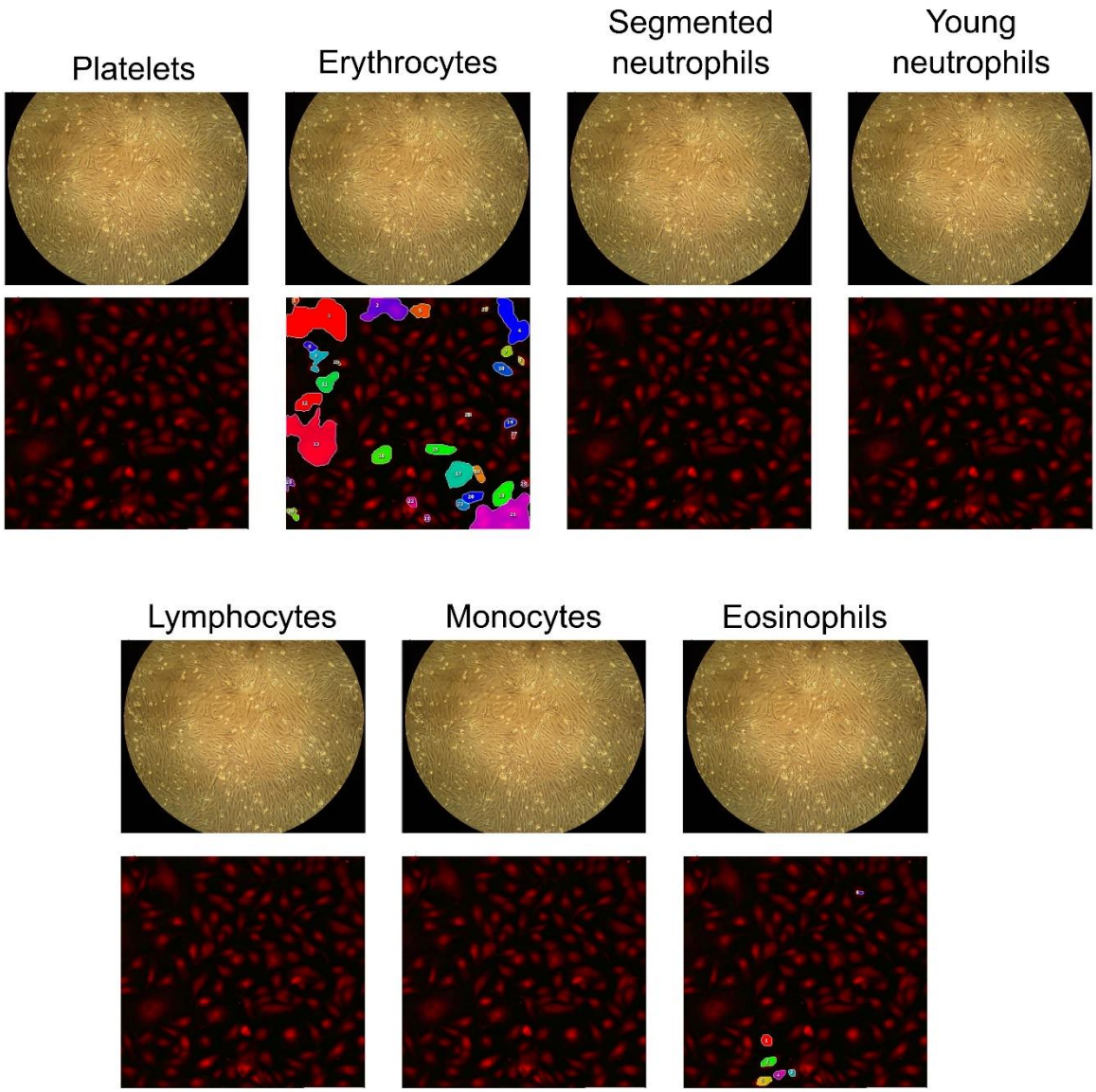

Figure S1. Control of the color-AI-trained algorithm detection on phase contrast images (top row) and fluorescence images (bottom row) of unrelated cells. The cells of the top row correspond to HUVEC cells (human umbilical vein endothelial cells) in culture. The cells in the bottom row correspond to HUVEC cells with a red fluorophore as a cytoplasmic marker. There are basically no wrong blood cell assignments in the phase contrast images and only low numbers of wrong cell recognitions in the fluorescence images (mis-identifications of erythrocytes and eosinophils). The area wrongly detected as erythrocytes corresponds to 0.5 ± 0.8 % of the total field of view. The area wrongly detected as eosinophils corresponds to 0.11 ± 0.06 % of the total field of view. It has to be stated that the AI-algorithm that we developed should be applied only to blood cell microscopy images (for which it had been built up) and not to other types of samples.
Still, the method delivers rather low numbers of errors even if applied to the wrong sample.

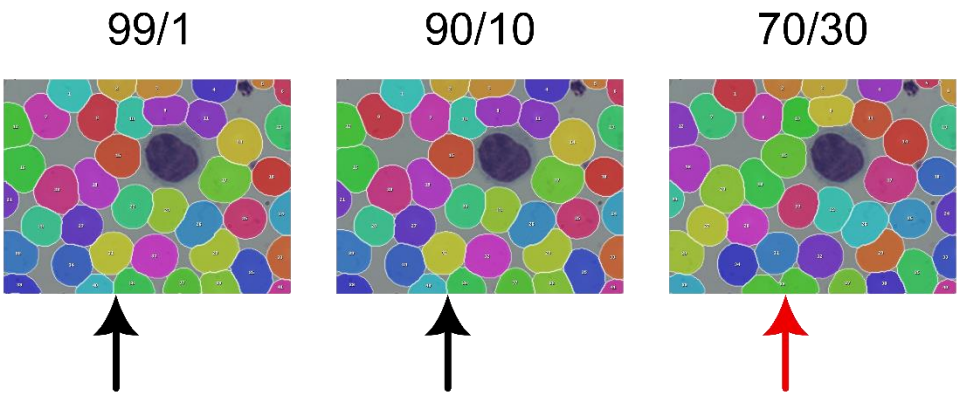

Figure S2. Example of automatic detection of erythrocytes in color images using three different algorithms – obtained with three different ratios of images for training and validation. Each column is labeled with the corresponding training/validation proportion of images used for the algorithm generation. The red arrow points to a false positive realization, which should correspond to the detection observed in the other two columns, highlighted with the black arrows.

Table S1. Statistical quantification of the observational erythrocyte-associated errors for the color-trained algorithms, using four different training/validation proportions of images

Training/Validation	Accuracy	Recall	IoU
99/1	0.998	1	0.999
90/10	0.998	1	0.999
80/20	0.998	1	0.999
70/30	0.996	0.999	0.998

Table S2. Statistical quantification of the observational errors for three color-trained algorithms using three different randomizations of images into training and validation datasets (at 80/20 ratio)

	Averages (n=3, Color)			Variation coeff [%]		
	Accuracy	Recall	IoU	Accuracy	Recall	IoU
Eosinophils	0.993	0.999	0.994	0.548	0.094	0.901
Lymphocytes	0.991	0.980	0.987	0.285	0.082	0.478
Monocytes	0.982	1.000	0.939	1.132	0.090	3.907
Neutrophils	0.987	1.000	0.986	0.908	0.007	0.956
Young neutrophils	0.530	1.000	0.097	2.712	0.080	5.585
Erythrocytes	0.993	0.998	0.993	0.389	0.236	0.639
Platelets	0.957	0.988	0.951	0.429	1.766	0.688

Table S3. Statistical quantification of the observational errors for three TDR-trained algorithms using three different randomizations of images into training and validation datasets (at 80/20 ratio)

	Averages (n=3, TDR)			Variation coeff [%]		
	Accuracy	**Recall**	**IoU**	**Accuracy**	**Recall**	**IoU**
Eosinophils	0.989	0.974	0.928	0.571977	3.725434	2.947337
Lymphocytes	0.985	0.974	0.977	0.335122	0.944707	0.460121
Monocytes	0.980	0.954	0.930	0.541903	3.897513	1.887093
Neutrophils	0.972	0.991	0.971	1.35188	1.284351	1.398302
Young neutrophils	0.952	0.956	0.844	3.85066	3.557637	5.040284
Erythrocytes	0.993	0.998	0.997	0.094914	0.216458	0.047298
Platelets	0.955	0.978	0.934	1.099722	3.230559	1.785153