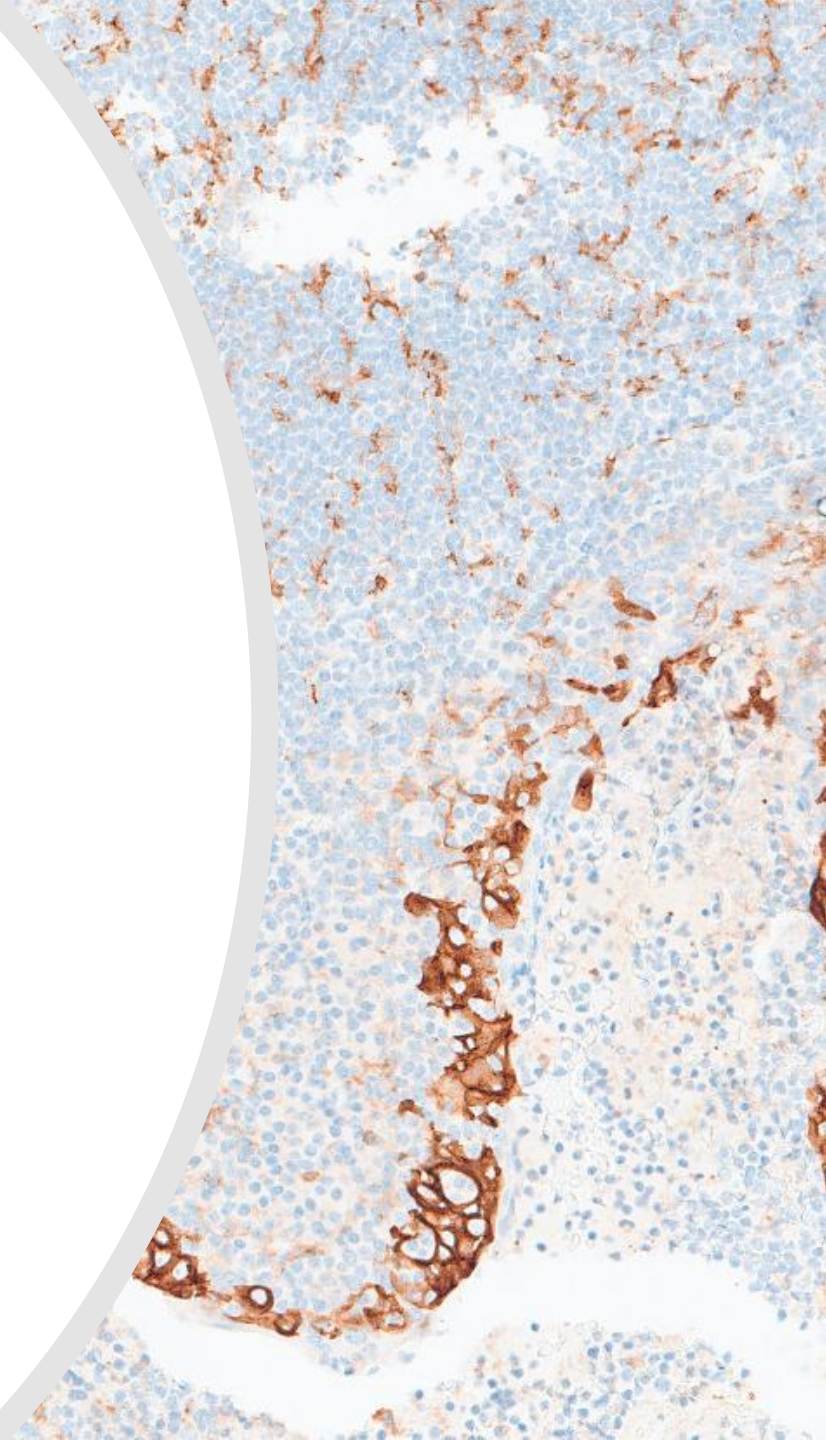
CONCLUSIONS

HALO PD-L1 Lung AI is in agreement with pathologist TPS scores in routine diagnostic cases.

Usage of HALO PD-L1 Lung AI in a diagnostic setting has the potential to support pathologists' scoring PD-L1, saving pathologists' time and ensuring consistency in the reported results.



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2. Gainor, JF. Adjuvant PD-L1 Blockade in Non-Small Cell Lung Cancer. *Lancet* **398**:1281-1283 (2021): DOI: 10.1016/S0140-6736(21)02100-0.
3. Cooper, WA *et al*. Intra- and Interobserver Reproducibility Assessment of PD-L1 Biomarker in Non-Small Cell Lung Cancer. *Clinical Cancer Research: An Official Journal of the American Association for Cancer Research* **23**: 4569-4577 (2017): DOI: 10.1158/1078-0432.CCR-17-0151.

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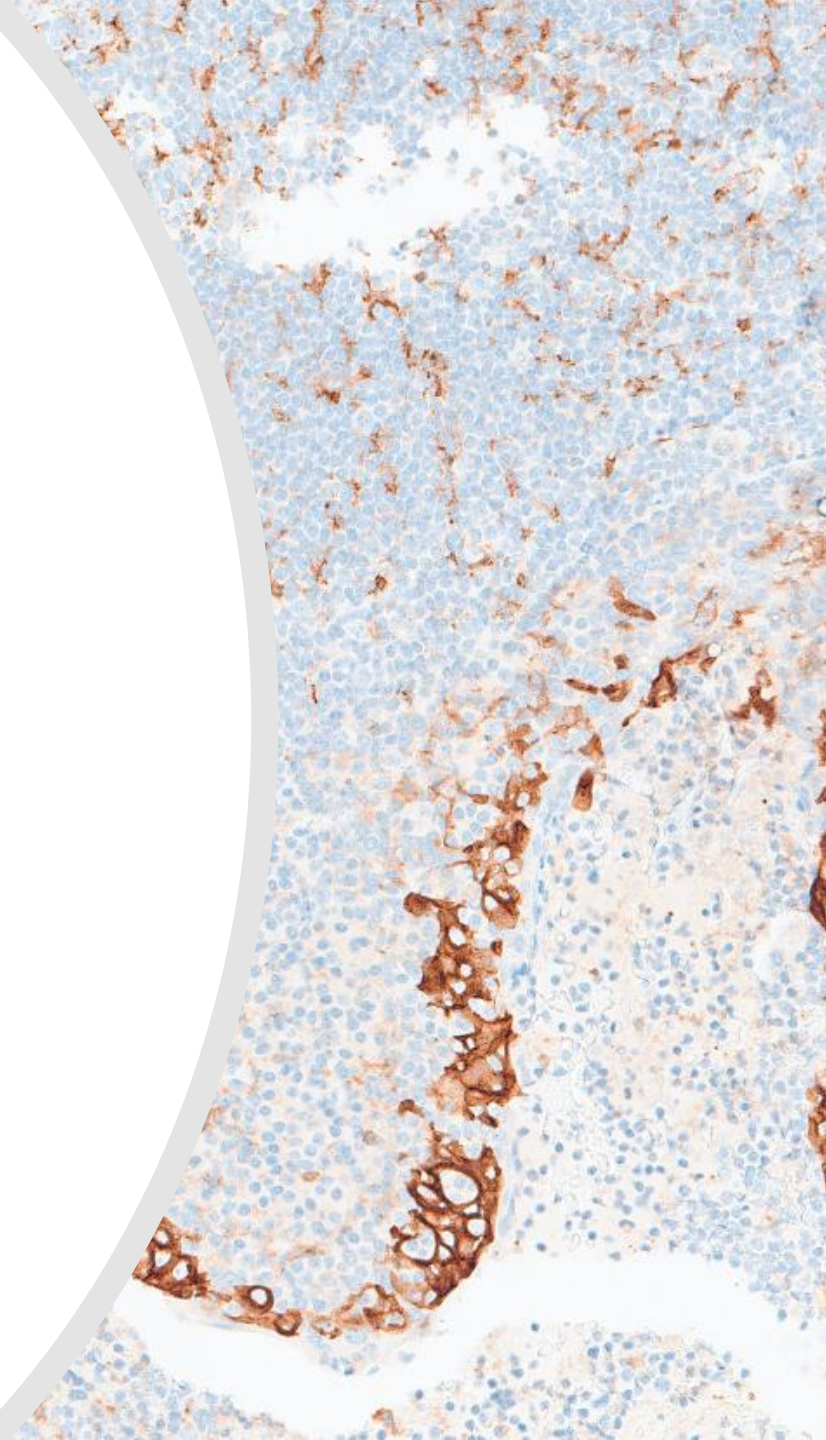
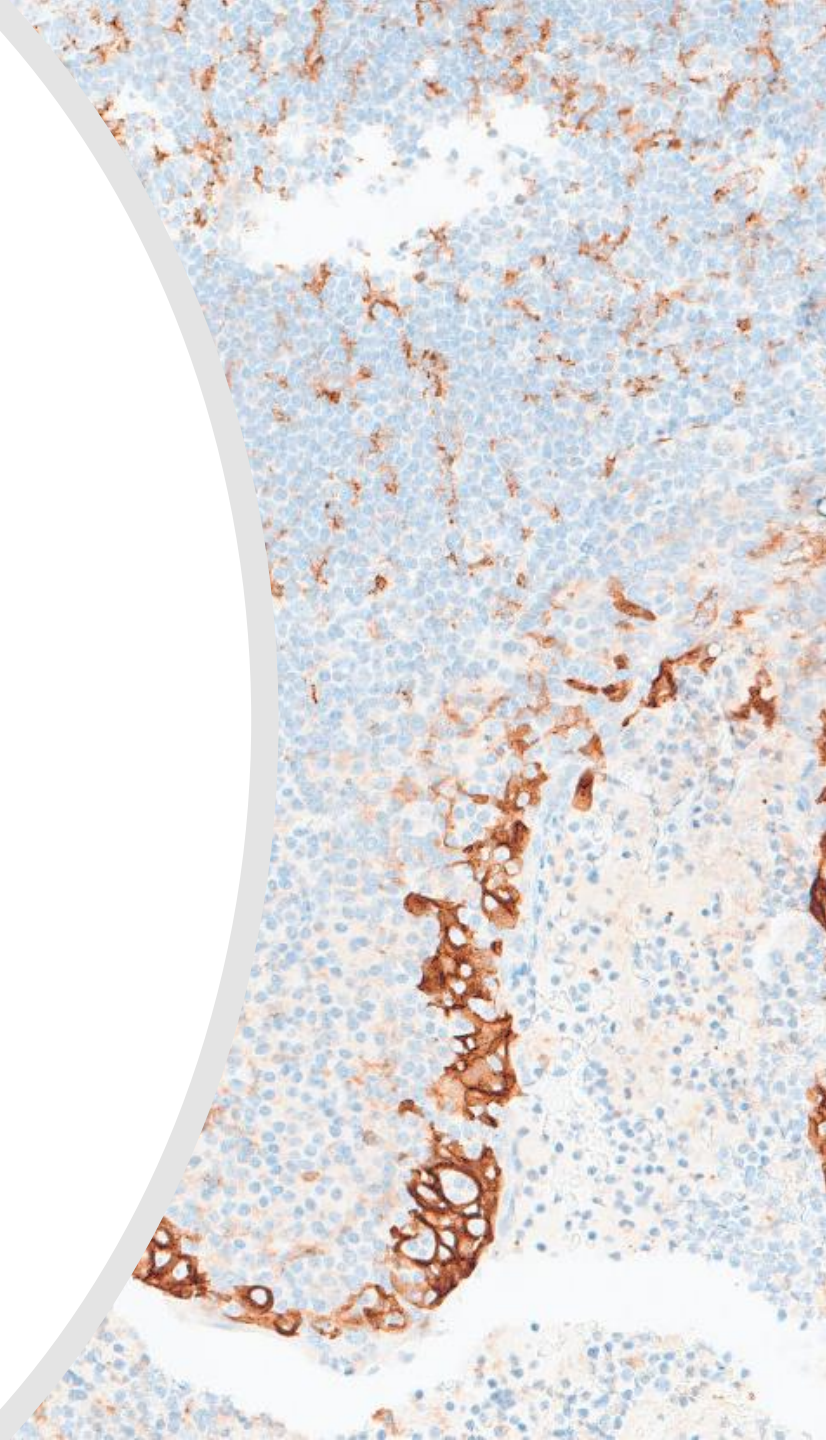


PRODUCT INFORMATION

Learn more about HALO PD-L1 Lung AI by emailing **info@indicalab.com**.

Learn more about the **HALO Link** and **HALO AP®** image analysis platforms on the Indica Labs website, or email **info@indicalab.com**.



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