Breakout Session 8: Track B

Piloting a Web-Based Neuropathology Image Resource for the ADRC Community: The Brain Digital Slide Archive

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Piloting a web-based neuropathology image resource for the ADRC community

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Goals for Pilot

1) Collect sample digital slide sets from ADRC centers
2) Survey sample collection metadata
3) Customize (B)DSA to simplify neuropathology workflows
4) Demonstrate NP specific analysis integrated into the DSA

Neuropathology Data Collection Overview

The status of digital pathology and associated infrastructure within Alzheimer's Disease Centers.

Scalco R, Hamsafar Y, White CL, Schneider JA, Reichard RR, Prokop S, Perrin RJ, Nelson PT, Mooney S, Lieberman AP, Kukull WA, Kofler J, Keene CD, Kapasi A, Irwin DJ, Gutman DA, Flanagan ME, Crary JF, Chan KC, Murray ME, Dugger BN.

J Neuropathol Exp Neurol. 2023 Feb 21;82(3):202-211. doi: 10.1093/jnen/nlac127.

PMID: 36692179 **Free PMC article.**

Survey of Neuroanatomic Sampling and Staining Procedures in Alzheimer Disease Research Center Brain Banks.

Vizcarra JC, Teich AF, Dugger BN, Gutman DA; Alzheimer's Disease Research Center Digital Pathology Working Group.

Free Neuropathol. 2023 Apr 13;4:4-6. doi: 10.17879/freeneuropathology-2023-4696. eCollection 2023 Jan.

PMID: 37347036 **Free PMC article.**

Image Viz: What We Had

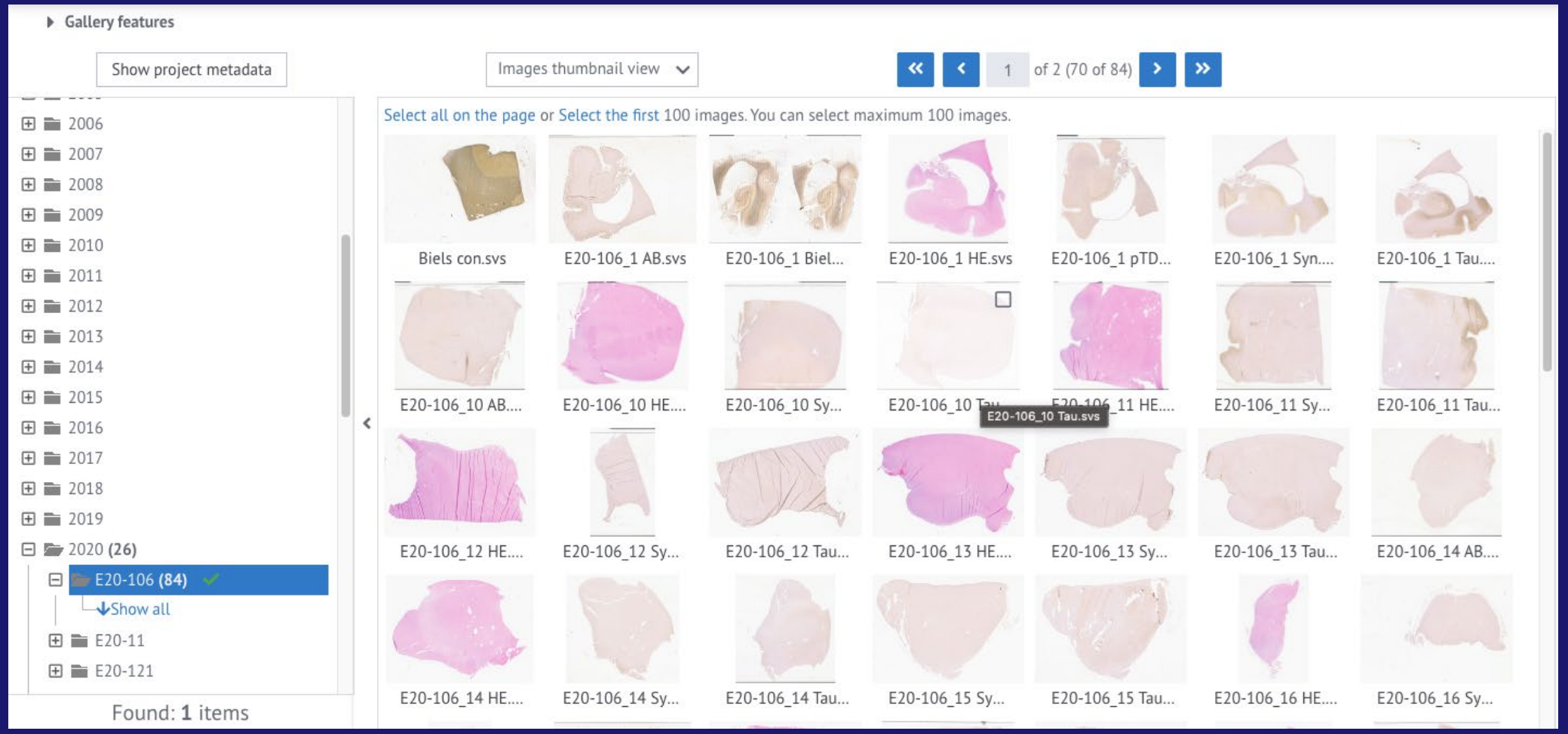


Image Viz: Metadata Driven Views

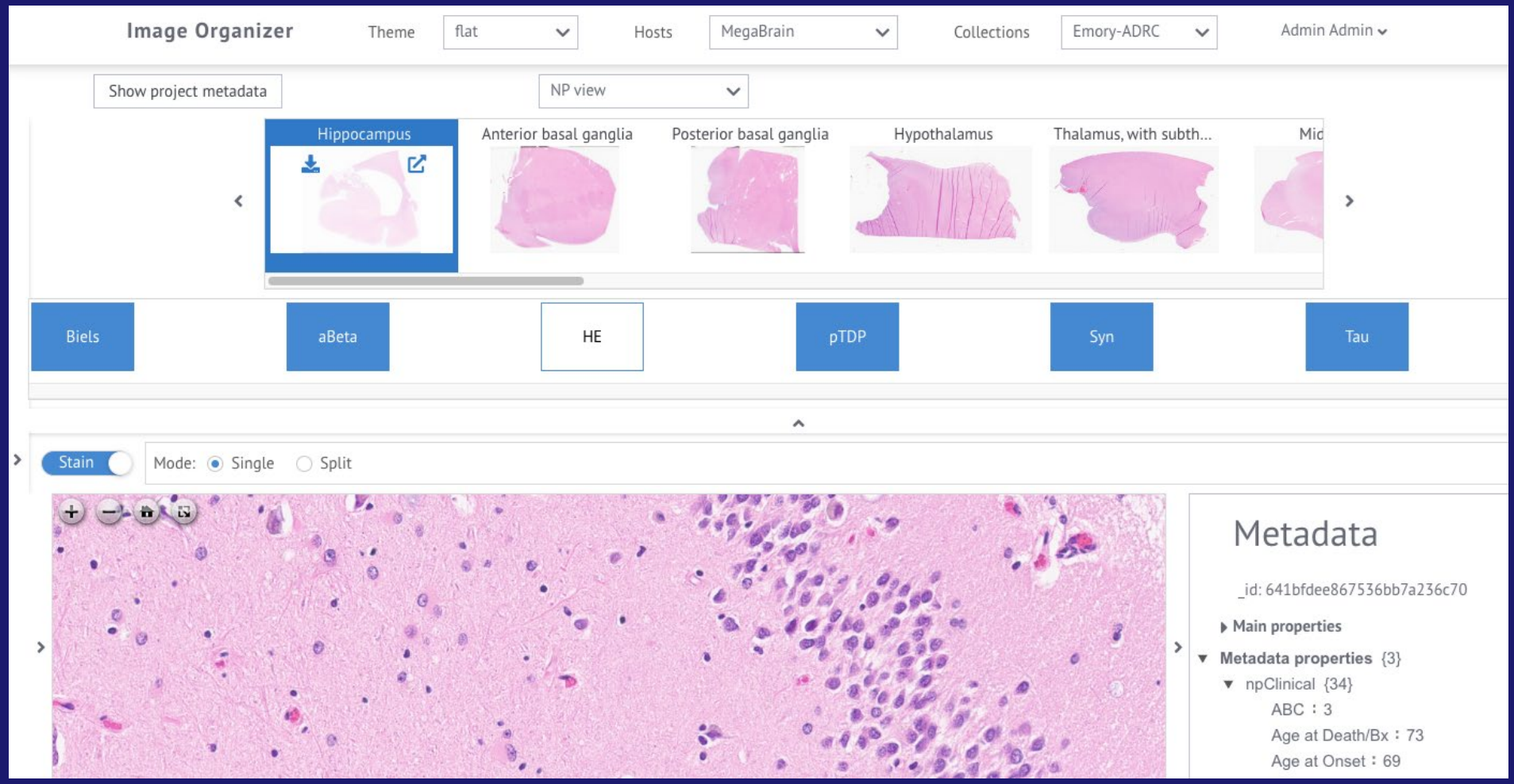
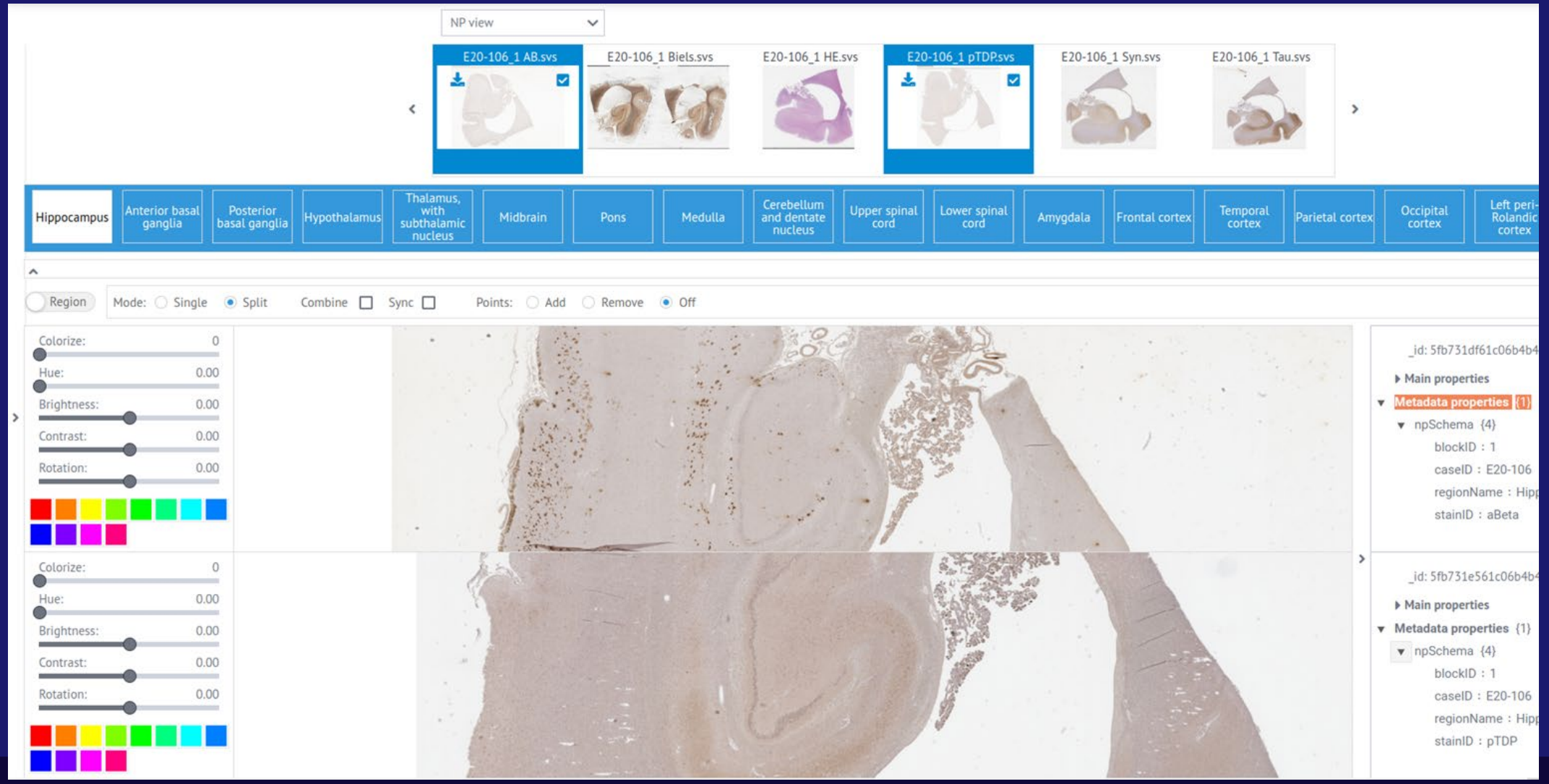
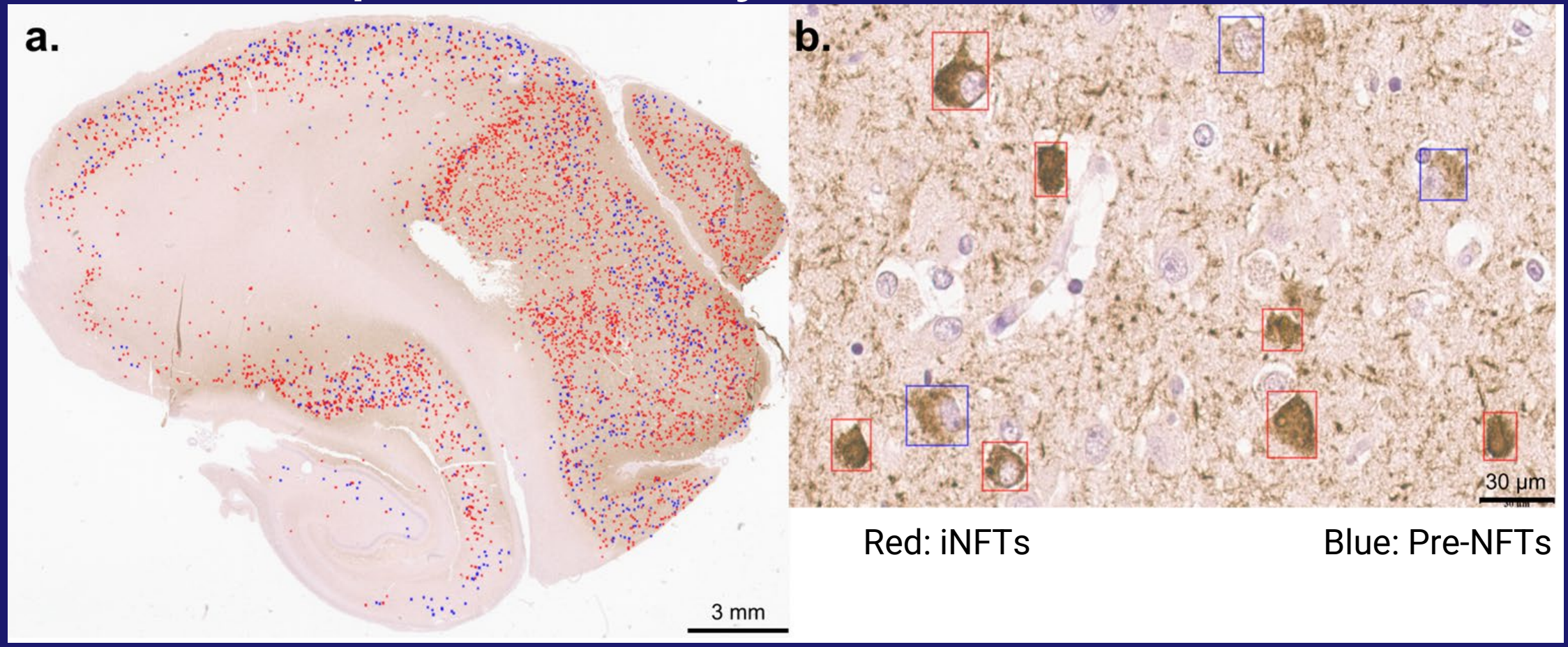


Image Registration / Overlay



Packaging Algorithms for Distribution

Example NP Analysis: NFT Detection



Red: iNFTs

Blue: Pre-NFTs

WSI Inference workflow - use best YOLO model to predict on entire tissue

Toward a generalizable machine learning workflow for neurodegenerative disease staging with focus on neurofibrillary tangles.

Vizcarra JC, Pearce TM, Dugger BN, Keiser MJ, Gearing M, Crary JF, Kiely EJ, Morris M, White B, Glass JD, Farrell K, Gutman DA.

Acta Neuropathol Commun. 2023 Dec 18;11(1):202. doi: 10.1186/s40478-023-01691-x.

PMID: 38110981 **Free PMC article.**

Challenges

1) Metadata harmonization is tedious
2) Generalization / validation of algorithms across sites
3) Data Storage and Compute Resources

Future Work

1. Received U24 to develop federated version of BDSA
2. Algorithm and UI enhancements for Human-In-The-Loop AI workflows
3. Improved / More Flexible Job Execution Pipelines