Supplementary Tables

HVM device	*Video format*	*Description*	*Approximate field of view* *	*Approximate pixel pitch* *
Cytocam IDF	avi, ≤ 716 x 572 px	CCtools AVA 3.x export	0.5898 mm^2	1.2 $\mu m\ px^{-1}$
Cytocam IDF	mha, ≤ 2208 x 1648 px	CCtools 1.7.x native recording format	1.7830 mm^2	0.7 $\mu m\ px^{-1}$
Microscan SDF	avi, ≤ 716 x 572 px	AVA 3.x native recording format	0.5898 mm^2	1.2 $\mu m\ px^{-1}$

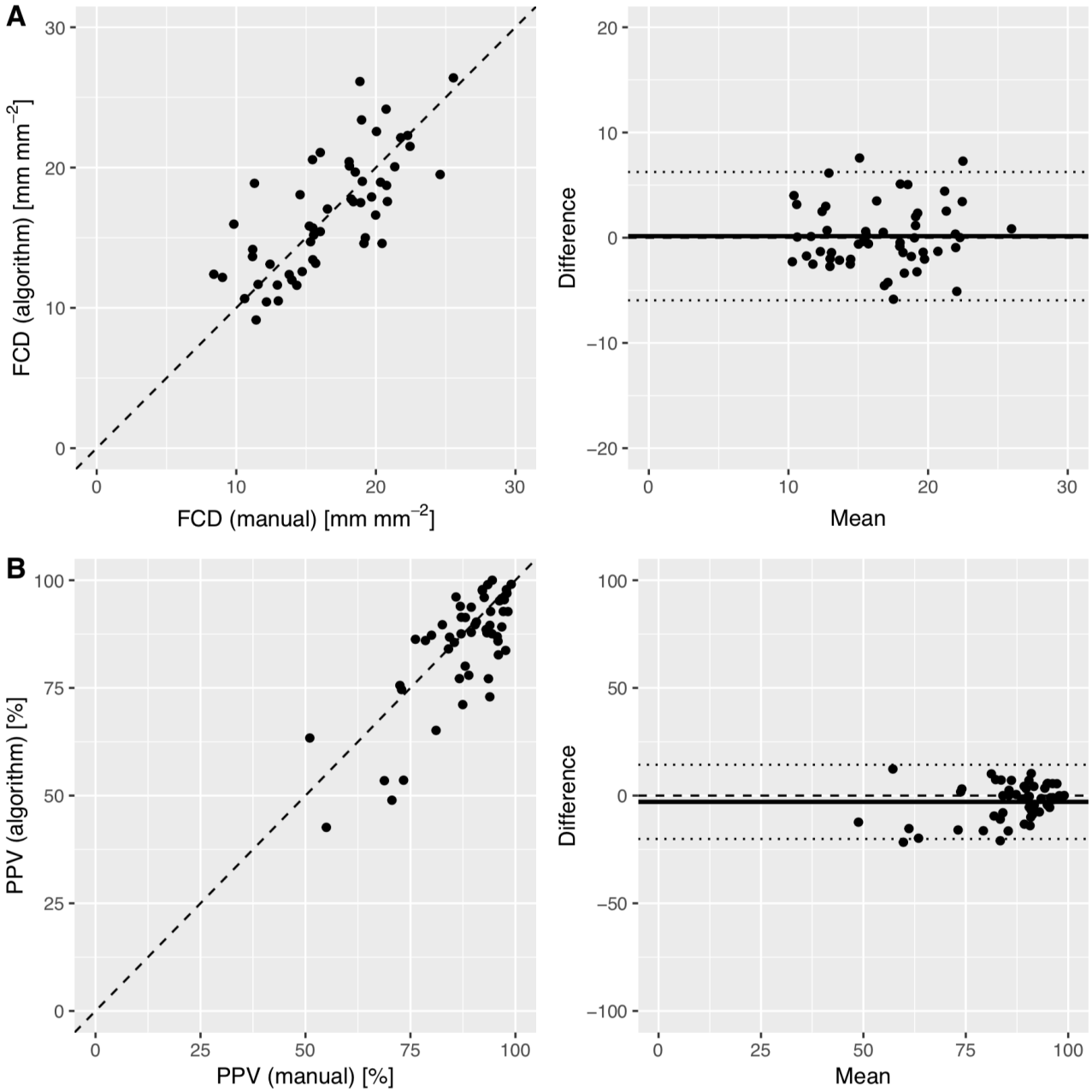
*Supplementary Table 1. Combinations of HVM recording devices and video formats. "≤" denotes the possibility of frame downsizing during stabilization procedures preceding analysis. * field of view and pixel pitch were determined for each combination of individual HVM recording device and video format using a formal calibration procedure, approximate mean values are given here for reference. IDF, incident dark field; SDF, sidestream dark field.*

Symbol	*Description*	*Parameter values*
		Cytocam IDF, porcine sublingual microcirculation, AVA 3.x avi
Vessel recognition		
clahe_clip	Contrast enhancement limit for contrast limited adaptive histogram equalization.	2, 0
clahe_grid [px]	Grid size for contrast limited adaptive histogram equalization.	32, 0
σ [px]	Standard deviation of the the Gaussian kernel used for principal curvature-based region detection[37].	3, 9
h [px]	Upper threshold for the linking algorithm, where new lines are created as long as the starting point has a higher second directional derivative[37].	1.1, 0.1
l [px]	Lower threshold for the linking algorithm, where points are added to the current line as long as they have a higher second directional derivative[37].	0, 0
min_length [px]	Threshold for a high-pass filter for vessel length implemented downstream of the detection and linking algorithms.	40, 120
	The number of segmentation passes is given by the number of parameters listed in the configuration file.	
capillary_cutoff [µm]	Low-pass cutoff value for mean vessel diameter used for vessel classification as a capillary.	20
Space-time diagram analysis		
smooth_σ [px]	Standard deviation of the Gaussian kernel used for Gaussian smoothing.	1
σ [px]	Standard deviation of the Gaussian kernel used for principal curvature-based region detection[37].	1.5
h [px]	Upper threshold for the linking algorithm, where new lines are created if the starting point has a higher second directional derivative[37].	1.1
l [px]	Lower threshold for the linking algorithm, where points are added to the current line if they have a higher second directional derivative[37].	0
min_length [px]	High-pass cutoff value for artefact detection: Threshold for a high-pass filter for vessel length implemented downstream of the detection and linking algorithms.	20
curvature index_cutoff [1]	High-pass cutoff value for artefact detection: proportion of length of straight line between start and endpoint of ridge AND actual ridge length.	0.02
low_flow_cutoff [µm s^{-1}]	Low-pass cutoff value for individual RBC path RBCv for RBC path classification of no flow/low flow versus normal flow.	10
perfused_cutoff [1]	High-pass cutoff value for the proportion of no flow / low flow RBC paths in a per-vessel frequency distribution used for vessel classification as perfused.	0.1

*Supplementary Table 2. Set of parameters for vessel detection and space-time diagram analysis using the proposed advanced computer vision algorithm. * depending on validation of combinations of tissue type, HVM recording devices and video formats.*

Supplementary Figures

Supplementary Figure 1. Good correlation was observed between manually measured and algorithm-based FCD (A) and PPV (B) in the septic shock model.



FCD and PPV were compared by field of view in the septic shock and control groups (n = 53). Good correlation was observed for FCD (r = 0.7, p < 0.0001, bias 0.2 mm mm^{-2}, level of agreement -6.0–6.3 mm mm^{-2}, precision 3.1 mm mm^{-2}, percentage error 2.9%) and PPV (r = 0.8, p < 0.0001, bias -3%, level of agreement -20–14%, precision 9%, percentage error -3.3%). Dashed lines represent identity lines. In Bland-Altman analysis, solid line represents bias and dotted lines represent ± 2 σ levels of agreement. FCD, functional capillary density; PPV, proportion of perfused vessels.