

(A)

	Tumor cell segmentation model	Immune cell segmentation model
Total cases	18 with PD-L1 staining	10 with CD45 staining
Total images	40	38
Total patches	52,239	67,491
Training dataset	41,791 patches	53,993 patches
Validation dataset	5,224 patches	6,749 patches
Testing dataset	5,224 patches	6,749 patches

(B)

		Model predictions		
		Positive	Negative	
Label	Positive	34,450,252	10,320,260	Sensitivity 76.95%
	Negative	3,228,232	37,591,252	Specificity 92.09%
				Accuracy 83.84%

The tumor cell segmentation showed an overall Dice score of 83.57%.

(C)

		Model predictions		
		Positive	Negative	
Label	Positive	9,562,615	2516085	Sensitivity 95.95%
	Negative	8,425,145	129302952	Specificity 91.63%
				Accuracy 92.02%

The immune cell segmentation showed an overall Dice score of 68.42%.

(D)

Preparation of learning targets for the immune cell group	
Kernel size of blurring (SYTO16)	1
Kernel size of opening (SYTO16)	5
Kernel size of closing (SYTO16)	3
Kernel size of blurring (CD45)	5
Kernel size of opening (CD45)	5
Kernel size of closing (CD45)	1
Distance parameter	5
Overlap proportion parameter	0.6
Post-processing of masks predicted by the segmentation models	
Upscaling ratio (tumor)	2
Iterations of median blurring (tumor)	2
Downscaling ratio (tumor)	2
Component size filtering (tumor)	12800
Upscaling ratio (immune cells)	8
Iterations of median blurring (immune cells)	4
Downscaling ratio (immune cells)	8
Component size filtering (immune cells)	100
Approximation of tumor area	
Kernel size of dilation (immune cells)	21
Distance parameter	1
Overlap proportion parameter	0.2
Approximation of PD-L1 expression area	
Kernel size of blurring (SYTO16)	1
Kernel size of opening (SYTO16)	5
Kernel size of closing (SYTO16)	3
Kernel size of blurring (SP142)	5
Kernel size of opening (SP142)	1
Kernel size of closing (SP142)	5
Component size filtering (SP142)	256
Distance parameter	1
Overlap proportion parameter	0.2

(E)

	Accuracy	Sensitivity	Specificity	Dice score
Image 1	94.71%	74.27%	97.09%	74.54%
Image 2	92.15%	91.65%	92.30%	84.66%
Image 3	90.51%	73.82%	96.81%	80.27%
Image 4	72.03%	61.20%	97.14%	75.36%
Image 5	77.44%	79.39%	72.62%	83.37%
Image 6	88.96%	44.08%	94.84%	48.07%
Image 7	89.14%	61.28%	97.29%	71.86%
Image 8	94.23%	88.34%	95.37%	83.30%
Image 9	77.53%	90.91%	71.96%	70.41%
Image 10	81.54%	91.60%	65.81%	85.83%
Image 11	89.02%	92.02%	87.33%	85.80%
Image 12	91.52%	86.18%	93.98%	86.50%
Image 13	90.41%	82.34%	94.98%	86.13%
Image 14	89.24%	68.23%	96.47%	75.99%
Image 15	86.81%	79.69%	91.84%	81.00%
Image 16	76.88%	69.99%	92.02%	80.55%
Image 17	79.35%	77.17%	90.86%	86.22%
Image 18	92.23%	80.83%	97.02%	86.02%
Image 19	91.37%	86.30%	94.75%	88.90%
Image 20	67.35%	53.38%	97.80%	69.15%
Image 21	56.42%	42.76%	98.93%	59.76%
Image 22	94.05%	94.70%	93.29%	94.51%
Image 23	93.12%	95.79%	87.83%	94.88%
Image 24	94.71%	74.27%	97.09%	74.54%