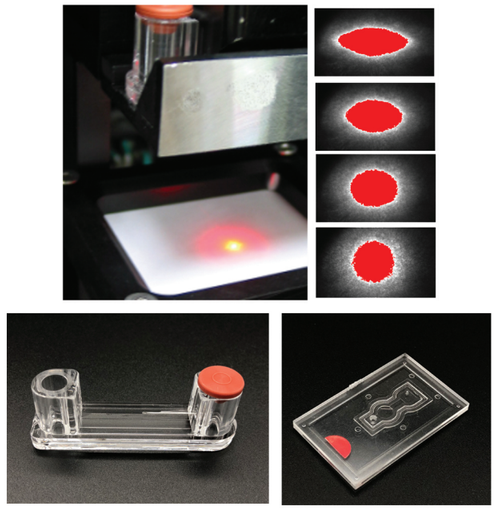
Creative Innovation in Hemorheology

The RheoScan® System's unique technology enables to measure comprehensive hemorheological characteristics at point-of-care with quick and easy operation.



The main features of the RheoScan® include

- Disposable microchip
- One-step of pipetting
- Rapid test (less than 1-2 minutes)
- Fully automated operation with one-touch
- Small sample volume of whole blood
  - Deformability : 6 µL (with 600 µL of PVP)
  - Critical Shear Stress: 500 µL
  - Aggregation: 8 µL blood

What the RheoScan® can provide

- Deformability (Elongation Index, EI)
- Critical Shear Stress (CSS)
- Aggregation (AI, M, t ½)
- Erythrocyte Sedimentation Rate (ESR)

TECHNICAL VALIDATION

[Deformability]

1. Validation and application of a microfluidic ektacytometer (RheoScan-D) in measuring erythrocyte deformability, Clin. Hemorheol. Microcirc. 37(2007) 319-328

[Critical Shear Stress]

2. A transient microfluidic approach to the investigation of erythrocyte aggregation: The treshold shear stress for erythrocyte disaggregation, Clin. Hemorheol. Microcirc. 42(2009) 117-125
3. Characterization at the individual cell level in whole blood samples of shear stress preventing red blood cell aggregation, J. Biomechanics 49(2016) 1021-1026
4. Disaggregating shear stress: The roles of cell deformability and fibrinogen concentration, Clin. Hemorheol. Microcirc. 55 (2013) 231.240

CLINICAL APPLICATION

[Diabetic Mellitus]

5. Progressive impairment of erythrocyte deformability as indicator of microangiopathy in type 2 diabetes mellitus, Clin. Hemorheol. Microcirc. 36(2007) 253-261
6. Critical Shear Stress is Associated with Diabetic Kidney Disease in Patients with Type 2 Diabetes, Scientific Reports 8 (2018) 908
7. Use of RBC deformability index as an early marker of diabetic nephropathy, Clinical Hemorheol. Microcirc. 72 (2019) 75–84
8. Potential Diagnostic Hemorheological Indexes for Chronic Kidney Disease in Patients With Type2 Diabetes, Frontiers in Physiology 10(2019) 1062

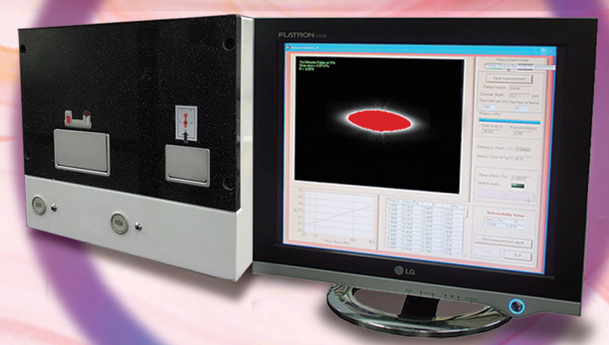
[Metabolic syndrom]

9. Hemorheology, ankle brachial pressure index (ABPI) and toe brachial pressure index (TBPI) in metabolic syndrome, Microvascular research 95(2014), 31-36
10. Association of altered hemorheology with oxidative stress and inflammation in metabolic syndrome, Redox Report 20 (2015), 139-144
11. The association of dyslipidemia with erythrocyte aggregation, Clinical Lipidology 10 (2015), 129-135
12. Hemorheological parameters better classify metabolic syndrome than novel cardiovascular risk factors and peripheral vascular disease marker, Clin. Hemorheol. Microcirc. 64 (2016), 1-5
13. Erythrocyte aggregation and metabolic syndrome, Clin. Hemorheol. Microcirc. 57 (2014) 73-83

RHEO Meditech

RHEOSCAN
Hemorheology Test

Assessment of
Deformability, Aggregation and Critical Shear Stress of RBCs



Comprehensive and precision hemorheological testing of metabolic syndrome, diabetic complications and circulatory diseases

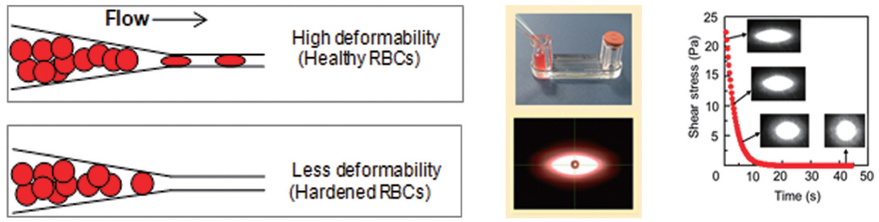
RheoScan

www.rheoscan.com
info@rheoscan.com

Hemorheological Measurements

1. Deformability of RBC

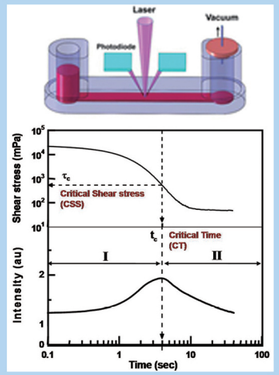
RBC deformability plays a critical role in blood circulation since they have to pass through capillaries whose diameter is smaller than their size.
Impaired deformability of RBCs, which are observed in diabetes mellitus, can be used to diagnose and monitor patients at a risk for diabetic vascular complications at earlier stage.[1-3]



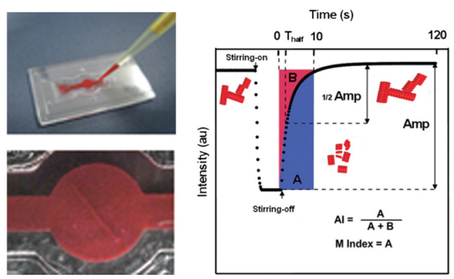
2. Critical Shear Stress of RBC aggregation

The critical shear stress (CSS) is the minimum force required to disperse RBC aggregates[4].
The CSS measured results are identical to the aggregation force between two RBCs measured with optical tweezer[5].
The CSS is found to be independent of hematocrit[4].

The RheoScan® System is the unique instrument to measure CSS, which has been hardly measured at point-of-care4.



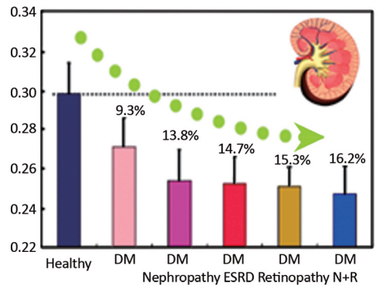
3. Aggregation of RBC



RBC aggregation is one of key factors in determining flow resistance in the microcirculation.
RBC aggregation is one of the major determinants of blood viscosity.Increased RBC aggregation has been observed in various pathological diseases such as cardiovascular diseases and microcirculatory diseases[8].

Clinical Associations

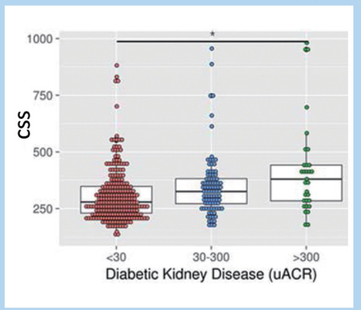
1. Deformability



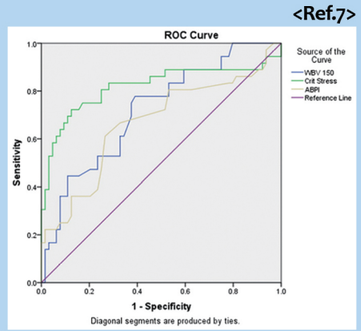
The RheoScan® System has successfully measured RBC deformability.
Owing to adopting disposable microchip technology, one can measure RBC deformability at point-of care within a minute.[2-3]
The core technology includes laser-diffraction, microfluidic rheometry, image analysis and precision fabrication.[3]

2. Critical Shear Stress

<Ref.6>

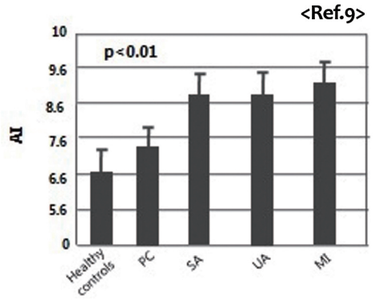


<Ref.7>



3. Aggregation

<Ref.9>



PC: Patient controls
SA: Stable angina
UA: Unstable angina
MI: Myocardial infarction

The RheoScan® System also provides the conventional information of RBC aggregation.
- Aggregation index (AI),
- Half time (t½),
- M-index (M)
- Erythrocyte Sedimentation Rate (ESR) (M)

RheoScan

www.rheoscan.com info@rheoscan.com