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THE SCIENCE THAT ADVANCES PATHOLOGY

ABSTRACTS (85-273)

BREAST PATHOLOGY

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MARCH 23-28, 2024 | BALTIMORE, MD

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213 Improving Interoperability in Digital HER2 FISH Enumeration – A Pilot Evaluation

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Disclosures: Alma Sanchez-Salazar: None; Ruben Alvarado: None; Rabiu Ibraheem: None; Cristina Steele: *Employee* - Applied Spectral Imaging; Dan Walker: *Employee* - 10x Genomics; Motic Digital Pathology; Yael Glickman: *Employee* - Applied Spectral Imaging

Background: Digital side-by-side registration of H&E or IHC slide with HER2 FISH specimen allows to specifically target tumor regions with highest protein expression when selecting areas for high magnification scanning of the FISH slide. While this workflow was established when performed on the same scanning platform in the FISH lab, the goal of the present evaluation was to assess the feasibility to reuse the digital region of interest marked by the pathologist on a brightfield image while requesting FISH.

Design: Core biopsy specimens from breast cancer patients were included in this evaluation. H&E and HER2 IHC slides were scanned with MoticEasyScan Infinity at 40X resolution (0.26 um/px). Slides were examined by certified pathologists using both conventional microscopy and digitalized imaging. FISH was requested in case of equivocal reporting, and analysis was performed manually. The FISH slides were then scanned and analyzed using the PathFusion system (Applied Spectral Imaging). The brightfield images acquired on the MoticEasyScan and marked by the pathologist when requesting FISH were retrieved and registered to the FISH images acquired in the FISH lab. Regions of interest were automatically transferred to the FISH scan (Figure 1) and frames were selected in these marked areas for scanning at high magnification (Figure 2). Results of digital FISH enumeration were compared to manual results.

Results: Twenty biopsy specimens from 20 patients were included in this evaluation. 19 samples had a diagnosis of IDC or ILC, and one of MCCD. Pathology reports indicated that HER2 IHC was positive in 4 cases, equivocal in 7 cases, negative in 9. FISH was manually performed on all equivocal cases, confirming 3 cases as HER2+ and 4 as HER2- (Table 1). FISH specimens were then scanned in the FISH lab and high magnification frames were acquired in regions of interest marked by the pathologist on the brightfield image, eliminating the need to review the FISH slide under the microscope. Comparison to manual process showed that digital FISH enumeration provided equivalent results for 6 slides. In one specimen, FISH signals were not present in tumor cells on the scanned image to provide a digital enumeration.

Table 1: Compared results of manual and computerized HER2/CEN17 FISH Amplification Ratio

Case #	Manual diagnosis	Computer-aided FISH score
1	1.1 NEG	1.1 NEG
4	1.1 NEG	1.1 NEG
5	1.0 NEG	1.3 NEG
8	1.3 NEG	1.2 NEG
10	4.9 POS	5.4 POS
17	3.8 POS	2.8 POS
18	3.5 POS	N/A*

* Not applicable because of technical difficulties related to fading fluorescent signals

Figure 1 - 213

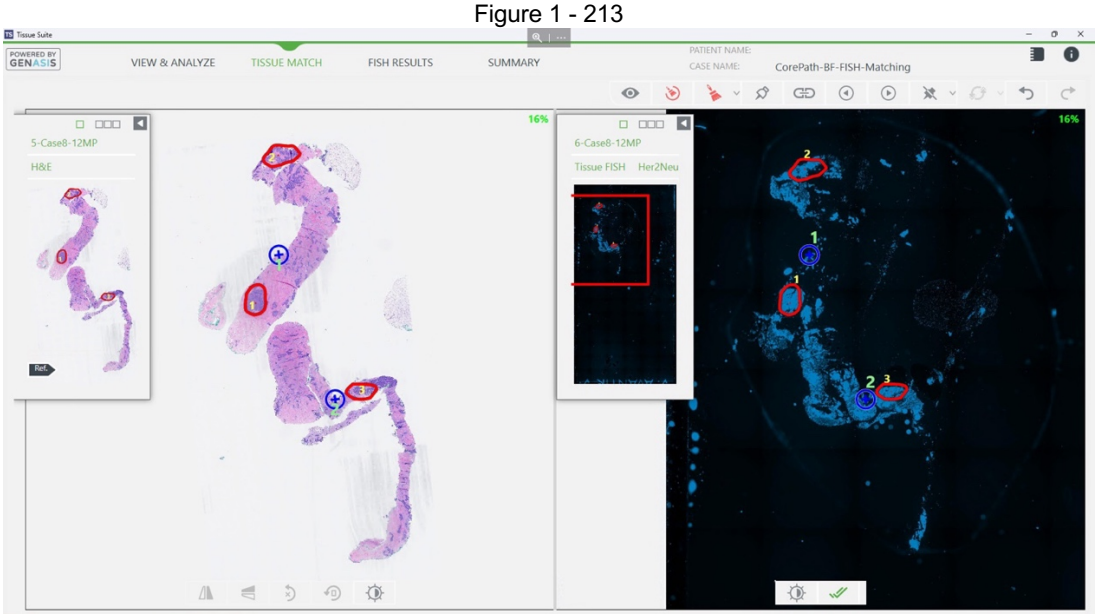
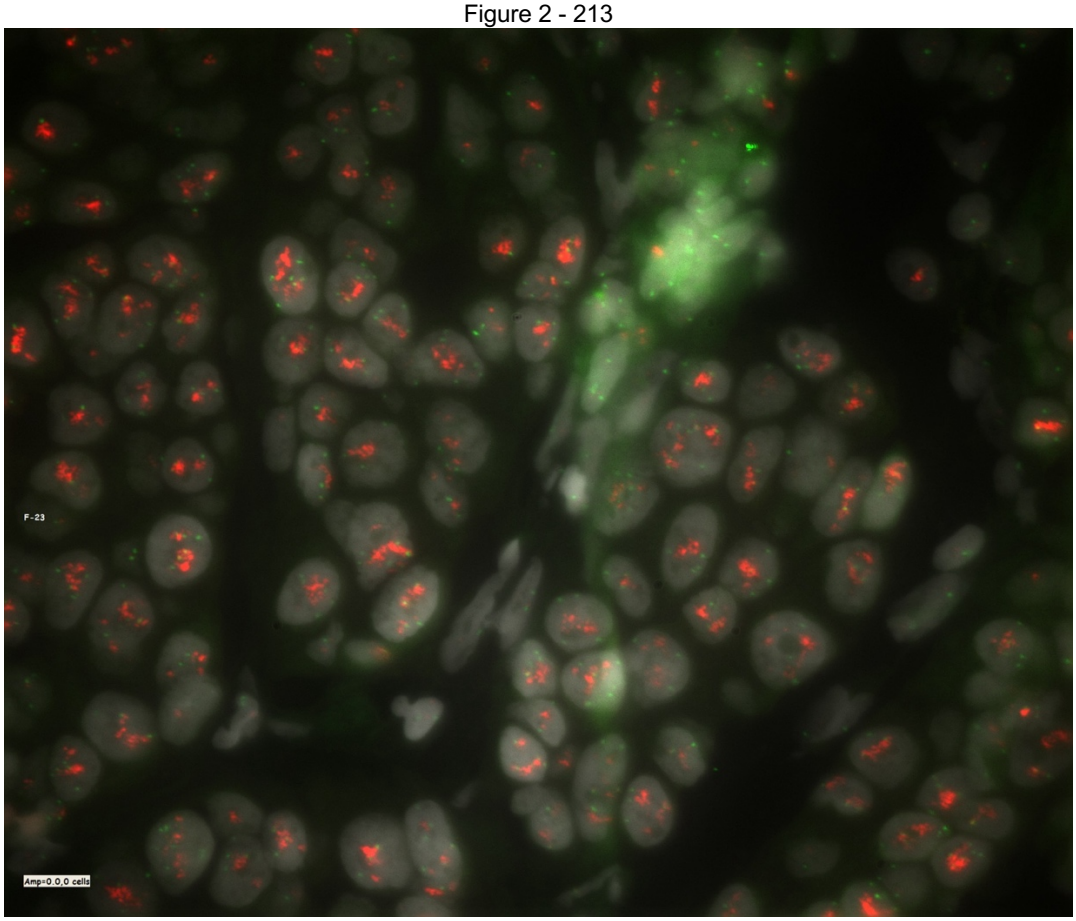


Figure 2 - 213



Conclusions: Interoperability in digital FISH enumeration allows to reuse regions of interest marked by the pathologist on the H&E or IHC image when requesting FISH. This integrated workflow is envisioned to enhance both accuracy and efficiency when performing digital HER2 FISH enumeration.