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Enhancing weakly supervised learning for histopathology images by incorporating the significance ratio

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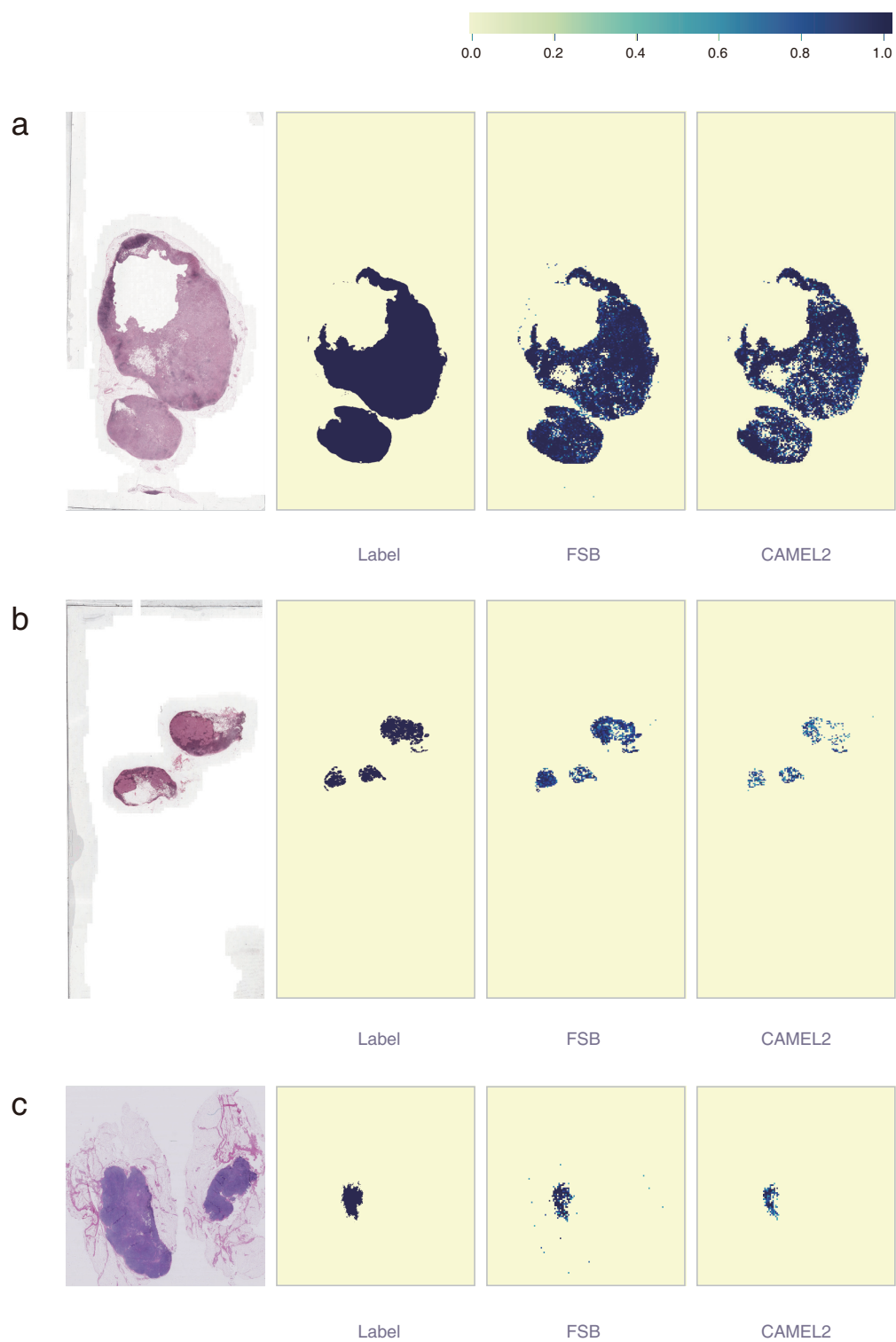


Figure S1: **Examples of low sensitivity cases from CAMEL2 with the test set of CAMELYON16.**

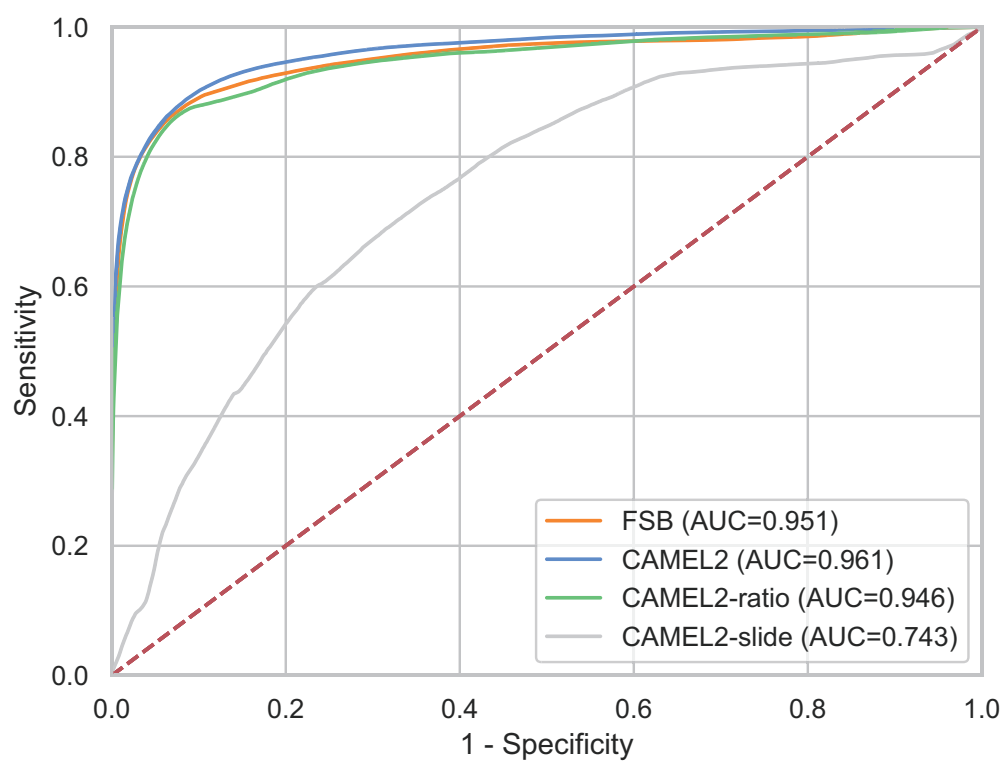


Figure S2: The ROC curve of the 320×320 patch-level binary classification results on the test set of in-house gastric cancer dataset.

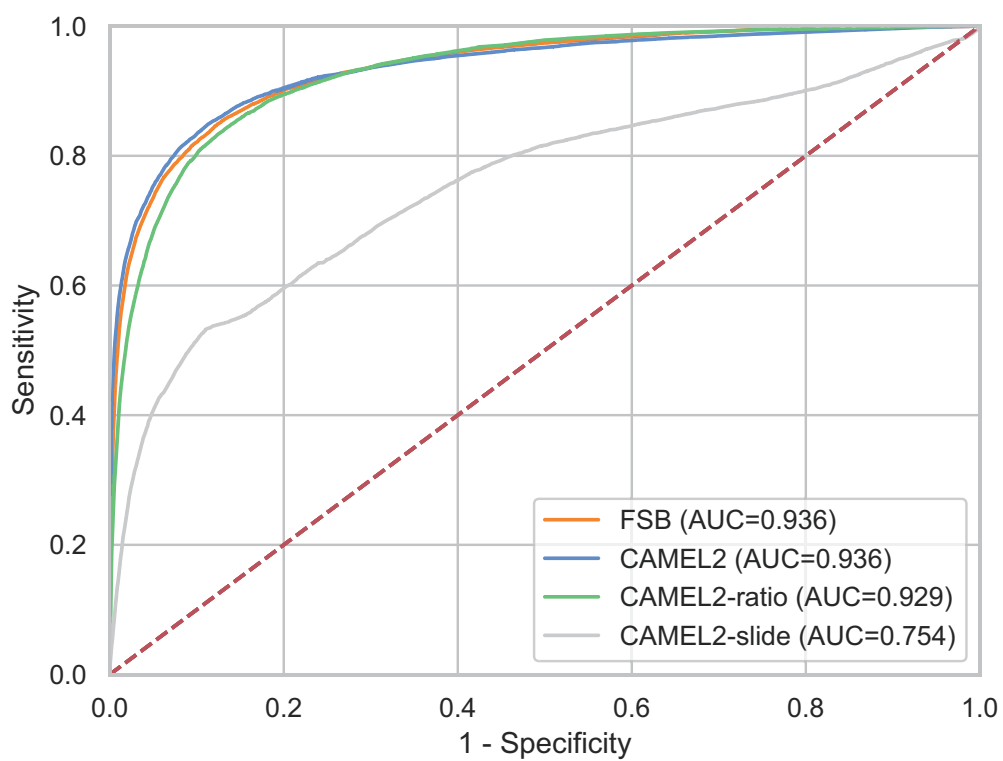


Figure S3: The ROC curve of the 320×320 patch-level binary classification results on the test set of in-house cervix cancer dataset.

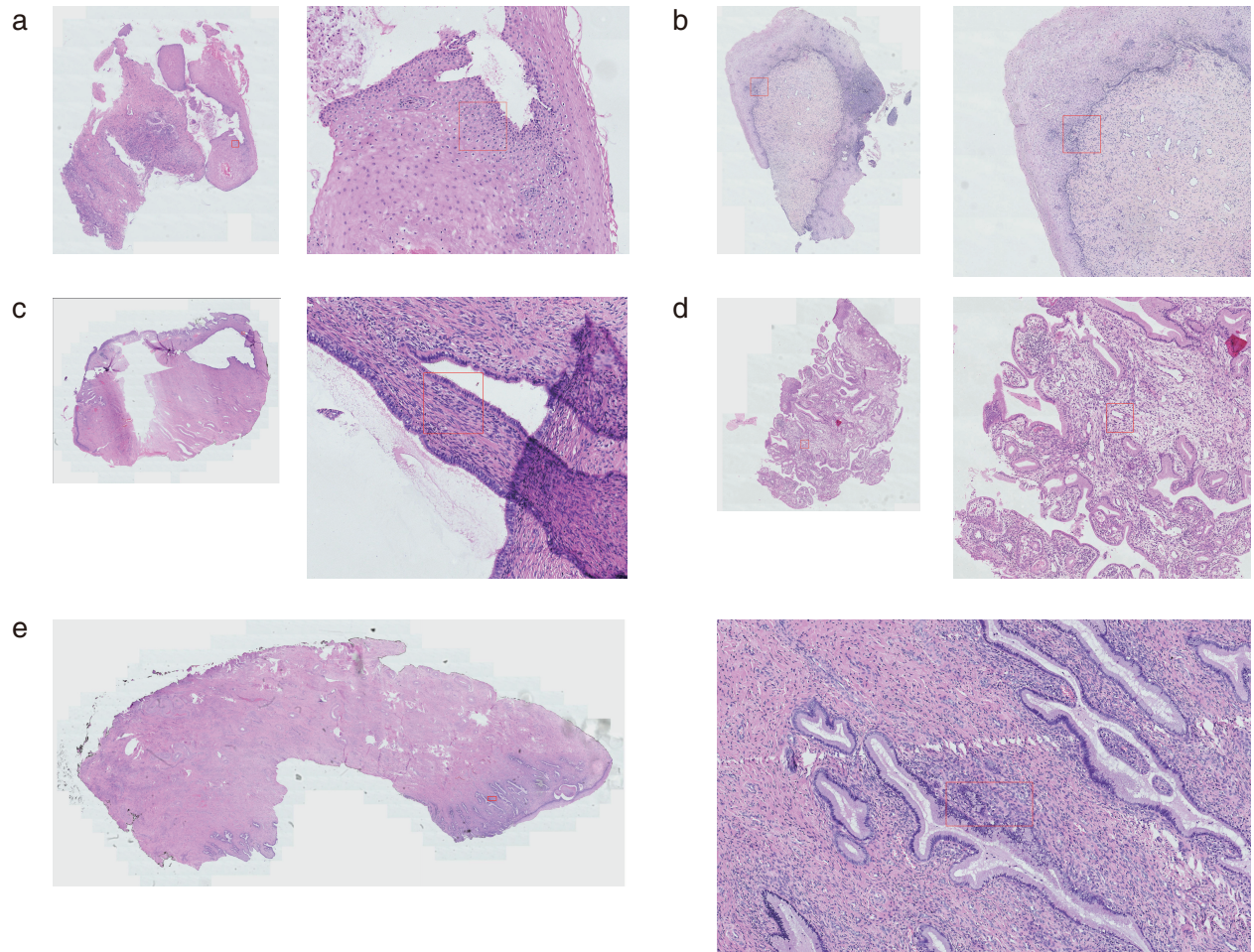


Figure S4: **Typical false positive predictions of CAMEL on the in-house cervix dataset.** **a**, Low-grade cervical squamous intraepithelial lesion. **b**, Low-grade cervical squamous intraepithelial lesion. **c**, Normal gland. **d**, Blood vessel with an irregular shape. **e**, Normal gland.

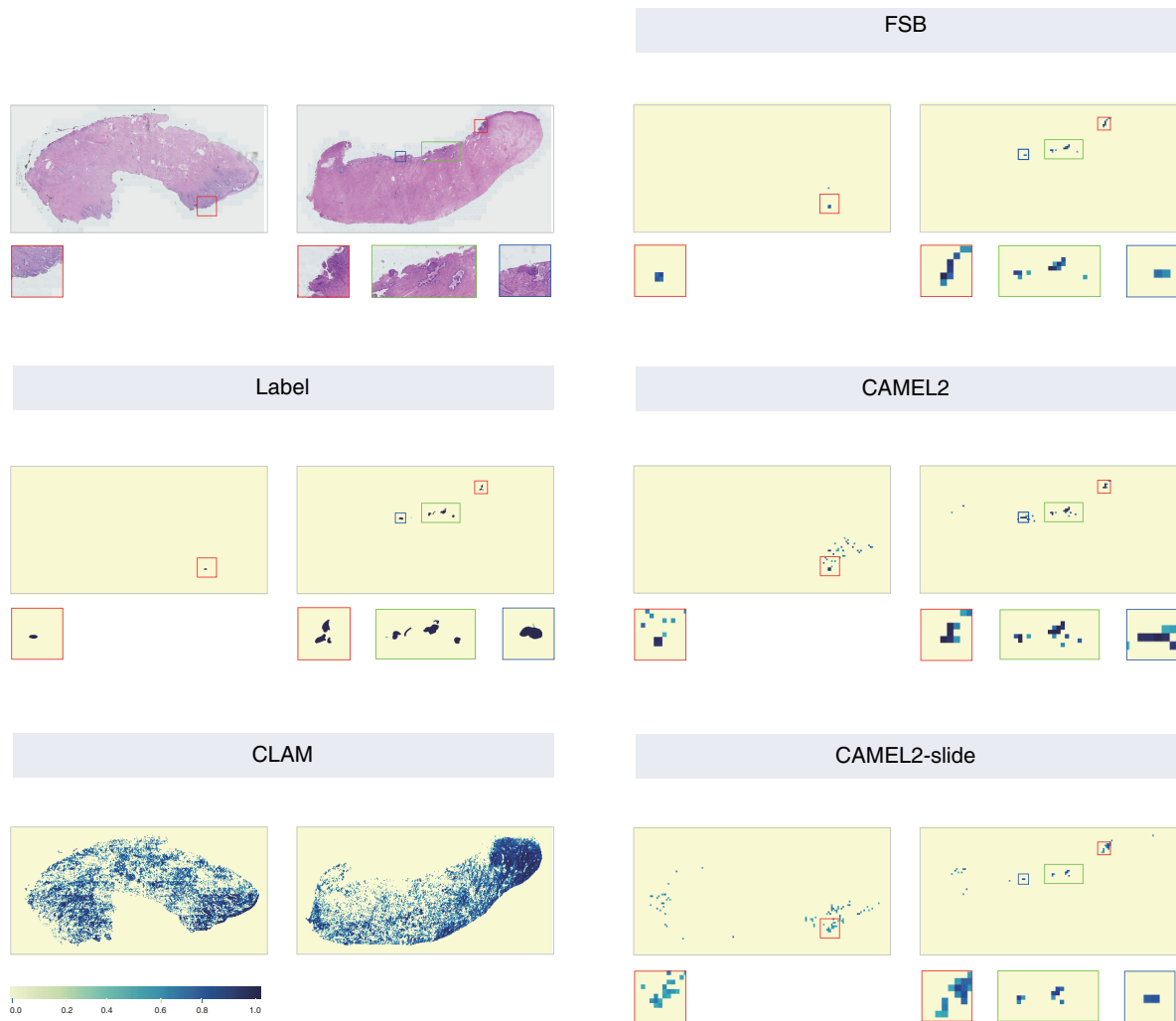


Figure S5: **Performance of different methods using test set WSIs of the cervical cancer dataset with a relatively small ratio of cancerous regions.**

Table S1: 320x320 patch-level binary classification results of different methods with the official test set of CAMELYON16.

	Sensitivity	Specificity	F1	AUC
320×320 instance-level annotation (20× magnification)				
FSB	0.838	0.996	0.869	0.972
1,280×1,280 image-level annotation (20× magnification)				
MIL	0.653	1	0.788	0.968
CAMEL2-ratio	0.826	0.997	0.873	0.966
5,120×5,120 image-level annotation (20× magnification)				
MIL	0.352	1	0.52	0.949
CAMEL2-ratio	0.747	0.998	0.831	0.979
CAMEL2-ratio wo/retrain	0.755	0.997	0.829	0.974
CAMEL2	0.737	1	0.844	0.97
CAMEL2 wo/retrain	0.735	0.999	0.839	0.969
CAMEL2 ($t = 50\%$)	0.653	0.999	0.782	0.959
Slide-level annotation (10× magnification)				
CAMEL2-slide	0.428	0.98	0.5	0.771
CAMEL2-slide ($t = 20\%$)	0.455	0.969	0.479	0.794
CAMEL2-slide ($t = 5\%$)	0.226	0.997	0.357	0.773
CAMEL2-slide w/ratio	0.485	0.996	0.625	0.874

Table S2: 320x320 patch-level binary classification results of different methods using the test set of the in-house gastric cancer dataset.

	Sensitivity	Specificity	F1	AUC
320×320 instance-level annotation (20× magnification)				
FSB	0.852	0.94	0.755	0.951
5,120×5,120 image-level annotation (20× magnification)				
CAMEL2-ratio	0.861	0.926	0.729	0.946
CAMEL2	0.636	0.995	0.76	0.961
Slide-level annotation (10× magnification)				
CAMEL2-slide	0.266	0.928	0.345	0.743

Table S3: 320x320 patch-level binary classification results of different methods with the test set of the in-house cervical cancer dataset.

	Sensitivity	Specificity	F1	AUC
320×320 instance-level annotation (20× magnification)				
FSB	0.578	0.985	0.653	0.936
5,120×5,120 image-level annotation (20× magnification)				
CAMEL2-ratio	0.741	0.931	0.563	0.929
CAMEL2	0.695	0.97	0.669	0.936
Slide-level annotation (20× magnification)				
CAMEL2-slide	0.29	0.975	0.36	0.754