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Integrative
Hepatology**



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La science pour la santé
From science to health

Intelligence Artificielle et Pathologie : Opportunités et Obstacles

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Département de Pathologie
Hôpital Henri Mondor
Créteil, France

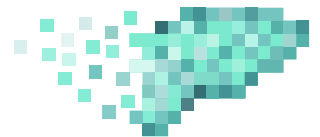
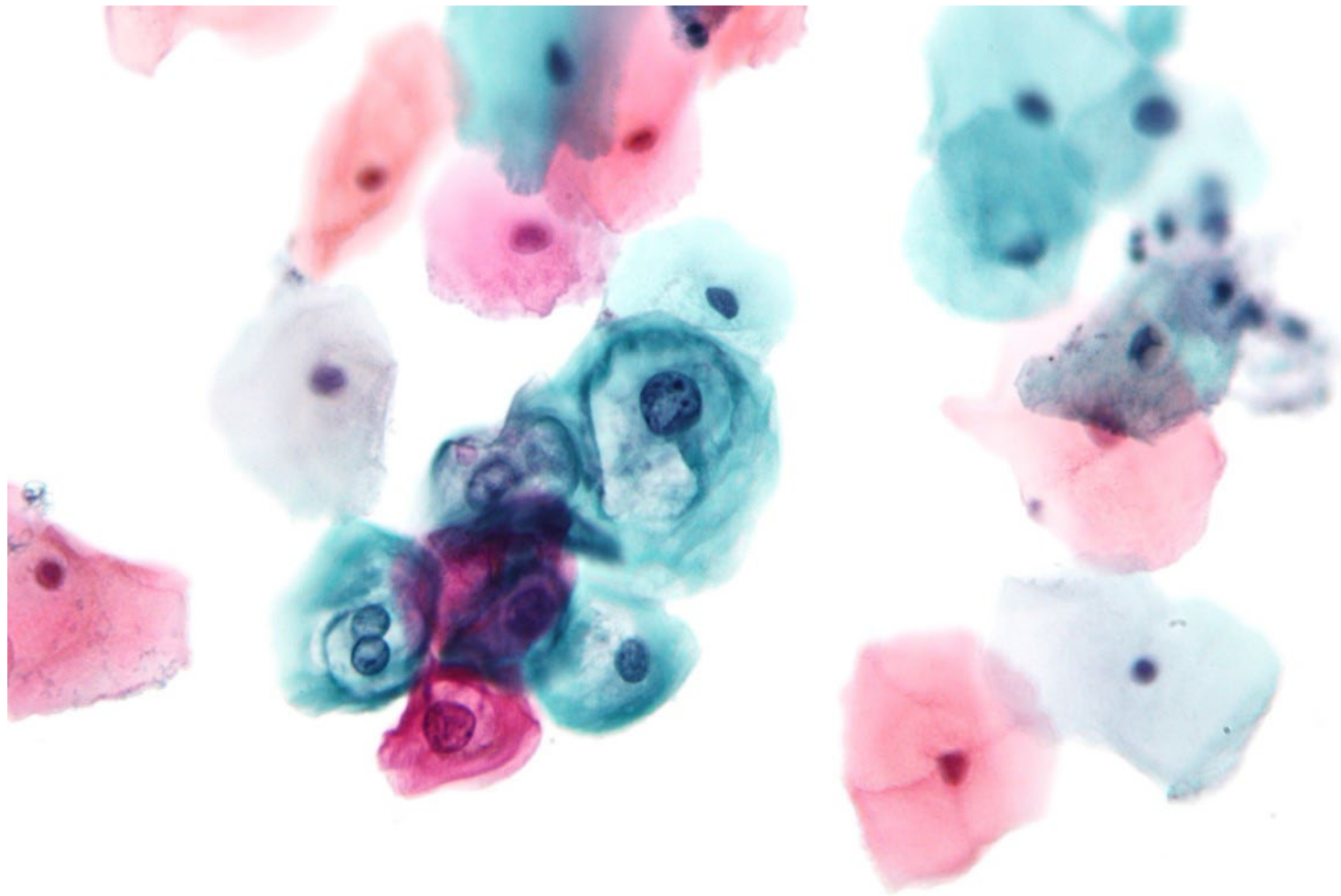


**INSTITUT MONDOR
DE RECHERCHE
BIOMÉDICALE**



**UNIVERSITÉ
PARIS-EST CRÉTEIL
VAL DE MARNE**

Analyse d'image en cytologie



L'IA comme assistant diagnostique

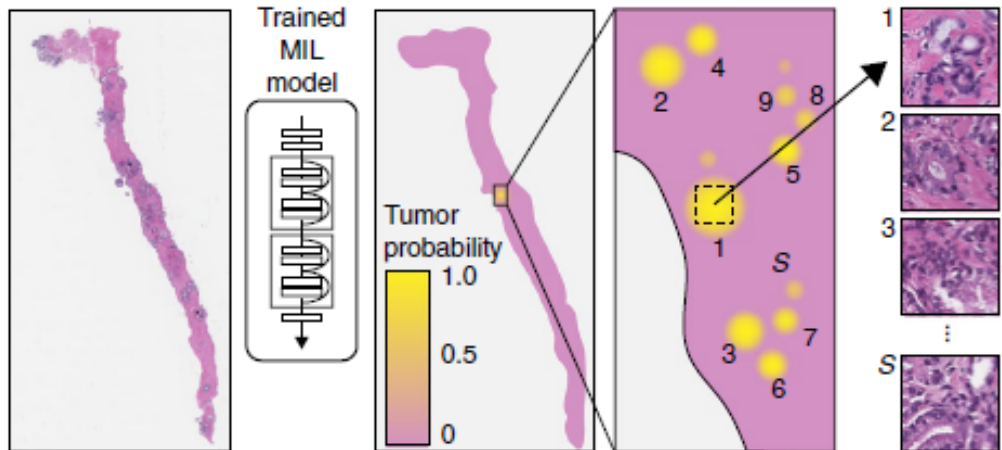
nature
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ARTICLES

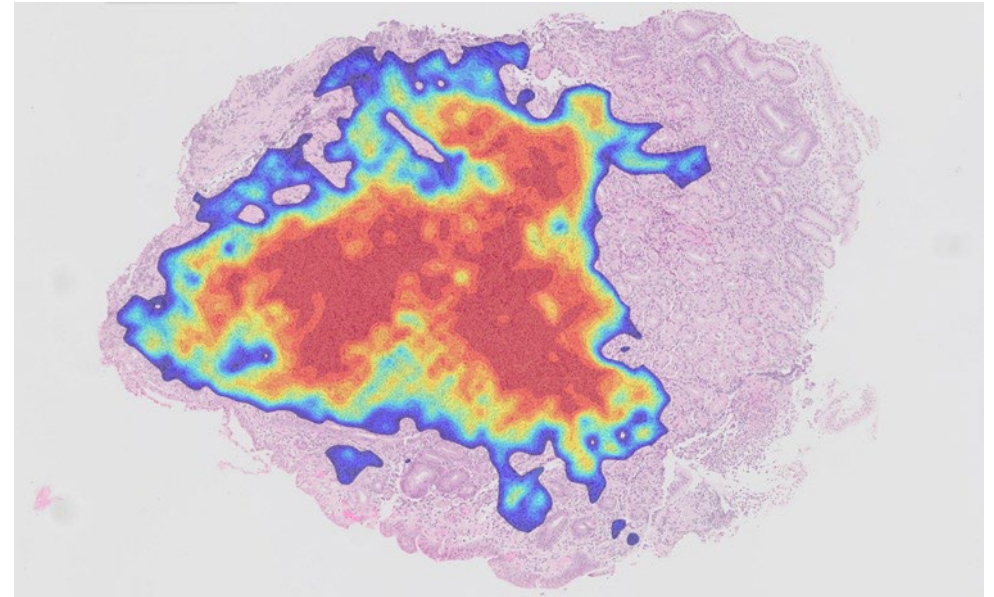
<https://doi.org/10.1038/s41591-019-0508-1>

Clinical-grade computational pathology using weakly supervised deep learning on whole slide images

Gabriele Campanella^{1,2}, Matthew G. Hanna¹, Luke Geneslaw¹, Allen Mirafior¹, Vitor Werneck Krauss Silva¹, Klaus J. Busam¹, Edi Brogi¹, Victor E. Reuter¹, David S. Klimstra¹ and Thomas J. Fuchs^{1,2*}

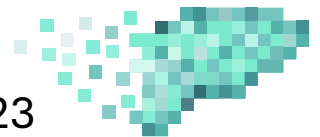
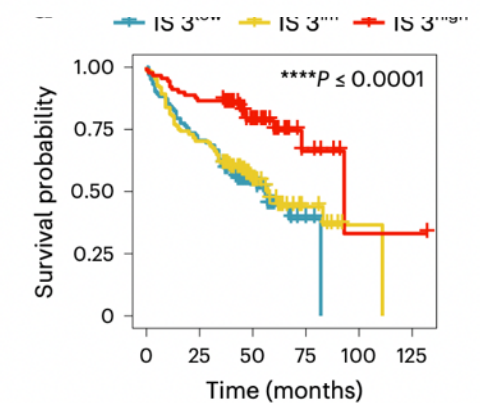
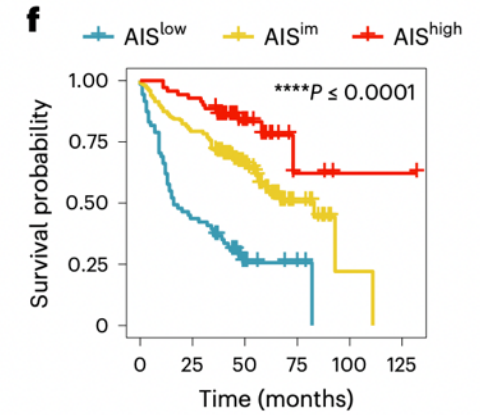
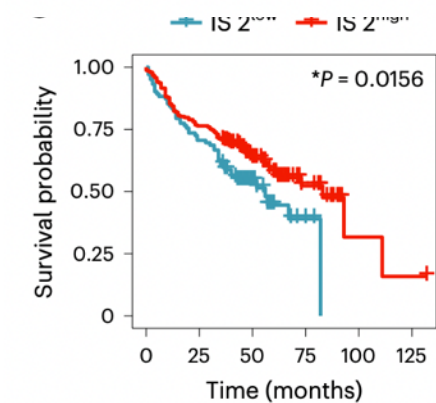
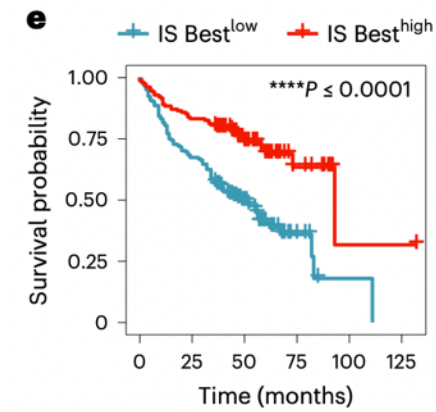
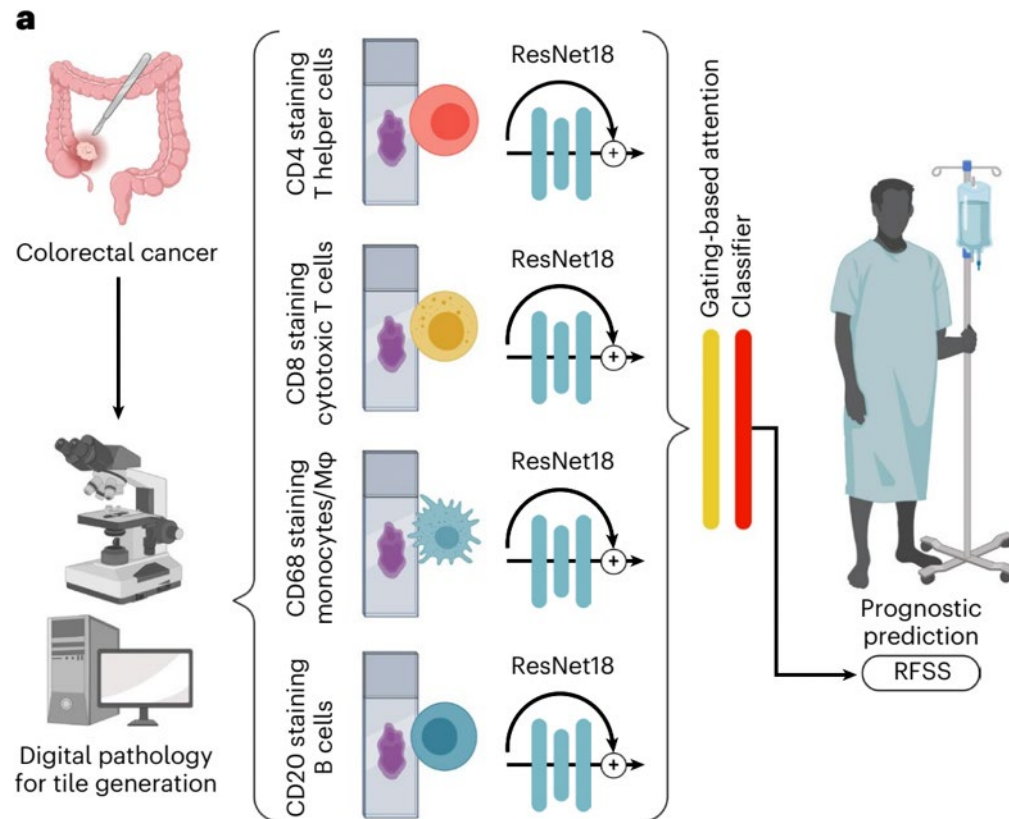


Ibex Obtains CE Mark for Galen Gastric, the World's First AI-powered Solution for Gastric Cancer Detection



IA et développement de biomarqueurs

Multistain deep learning for prediction of prognosis and therapy response in colorectal cancer

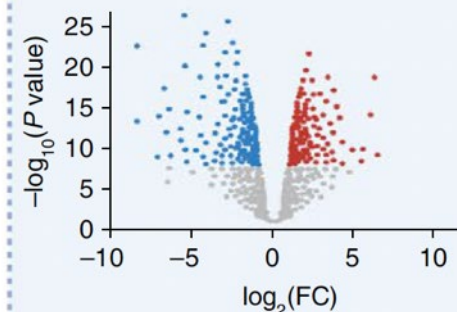




Molecular correlates of clinical response and resistance to atezolizumab in combination with bevacizumab in advanced hepatocellular carcinoma

Andrew X. Zhu^{1,2}, Alexander R. Abbas^{3,20}, Marina Ruiz de Galarreta^{4,5,6,20}, Yinghui Guan^{3,20}, Shan Lu³, Hartmut Koeppen⁷, Wenjun Zhang⁸, Chih-Hung Hsu⁹, Aiwu Ruth He¹⁰, Baek-Yeol Ryoo¹¹, Thomas Yau¹², Ahmed O. Kaseb¹³, Adam M. Burgoyne¹⁴, Farshid Dayyani¹⁵, Jessica Spahn¹⁶, Wendy Verret¹⁶, Richard S. Finn¹⁷, Han Chong Toh¹⁸, Amaia Lujambio^{4,5,6,19} and Yulei Wang³✉

Transcriptome analyses



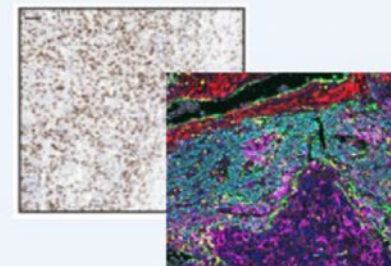
- Differential gene expression
- Gene set enrichment
- Cell type deconvolution

Genetic profiling



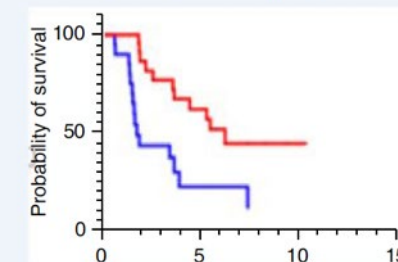
- Tumor mutation burden
- Neoantigen load
- Mutations (CTNNB1, TERT)

In situ analyses



- PD-L1 IHC
- CD8 IHC
- Multiplex IHC (CD31, MHC-I)

Survival analyses



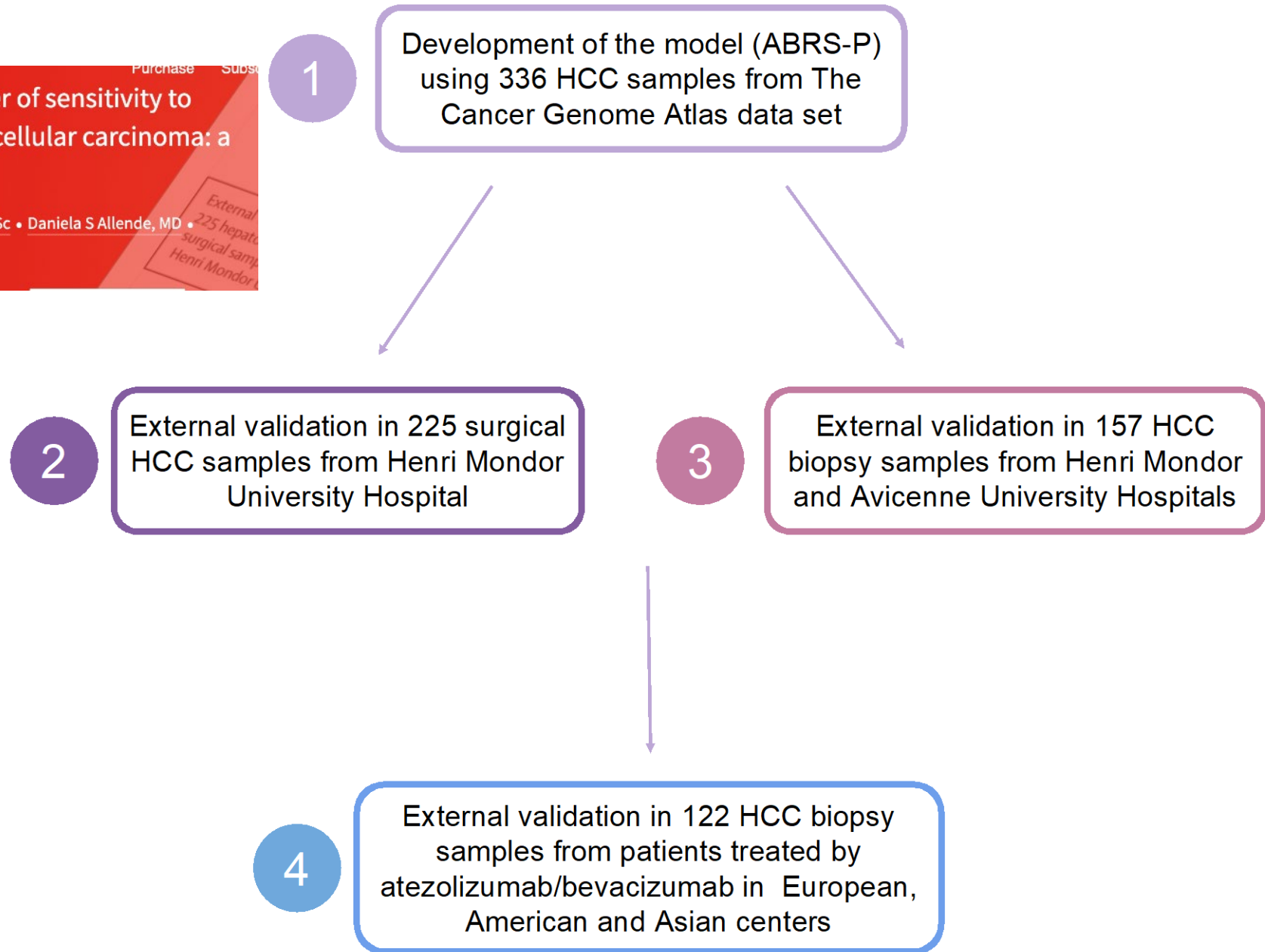
- Pathway/immune signatures
- TMB, mutations
- CD8 T cell, vasculature density

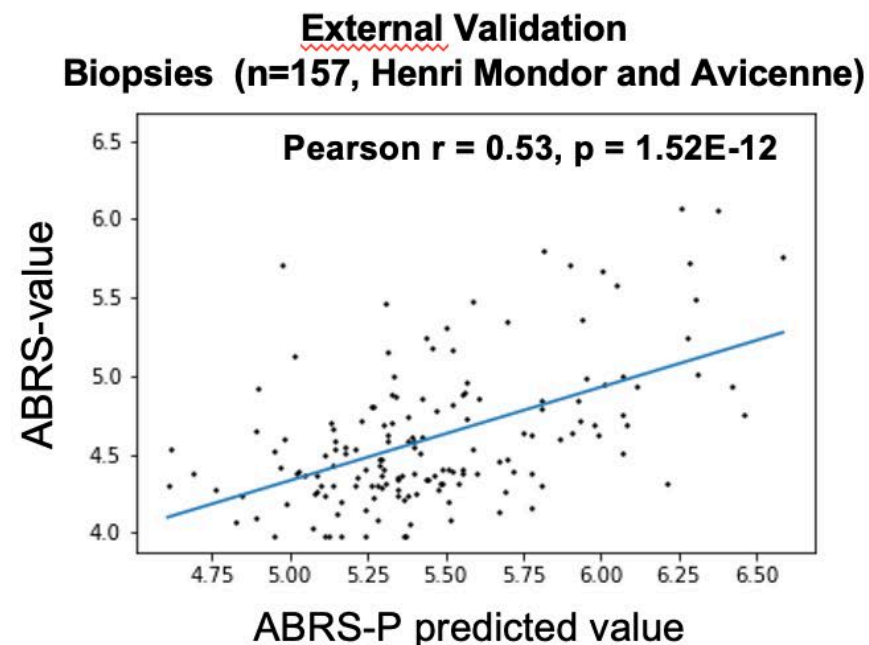
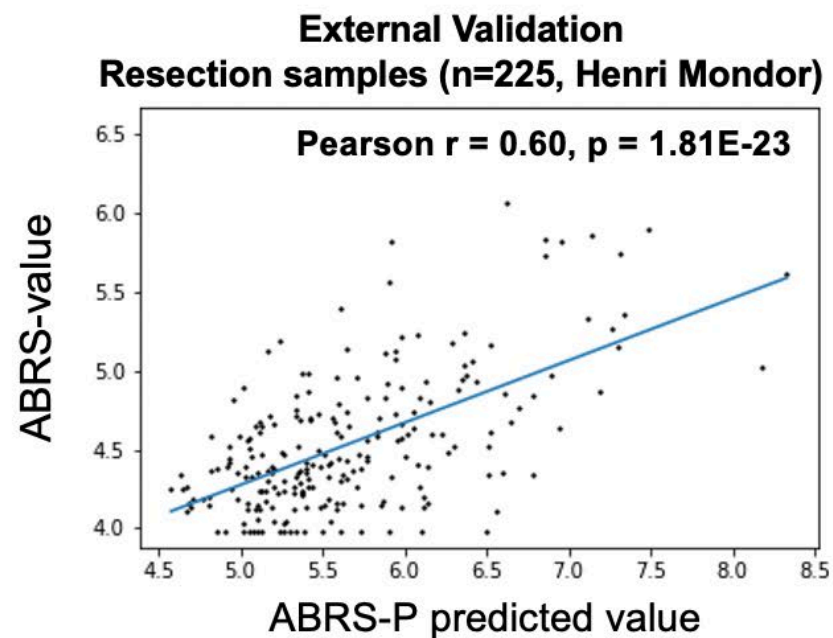


Artificial intelligence-based pathology as a biomarker of sensitivity to atezolizumab–bevacizumab in patients with hepatocellular carcinoma: a multicentre retrospective study

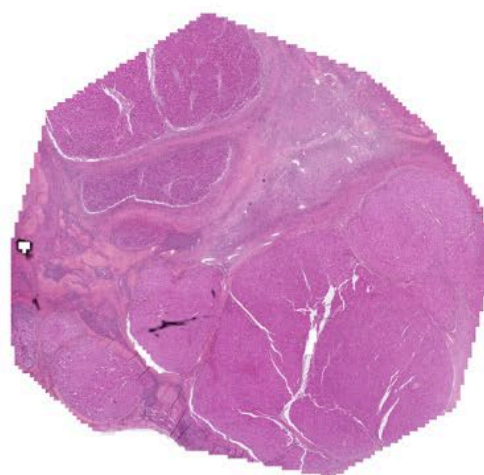
Qinghe Zeng, MSc • Christophe Klein, MSc • Stefano Caruso, PhD • Pascale Maille, MSc • Daniela S Allende, MD •

Beatriz Mínguez, MD • et al. [Show all authors](#) • [Show footnotes](#)

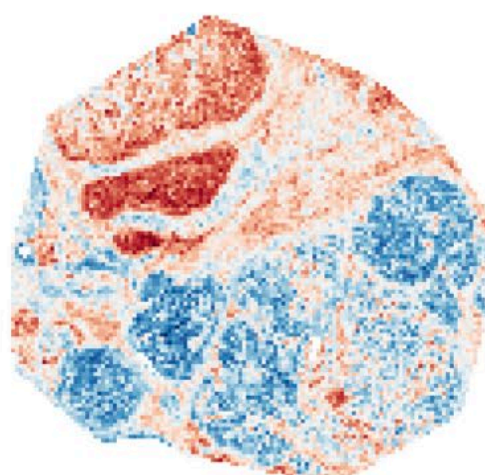




Resection sample



Hematein-and-eosin

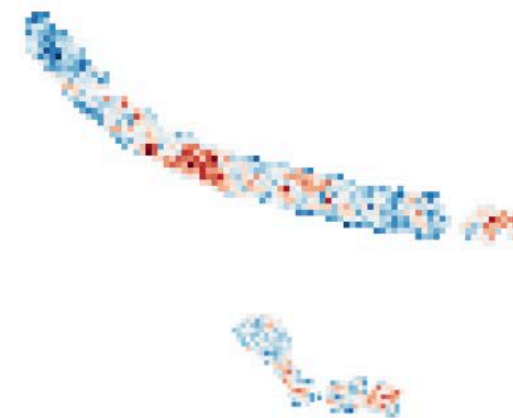


Prediction heat map

Biopsy sample

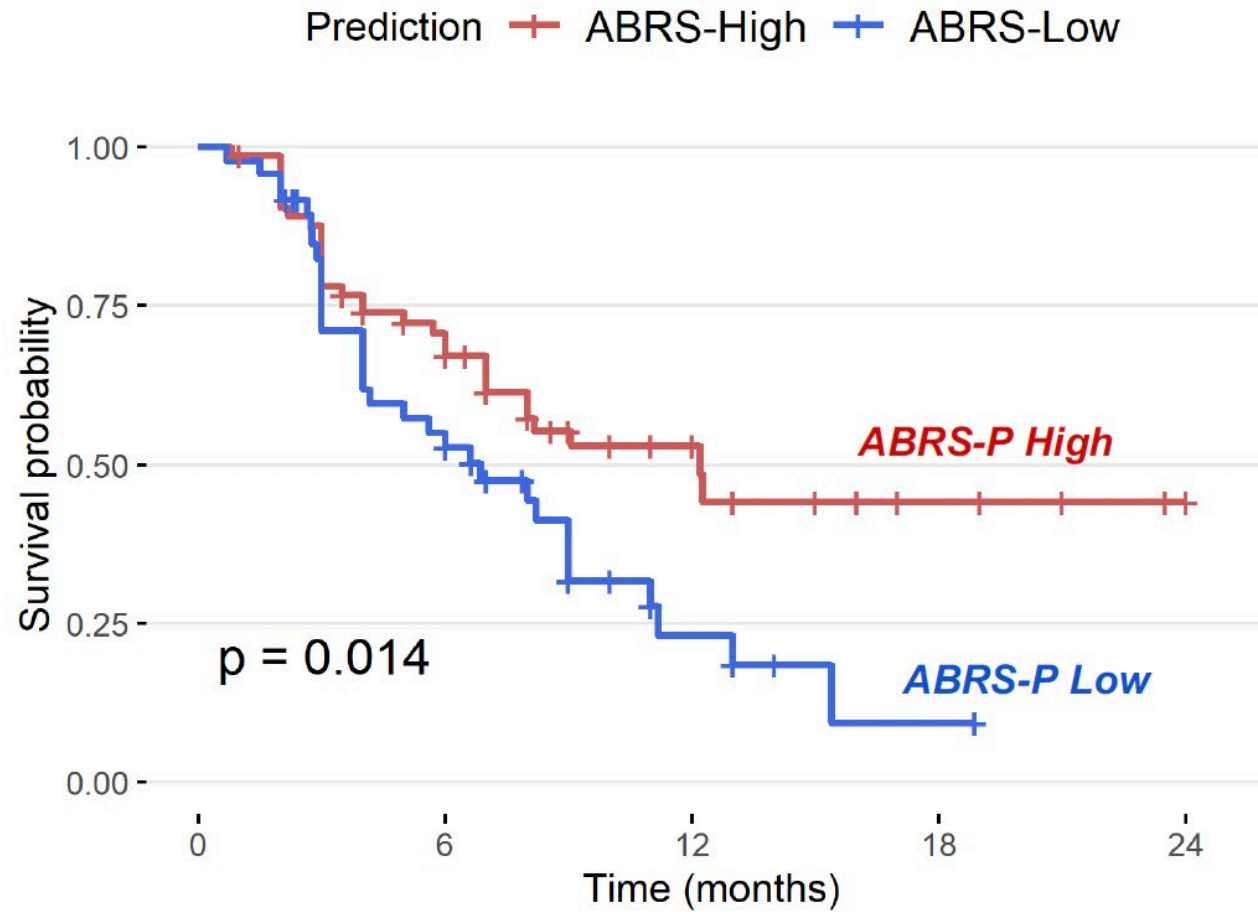


Hematein-and-eosin



Prediction heat map

Atezolizumab-bevacizumab

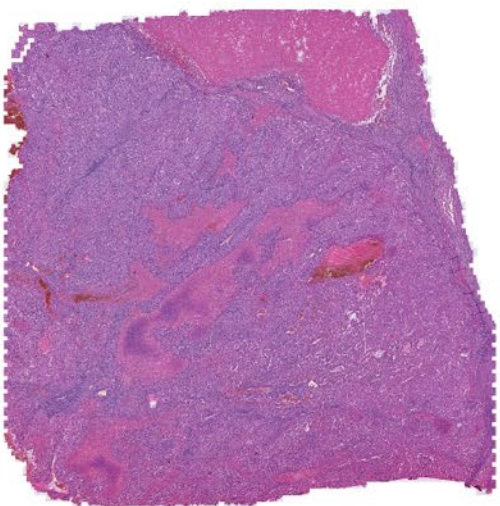


Number at risk

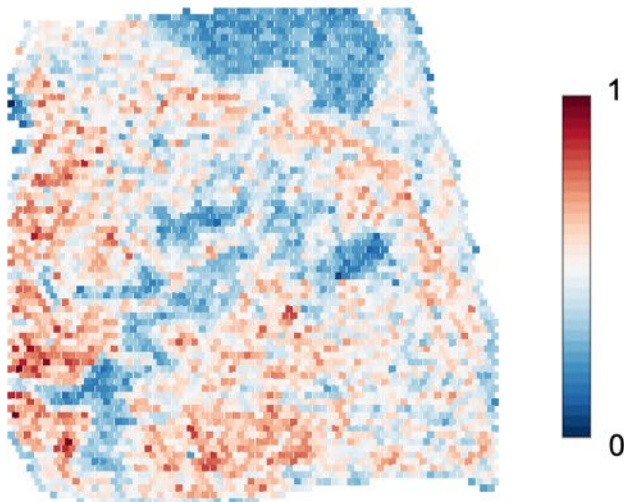
Prediction	74	41	18	5	1
	48	24	5	1	0
	0	6	12	18	24
			Time (months)		



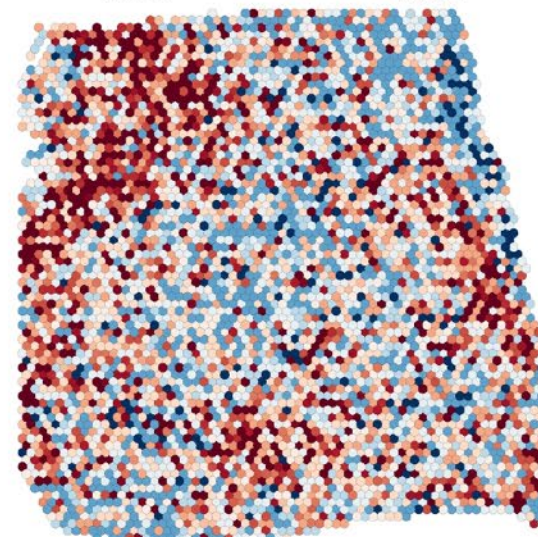
Hematein-and-eosin



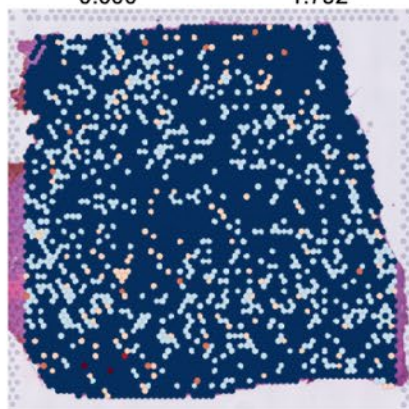
Prediction heat-map



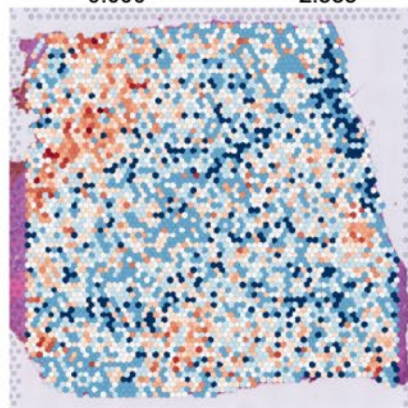
ABRS
0.000 0.374



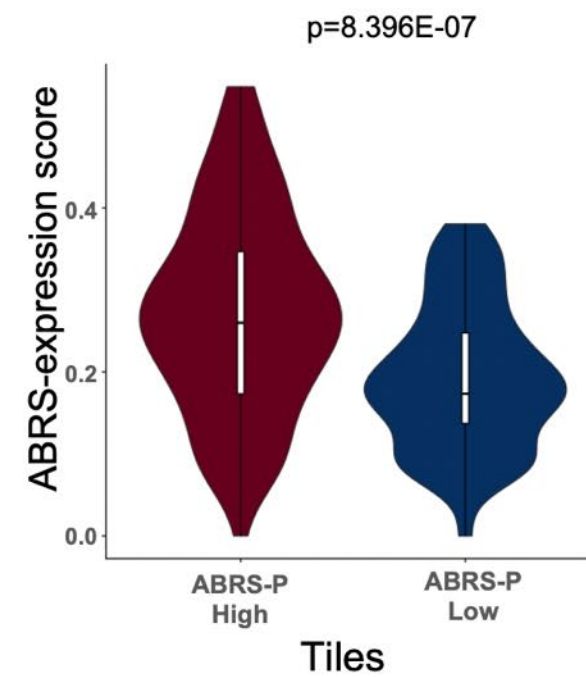
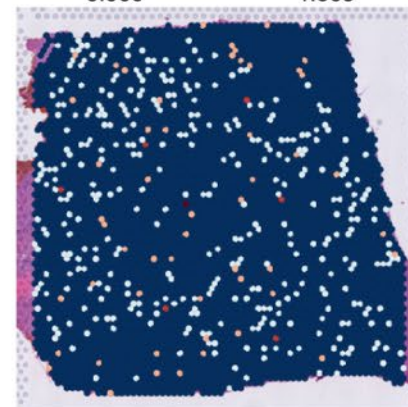
AIM2
0.000 1.792



GBP5
0.000 2.833



FCRL3
0.000 1.609



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Uncertainty-informed deep learning models enable high-confidence predictions for digital histopathology

[James M. Dolezal](#), [Andrew Srisuwananukorn](#), [Dmitry Karpeyev](#), [Siddhi Ramesh](#), [Sara Kochanny](#), [Brittany](#)

[Cody](#), [Aaron S. Mansfield](#), [Sagar Rakshit](#), [Radhika Bansal](#), [Melanie C. Bois](#), [Aarc](#)

[Schulte](#), [Everett E. Vokes](#), [Marina Chiara Garassino](#), [Aliya N. Husain](#) & [Alexandre](#)

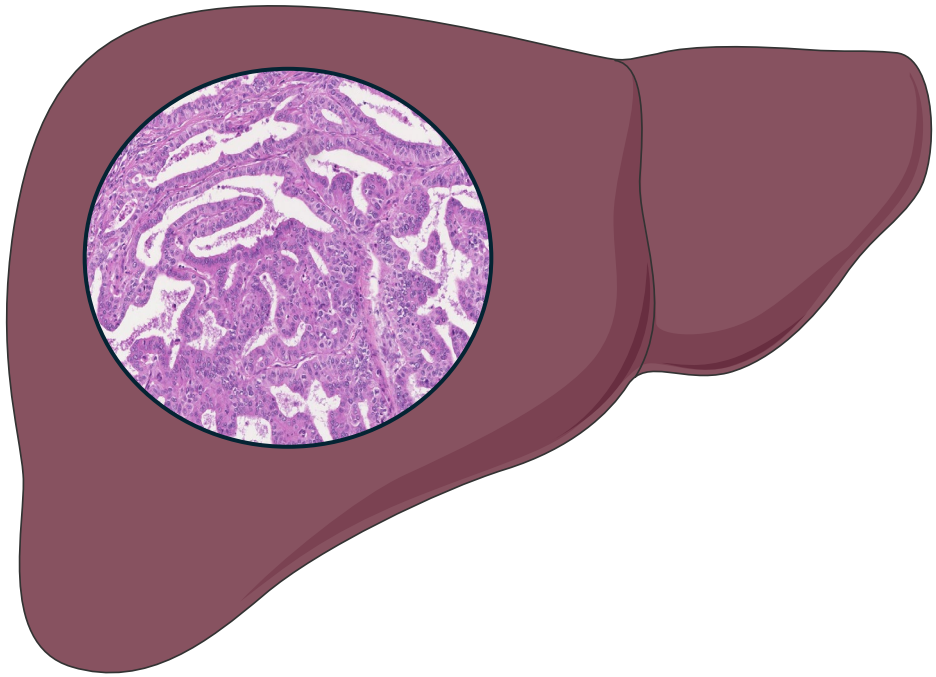


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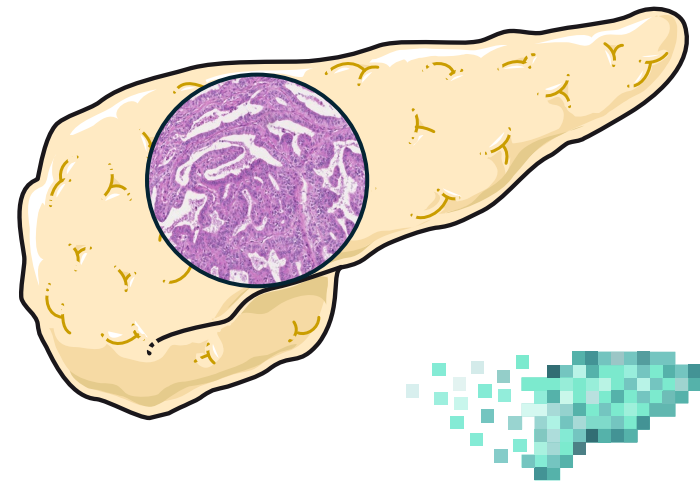
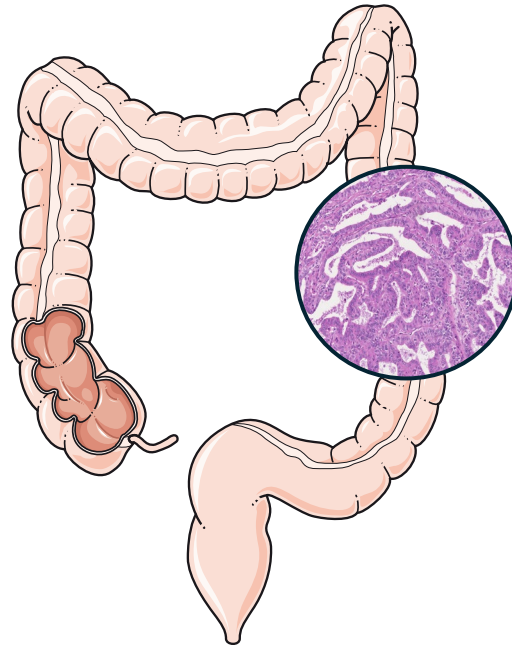
Diagnosis with confidence: deep learning for reliable classification of laryngeal dysplasia

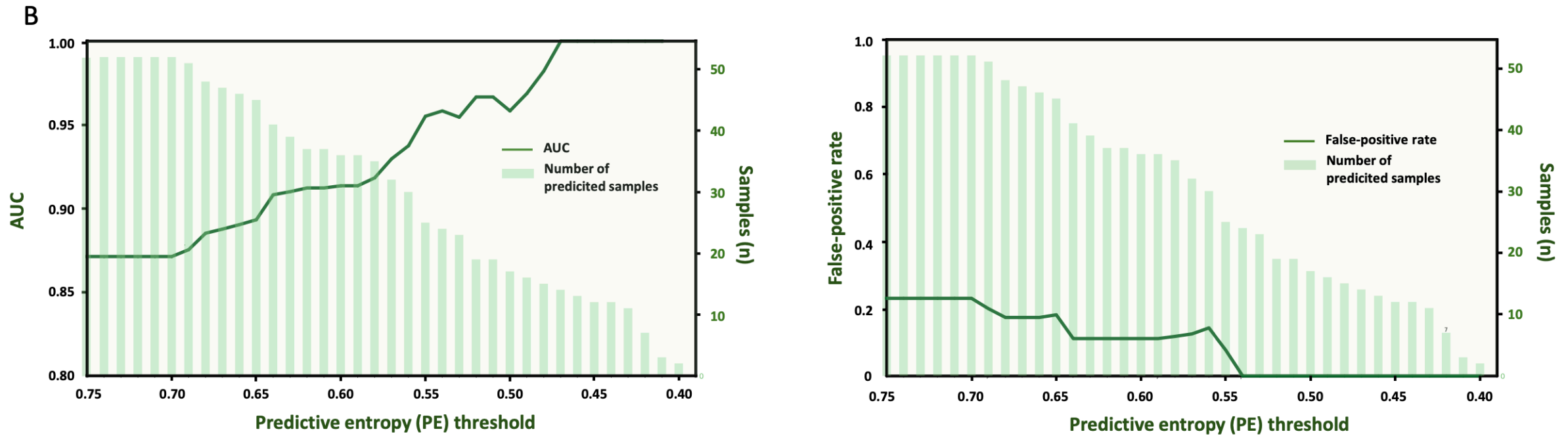
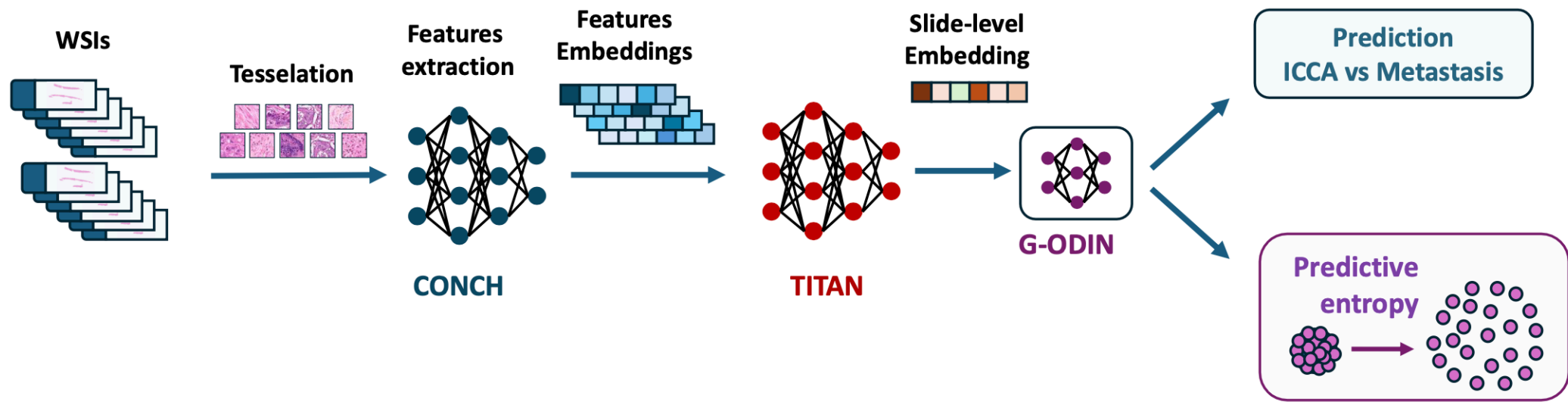
[Mélanie Lubrano](#), [Yaëlle Bellahsen-Harrar](#), [Sylvain Berlemont](#), [Sarah Atallah](#), [Emmanuelle Vaz](#), [Thomas Walter](#), [Cécile Badoual](#) 

CHOLANGIOCARCINOMA vs METASTASIS

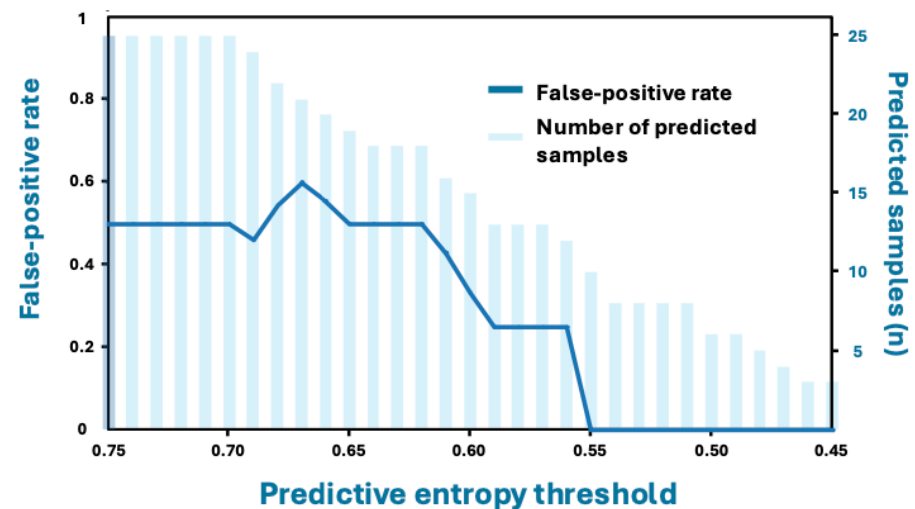
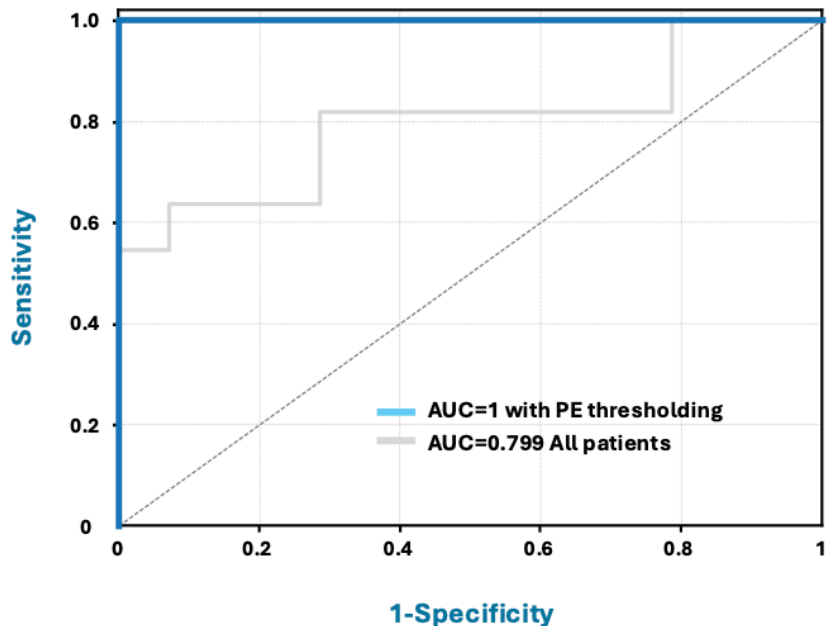


?

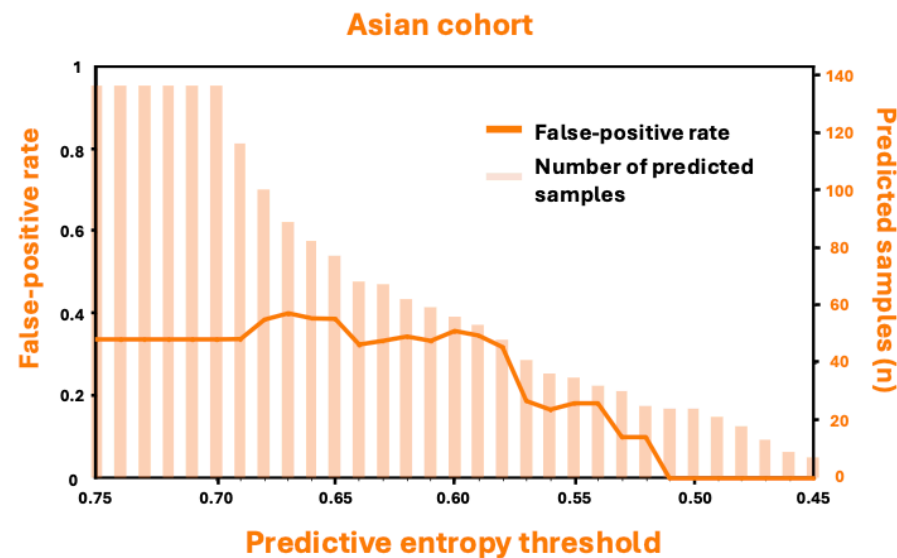
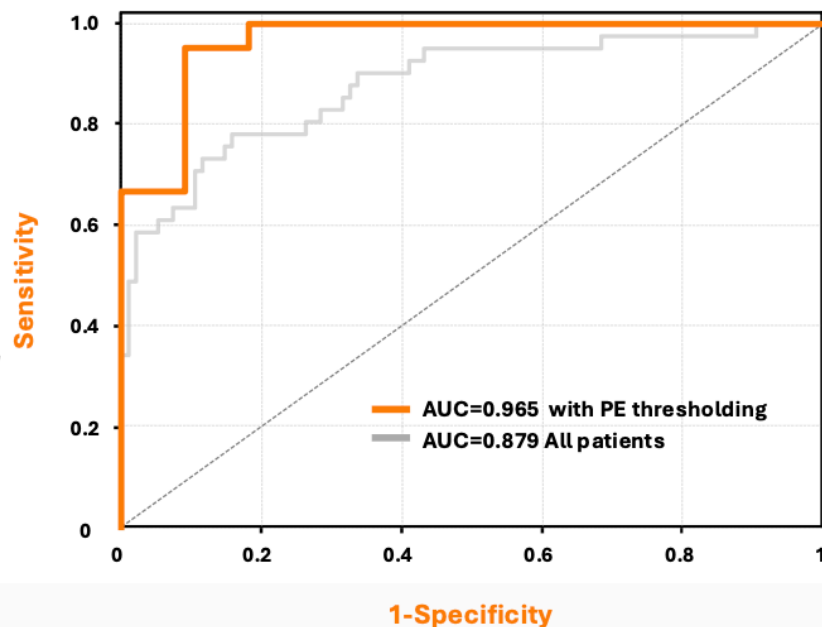
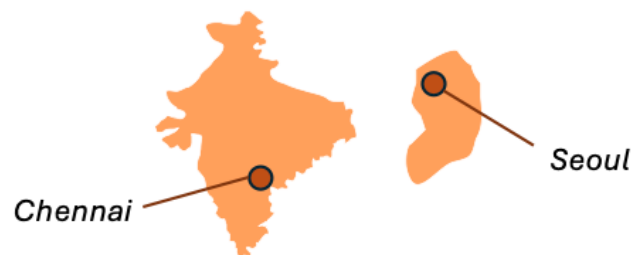




French cohort



Asian cohort

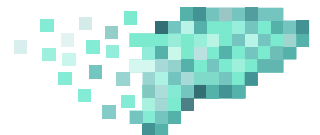


Obstacles à l'implémentation de l'IA

-Systèmes informatiques des hôpitaux++++

-Coût

-Réglementaire



Dispositifs médicaux ou tests «maisons»

FDA APPROVED



Dispositifs médicaux ou tests «maisons»

Journal of Pathology

J Pathol August 2025; **266**: 390–394

Published online 3 July 2025 in Wiley Online Library

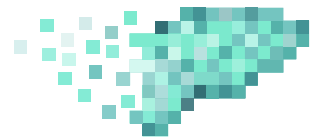
([wileyonlinelibrary.com](https://www.wileyonlinelibrary.com)) DOI: 10.1002/path.6438

PERSPECTIVE

The case for homebrew AI in diagnostic pathology

Julien Calderaro^{1,2*}, Helen Morement³, Frédérique Penault-Llorca^{4,5}, Stephen Gilbert^{6†} and Jakob Nikolas Kather^{6,7,8*†}

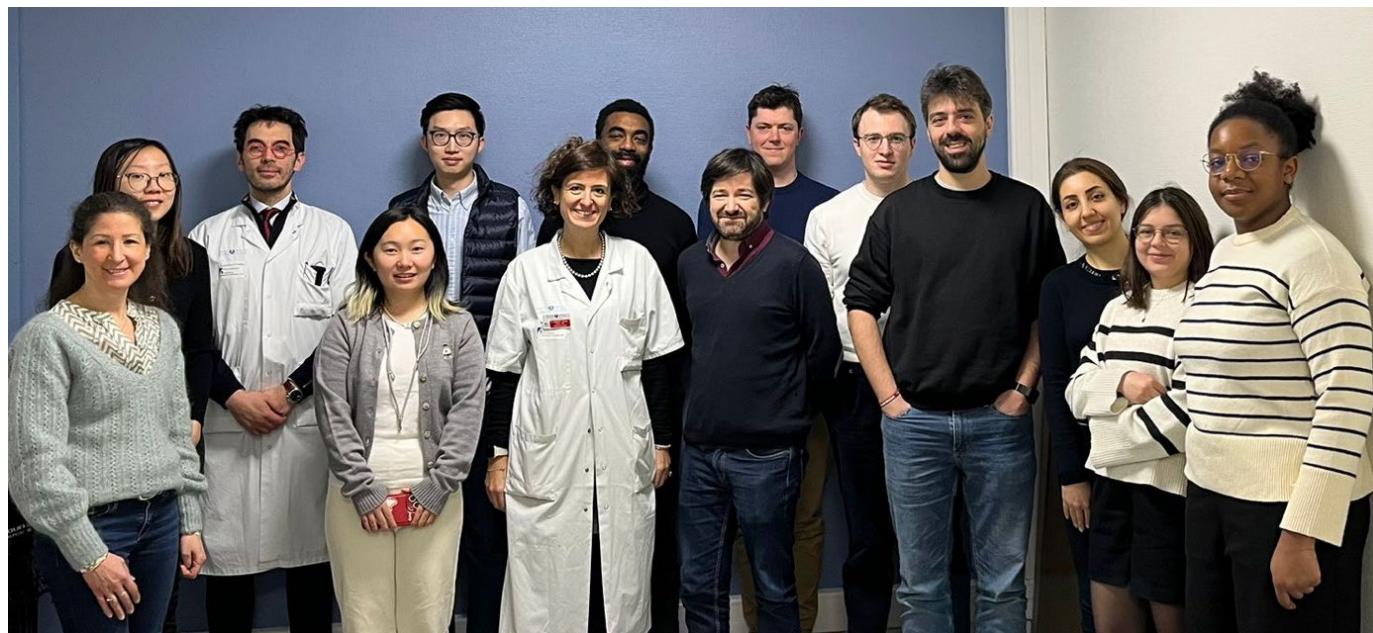
In summary, noncommercial homebrew AI systems offer substantial potential to enhance diagnostic accuracy, efficiency, and patient outcomes in digital histopathology. Recognizing that such systems are already permitted under current EU regulatory frameworks, we advocate for their advancement and integration into pathology practice. Tighter rules that





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