A NEW PLT COUNTING METHOD BASED ON ARTIFICIAL INTELLIGENT RECOGNITION OF PLTS BY MC-80 BLOOD CELL MORPHOLOGY ANALYZER

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Introduction

- MC-80 utilizes a visual and artificial intelligence (AI) system to digitally scan and identify platelets in peripheral blood smears for PLT number estimation.
- MC-80 provides two ways of counting platelets:

A. Based on **the ratio of RBC/PLT** combined with the RBC counting yield from the hemocytometers

B. Based on **the estimate factor** method (an estimation factor of the fixed fields scanned)

Methods

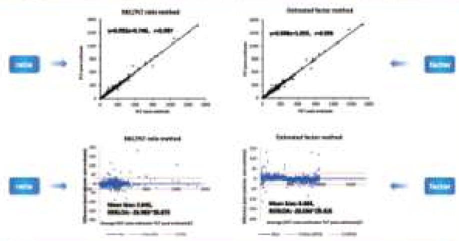
976 blood samples were selected for the study: Microscopic examination confirmed 700 normal samples and 276 samples containing different interfering substances

- Comparison of two counting principles before and after sample verification — ALL blood samples, N = 976
- Compare MC-80 AI automatic estimation and the Optical PLT counting method (PLT-O) — Blood samples triggered PLT flags: PLT Abn Distribution; PLT Clump? Thrombocytopenia; N = 364
- Compare MC-80 AI automatic estimation and PLT-IRM (CD41+CD61 Antibody staining) — Blood samples identified as interfering samples by microscopic examination, N = 170
- Sensitivity and specificity analysis at different transfusion thresholds — Randomly selected normal and abnormal blood samples, N = 420

Conclusion

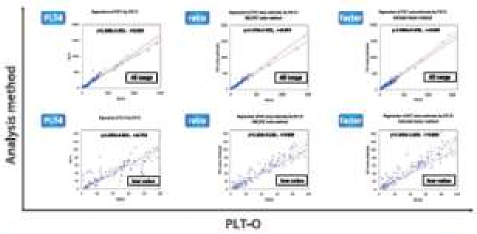
- MC-80 AI automatically estimates platelets (both RBC/PLT ratio and estimate factor method) showed high accuracy and has strong reliability at low PLT levels or in the presence of interfering substances.

1 No Significant Deviation on PLT Counts before and after Sample Verfication in all samples



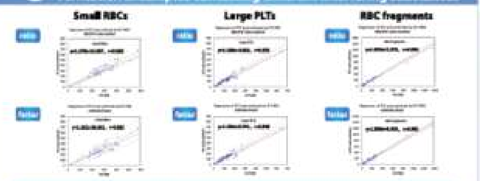
- Both the ratio method and the fixed estimate factor method showed good correlation before and after sample verification by morphology experts. And there is no apparent deviations, indicating that the AI technology of MC-80 can accurately identify platelets.

2 AI Automatic Estimation has a Higher Correlation with PLT-O than PLT-I in Blood Samples Triggered PLT Flag



- The MC-80 AI automatically estimates platelets with higher accuracy compared with PLT-I in samples with possible abnormal PLTs, especially in samples with low PLT levels.

3 No Significant Deviation on PLT Counts before and after Sample Verfication in samples containing different interfering substances



- Both of the AI PLT counting methods showed good correlations with the reference method for blood samples with common interfering elements, especially when the interference is the RBC fragments (r>0.99) compared with the reference method.

4 AI automatic estimation showed high reliability in the blood transfusion decision-making

Ratio method

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	18	4	
	Negative	4	399	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	38	8	
	Negative	7	375	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	91	4	
	Negative	13	318	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

Estimate factor

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	3	1	
	Negative	11	403	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	16	1	
	Negative	14	397	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

		[illegible] (reference method)		
cut-off	[illegible]	Positive	Negative	
AI automatic estimation	Positive	77	1	
	Negative	27	314	
		Sensitivity	[illegible]	[illegible]
		Specificity	[illegible]	[illegible]
		Accuracy	[illegible]	[illegible]

- Both the two PLT counting methods showed very high specificities in different blood transfusion thresholds. The sensitivity was relatively lower than the specificity, but the ratio method showed higher sensitivities than the estimate factor method.