

Supplementary Table 1. Classification accuracy using transfer learning with ResNet-50.

Classification Task	CNN Accuracy	Control Experiment Accuracy
Normal versus Akt ^{myr} on Glass	93.12%	50.38%
Normal versus Mek ^{DD} on Glass	94.85%	50.04%
Normal versus Ras ^{v12} on Glass	95.20%	49.77%
Normal versus Akt ^{myr} on FN ^a	91.79%	50.56%
Normal versus Mek ^{DD} on FN	93.04%	51.39%
Normal versus Ras ^{v12} on FN	96.56%	49.97%
Akt ^{myr} versus Mek ^{DD} on Glass	84.03%	48.99%
Akt ^{myr} versus Ras ^{v12} on Glass	85.71%	51.97%
Ras ^{v12} versus Mek ^{DD} on Glass	85.66%	51.21%
Akt ^{myr} versus Mek ^{DD} on FN	83.33%	52.39%
Akt ^{myr} versus Ras ^{v12} on FN	87.85%	48.97%
Ras ^{v12} versus Mek ^{DD} on FN	80.53%	49.00%
Normal ARPE19 on Glass versus on FN	70.29%	50.64%
Akt ^{myr} on Glass versus on FN	85.39%	50.50%
Mek ^{DD} on Glass versus on FN	61.34%	48.12%
Ras ^{v12} on Glass versus on FN	82.60%	52.08%
Multiclass: All ARPE19 Cell Lines on FN	79.97%	24.18%
Multiclass: All ARPE19 Cell Lines on Glass	82.18%	25.03%
MDA-MB-453 WT ^b versus SUM159PT WT	91.48%	46.47%
MDA-MB-453 Cof KD ^c versus SUM159PT Cof KD	86.62%	50.43%
MDA-MB-453 WT versus MDA-MB-453 Cof KD	81.07%	48.97%
SUM159PT WT versus SUM159PT Cof KD	81.90%	45.91%
All TNBC WT versus All TNBC Cof KD	82.20%	50.01%
MDA-MB-453 WT versus SUM159PT WT – Nuclei	76.67%	46.96%
MDA-MB-453 Cof KD versus SUM159PT Cof KD – Nuclei	62.27%	54.78%
MDA-MB-453 WT versus MDA-MB-453 Cof KD – Nuclei	67.50%	51.38%
SUM159PT WT versus SUM159PT Cof KD – Nuclei	71.43%	44.72%
All TNBC WT versus All TNBC Cof KD – Nuclei	67.60%	46.74%

^aFN = Fibronectin-coated Glass

^bWT = Wild Type

^cCof KD = Cofilin KD

Supplementary Table 2. Comparison of classification accuracy scores using the original grayscale images versus binarized cell images.

Classification Task	Original Images		Binarized Images	
	CNN Accuracy	Control Experiment Accuracy	CNN Accuracy	Control Experiment Accuracy
Normal ARPE19 versus Akt ^{myr}	91.72%	48.33%	72.89%	47.17%
Normal ARPE19 versus Mek ^{DD}	93.71%	50.15%	68.18%	50.79%
Normal ARPE19 versus Ras ^{v12}	93.91%	51.5%	68.81%	50.55%
Akt ^{myr} versus Mek ^{DD}	85.56%	50.45%	62.50%	49.83%
Akt ^{myr} versus Ras ^{v12}	87.62%	51.85%	64.19%	50.13%
Ras ^{v12} versus Mek ^{DD}	87.33%	49.42%	66.31%	50.35%
MDA-MB-453 WT versus SUM159PT WT	91.48%	46.47%	68.15%	48.86%
MDA-MB-453 Cof KD versus SUM159PT Cof KD	86.62%	50.43%	81.82%	47.39%
MDA-MB-453 WT versus MDA-MB-453 Cof KD	81.07%	48.97%	68.93%	52.08%
SUM159PT WT versus SUM159PT Cof KD	81.90%	45.91%	70.00%	50.00%
All TNBC WT versus All TNBC Cof KD	82.20%	50.01%	65.40%	49.40%