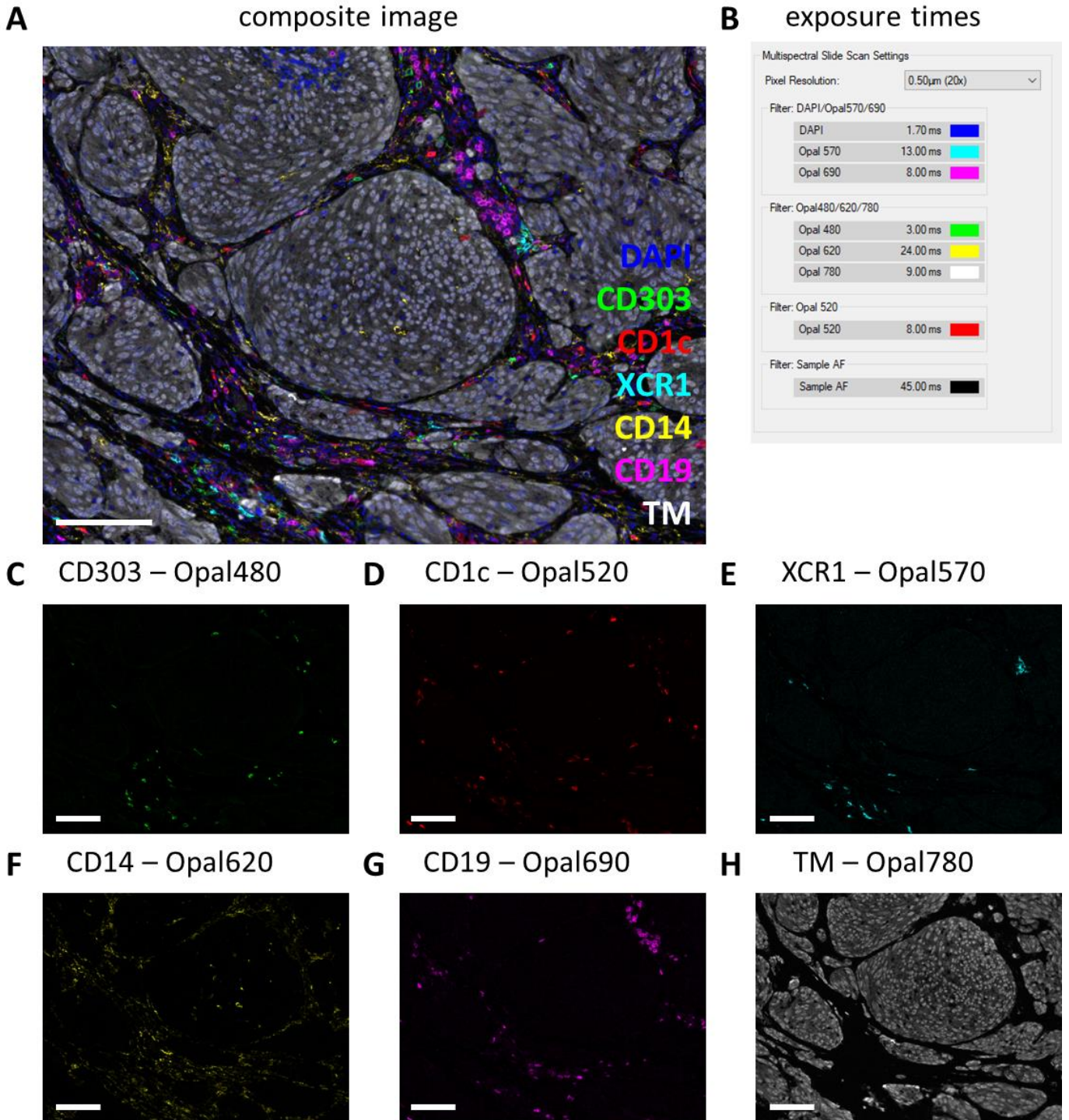
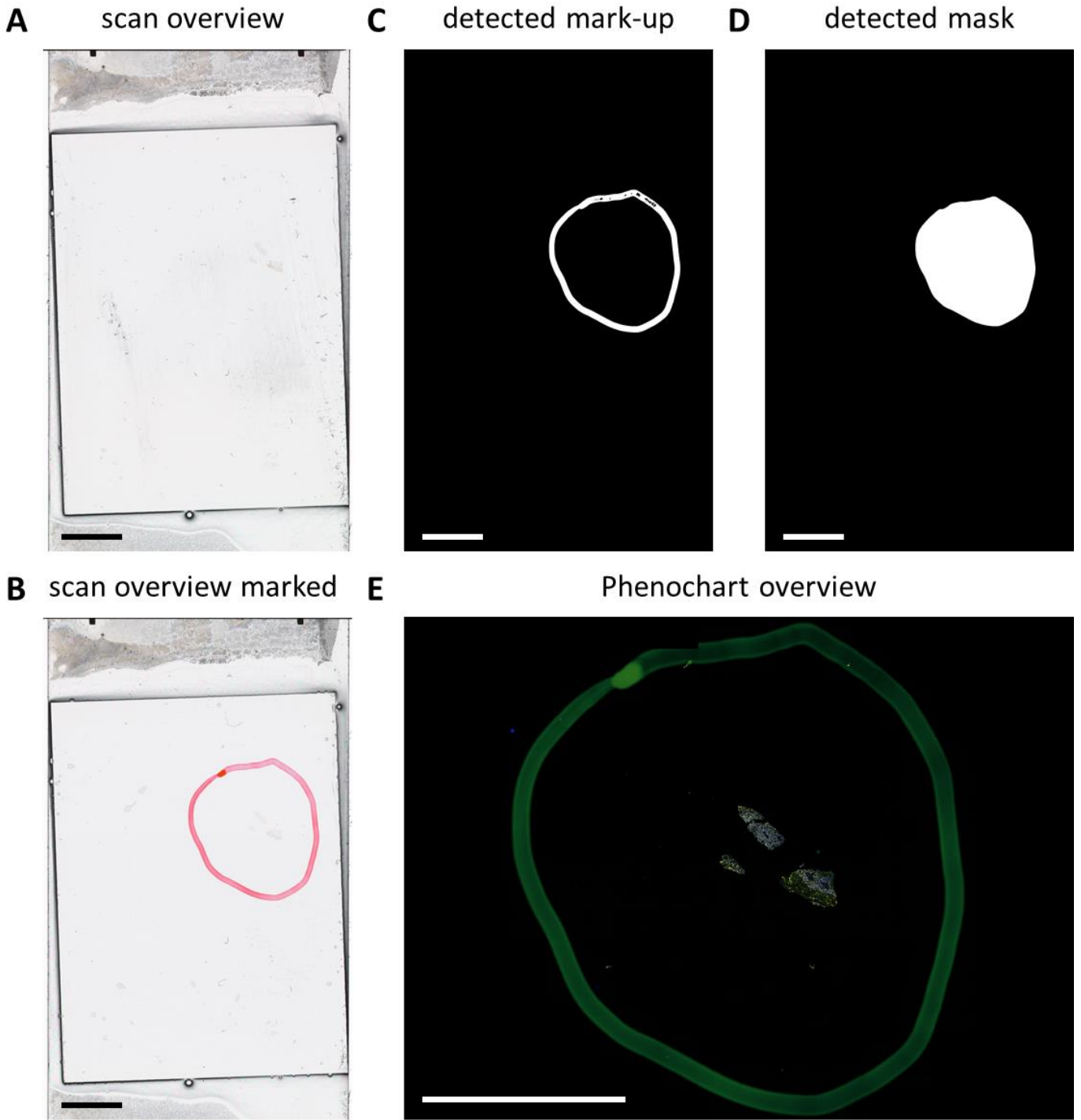


**Supplemental Figure S1: Example of successful myeloid cell panel in a melanoma tumor specimen. (A)** Composite image of multiplex IHC myeloid panel within tumor tissue. **(B)** Exposure times that were used to record this multiplex IHC sample. **(C)** CD66b – Opal 480 signal in orange. **(D)** CD163 – Opal 520 signal in cyan. **(E)** CD68 – Opal 570 signal in red. **(F)** CD14 – Opal 620 signal in yellow. **(G)** HLA-DR – Opal 690 signal in magenta. **(H)** TM – Opal 780 in white. Scale bars = 100 µm. Abbreviation: TM = tumor marker.

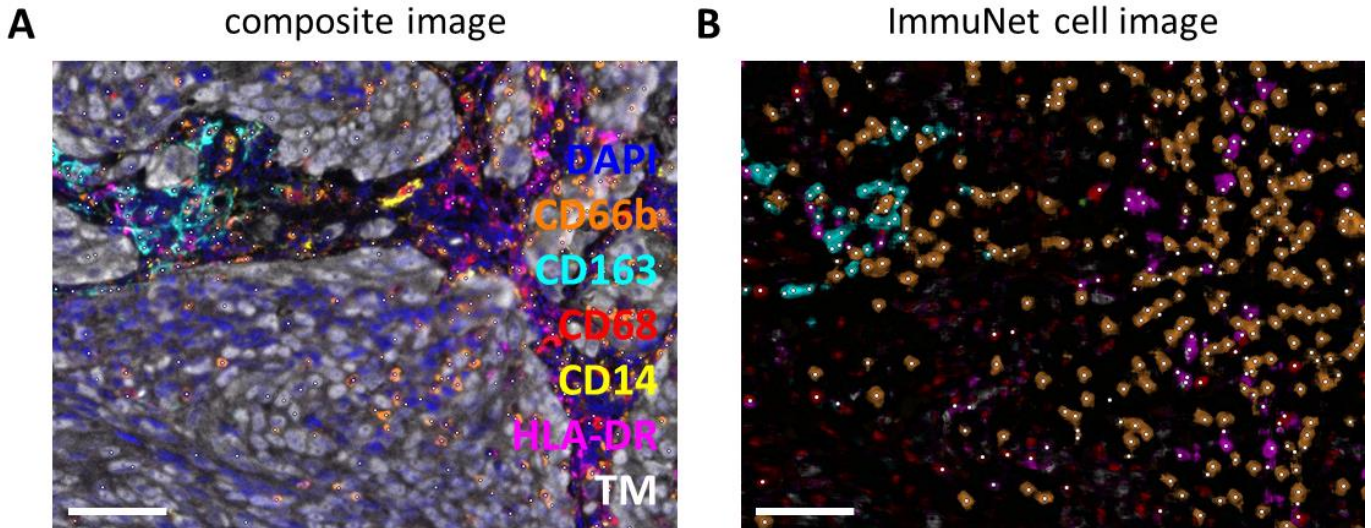


**Supplemental Figure S2: Example of successful dendritic cell panel in a melanoma tumor specimen. (A)** Composite image of multiplex IHC DC panel within tumor tissue. **(B)** Exposure times that were used to record this multiplex IHC sample. **(C)** CD303 – Opal 480 signal in green. **(D)** CD1c – Opal 520 signal in red. **(E)** XCR1 – Opal 570 signal in cyan. **(F)** CD14 – Opal 620 signal in yellow. **(G)** CD19 – Opal 690 signal in magenta. **(H)** TM – Opal 780 in white. Scale bars = 100 µm. Abbreviation: TM = tumor marker.

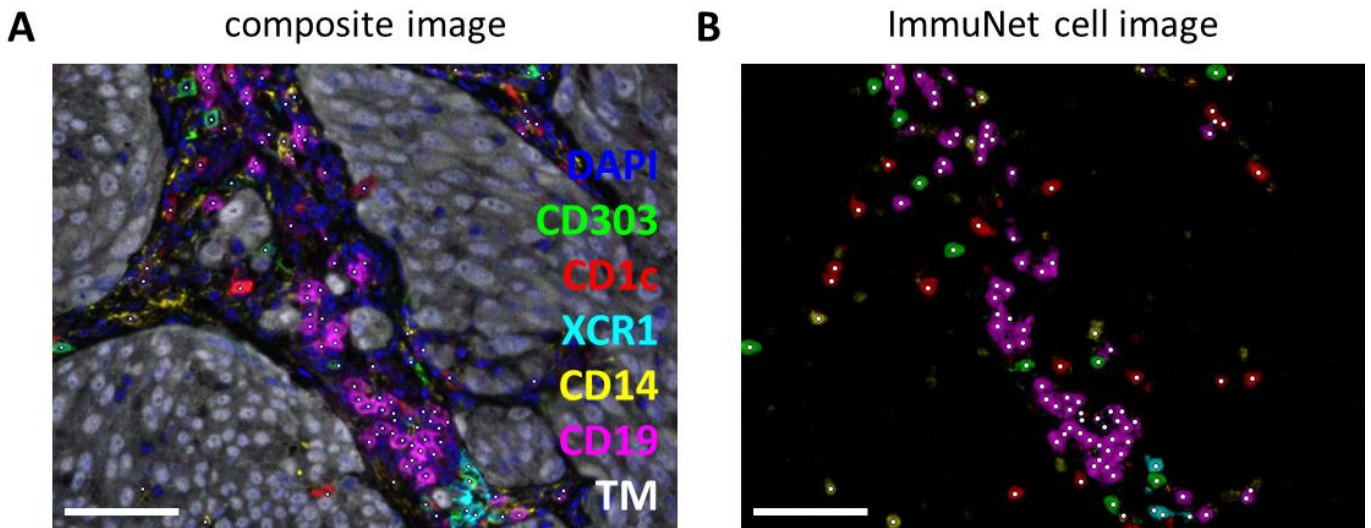




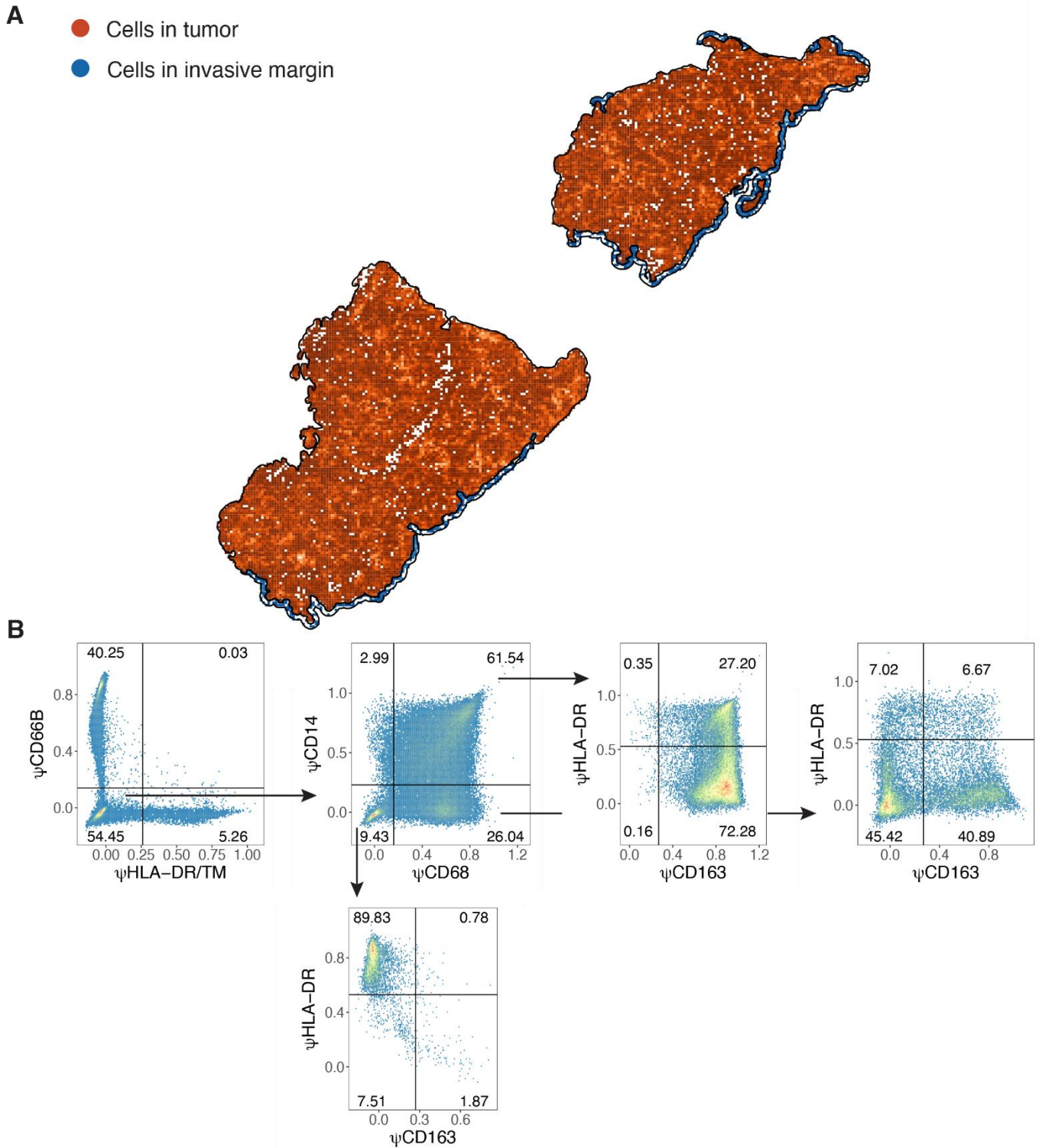
**Supplemental Figure S3: Marking slides in case of scanning failure.** (A) Scan overview of a slide that was not recognized to contain tissue. (B) Scan overview of a slide that was not recognized to contain tissue after marking the slide with a red marker. (C) Marking detected by the digital imager. (D) A mask is detected for the scanning of that area. (E) The small biopsy tissue is now successfully detected and scanned by the imager. Scale bars = 5 mm.



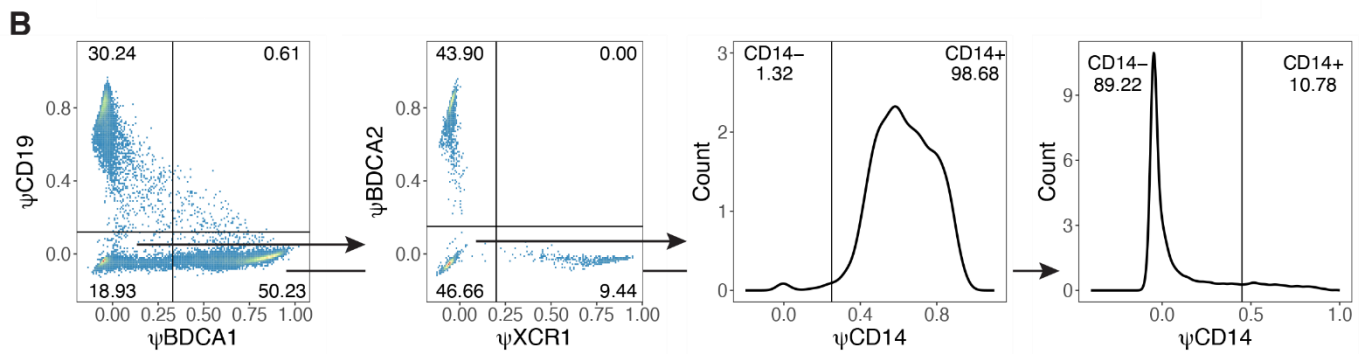
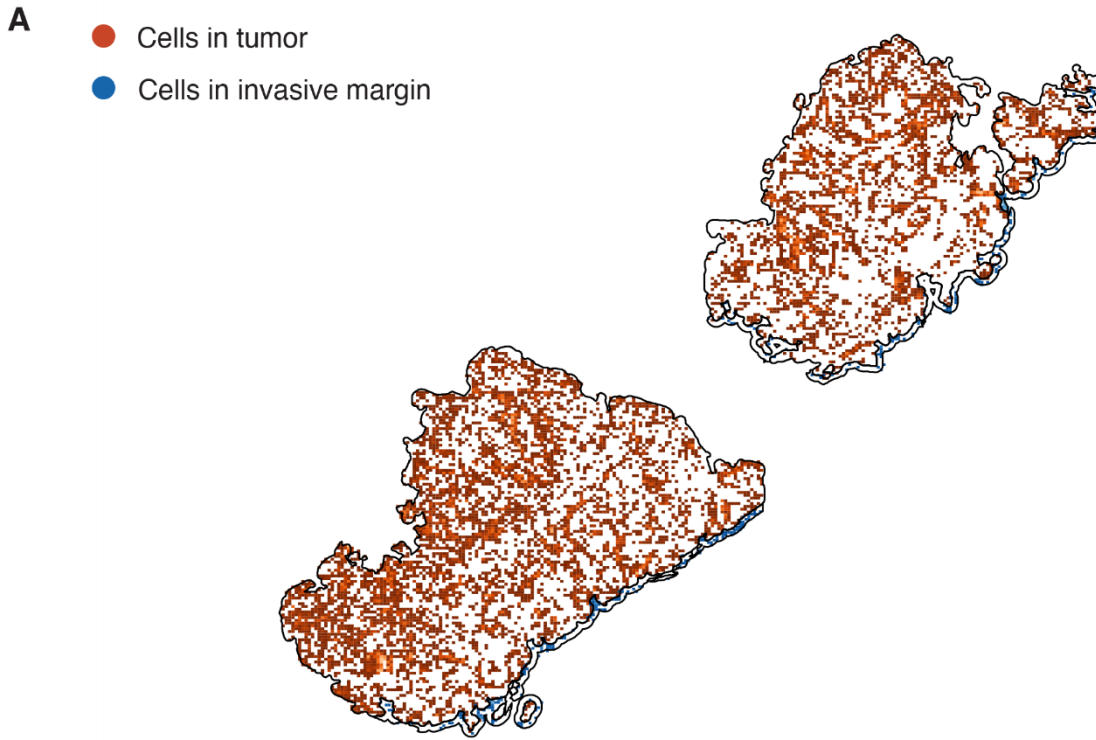
**Supplemental Figure S4: Myeloid cells recognized by ImmuNet.** (A) Composite image of **Supplemental Figure 1A** showing cells with white dots recognized by ImmuNet. (B) Cells recognized by ImmuNet and subsequent detected marker expression. Scale bars = 50  $\mu$ m. Abbreviation: TM = tumor marker.



**Supplemental Figure S5: Dendritic cells recognized by ImmuNet.** (A) Composite image of **Supplemental Figure 2A** showing cells with white dots recognized by ImmuNet. (B) Cells recognized by ImmuNet and subsequent detected marker expression. Scale bars = 50  $\mu$ m. Abbreviation: TM = tumor marker.



**Supplemental Figure S6: Gating strategy of myeloid panel. (A)** Myeloid cells detected by ImmuNet retain their spatial information and can be analyzed in tumor and invasive margins separately. **(B)** Detected cells are first gated on CD66b<sup>+</sup> granulocytes/PMN-MDSCs versus HLA-DR<sup>+</sup> tumor cells. The negative population is subsequently divided for CD14<sup>+</sup> and CD68<sup>+</sup> myeloid cells. Different populations are observed when gating for these markers and these different populations are further gated for CD163 and HLA-DR. Abbreviation: TM = tumor marker.



**Supplemental Figure S7: Gating strategy of DC panel. (A)** Dendritic cells detected by ImmuNet retain their spatial information and can be analyzed in tumor and invasive margins separately. **(B)** Detected cells are first gated on CD19<sup>+</sup> B cells and BDCA1<sup>+</sup> cells. The negative population is subsequently divided for XCR1<sup>+</sup> cDC1s and BDCA2<sup>+</sup> pDCs. The remaining negative population is gated for CD14<sup>+</sup> myeloid cells and this threshold for CD14 is also applied for BDCA1<sup>+</sup> cells to divide these into CD14<sup>+</sup> and CD14<sup>-</sup> cDC2s. Abbreviation: DC = dendritic cell.