



RR Mechatronics
Masters of Measurement



NPEX

**GELD VOOR
AMBITIE**



RR Mechatronics

Beleggersbijeenkomst RR Mechatronics

Zwaag, 27 november 2018



RR Mechatronics
Masters of Measurement

Platform waar **middelgrote** ondernemingen
aandelen of (achtergestelde) **obligaties**
kunnen uitgeven om hun **groei** te financieren
en waar **beleggers** kunnen investeren.



Ministerie van Economische Zaken

inkef capital



DeNederlandscheBank

EUROSYSTEM



RR Mechatronics
Masters of Measurement

Ondernemers



Beleggers



Aandelen



Zeggenschap



Dividend betaling/ koerswinst



Financieel Sanity Check



Prospectus conform regelgeving AFM

Obligaties



5-7 jaar looptijd (vervroegd aflossen mogelijk)



Leensom vanaf € 1.000.000 (**€3.500.000**)



Bullet aflossing



Door achterstelling, versterking garantie vermogen en verbetering positie bank



Rente 6-10 %, **RR Mechatronics 8%**



Maandelijkse rentebetaling



Coupure vanaf € 1.000



Financieel Sanity Check



Prospectus conform regelgeving AFM

Onderneming



Businessplan/cijfers



Kredietcheck Credit Reform



**Sanity check door
onafhankelijke CF
partij**



**Prospectus conform
AFM richtlijn**

Groeifinanciering via NPEX

Financiering groei

Financiering buitenland

Financiering overname

Financiering nieuwe ontwikkeling

Financiering nieuwe vestiging

Financiering nieuw business model

Financiering werkkapitaal

Financiering buy out

Financiering productontwikkeling

Financiering RR Mechatronics

Xillio /Informed /Hygear/Innr/.....

OceanDiva/Hygear/Innr

BobAutowas

Freshbed

Wagamama

Hygear

DBS2/Innr

Wagamama

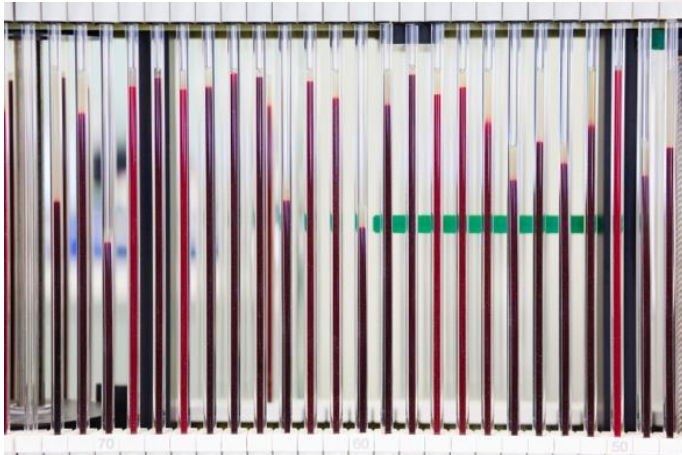
Innr

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RR Mechatronics
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NPEX
Geld voor Ambitie



RR Mechatronics Beleggersbijeenkomst

27 November 2018
RRM, Zwaag

Our why

We, the team of RR Mechatronics, believe that every patient deserves the right diagnosis and care

Focusing on hematology, we help to provide precise and accurate laboratory measurements

By developing, producing, selling, and servicing state-of-the-art medical technology solutions

Introduction RRM



**3000+ ESR instruments delivered
Worldwide**

**Smallest to largest labs
Single labs to largest chains
Gold Standard only**



LEIDS UNIVERSITAIR MEDISCH CENTRUM



Introduction RRM

- RR Mechatronics established 1986
 - Zwaag The Netherlands
 - Providence, RI, USA
- Focus on hematology: ESR and RBC-analyzer
- World leader in ESR automation
 - Specialist in Westergren gold standard
- Instruments on all continents
 - Customers from research, small labs to worlds largest labs
- R&D, assembly & testing



Company milestones



The Medical Technology Company

- Medical Technology company
- State-of-the-art R&D
 - Processes, methodologies, regulatory, skills, high-class people
- Sublime regulatory environment
 - Greenlight.Guru implementation
- Strong growth due to alliances, commercial expansion
- NPD programs fuel further growth
 - State-of-the-art, Gold Standards, lower CAPEX, smaller footprint, higher uptime, improved ease-of-operation, increased recurring business model
 - Starrsed range, Lorrca-platform, RPI
 - Product Roadmap: Instruments, reagents, data



The Solutions from RRM

Starrsed, Lorrca & RPI

RRM lines of business

Starrsed ESR

- Gold Standard
- Global reach
- Market leader
- Fast growing
- Growth drivers
 - Lab automation
 - Emerging markets

Lorrca

- World leading hemorheology
- Patented Oxygenscan
- Growth drivers
 - Break-through position in SCD
 - Pharma: companion diagnostics
- Lorrca expandable platform technology: pipeline projects

RPI

- Next generation reagent re-constitution
- OEM-sales to large IVD players
- Allows for continued milking strategies
- OEM field introductions Q3-2019

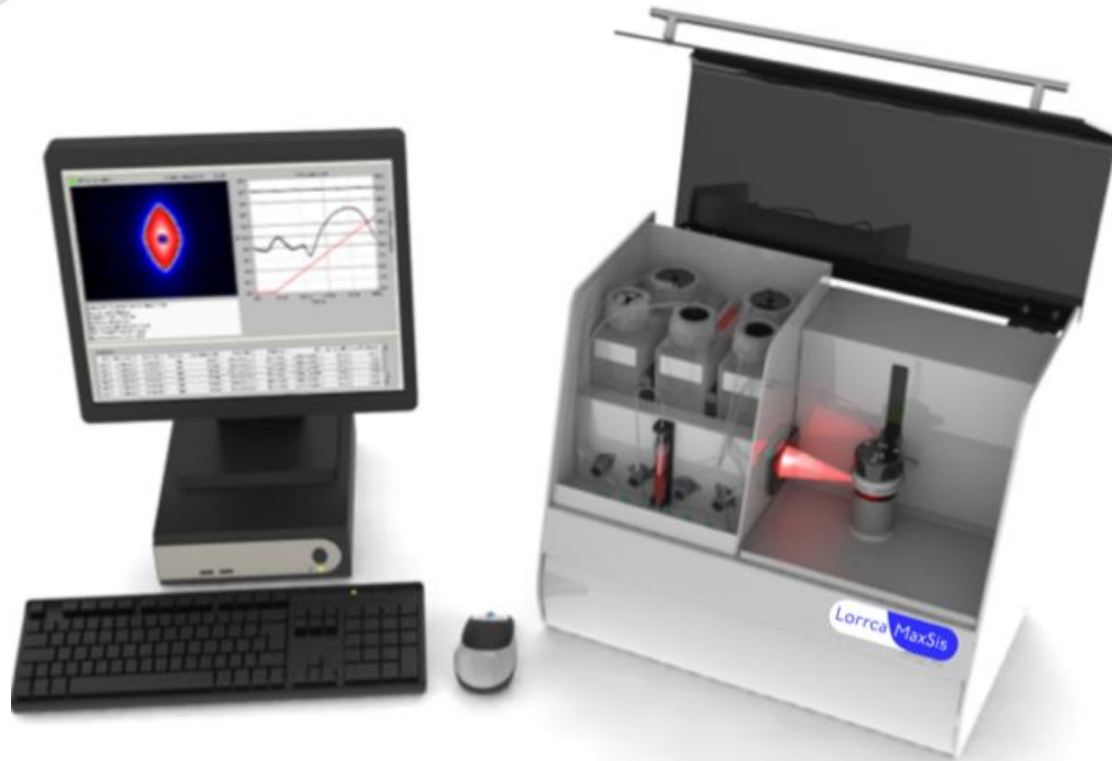
- Recurring business model: Reagents, Controls, Parts

Starrsed range



- **Starrsed ESR = Westergren automated**

Lorcca reference instrument

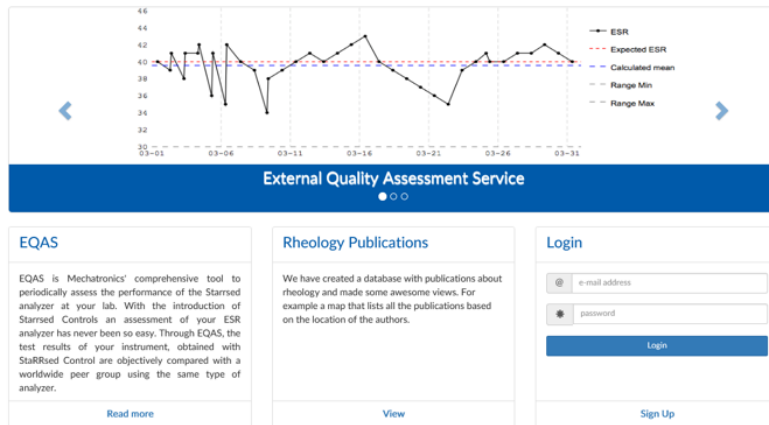


- Osmotic Fragility
- Erythrocyte Deformability
- Aggregation & Critical Stress
- Oxygenscan
 - Sickle Cell Disease (SCD)



- New generation reagent processing instrument

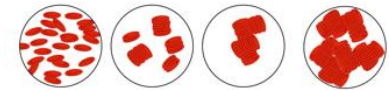
- **Starrsed Control & EQAS**



- **Starrsed CAP-Accredited**

- **Starrsed Reagents**



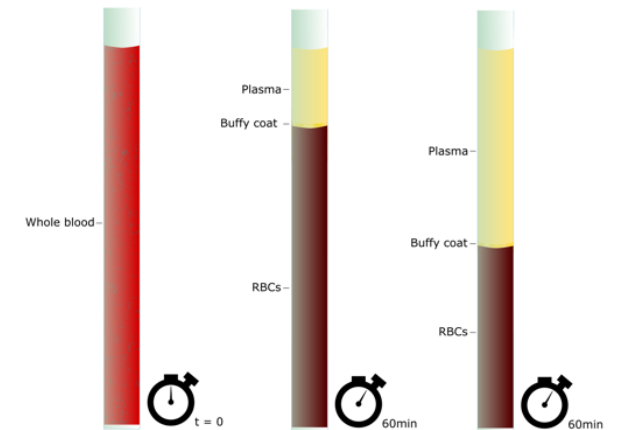


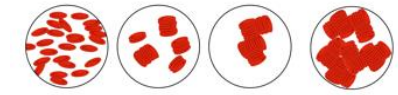
Gold Standard ESR

2. Westergren ESR without compromise

Westergren: Gold Standard ESR

- 2017 confirmation & definition:
Reference Method for ESR being Westergren
 - ICSH: International Council for Standardization Hematology
 - CLSI: Clinical Laboratory Standards Institute
- 1897 principle invention by Edmund Biernacki
- 1918 Fåhræus & Westergren added sodium citrate-anti-coagulation (minimizing Hct influence)
- 1987 RR Mechatronics introduces first automated Westergren method
- **1987-2017 Starrsed only automated gold standard Westergren method**





Whitepaper Westergren



- Reference method
- CLSI & ICSH
- Always clarity interpretation of measurements
- No false positives
- No false negatives
- RR Mechatronics Starrsed range
 - Single tube Starrsed ST
 - Rack Starrsed RS
 - Track Starrsed TL
 - Starrsed Interrliner

Westergren is Gold Standard

Received: 20 November 2016 | Accepted: 3 April 2017


DOI: 10.1111/ijlh.12693

ORIGINAL ARTICLE

WILEY

 International Journal of
Laboratory Hematology

ICSH recommendations for modified and alternate methods measuring the erythrocyte sedimentation rate

A. Kratz¹  | M. Plebani² | M. Peng³ | Y.K. Lee⁴ | R. McCafferty⁵ | S.J. Machin⁶ |
on behalf of the International Council for Standardization in Haematology (ICSH)

***“The working group fully endorses continued use of the
Westergren method as the gold standard for all ESR”***

***“Westergren based methods usually correlate very well with
each other”***

A.Kratz et al. Int J Lab Hem. 2017;1-10

ICSH 2017 recommendations

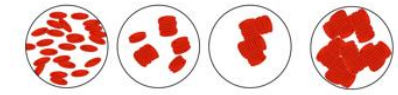
KRATZ ET AL.

TABLE 5 ICSH recommendations for the use of modified and alternate ESR methods

Manufacturers' Obligations	<ul style="list-style-type: none"> Clearly mark alternate methods as "modified" or "alternate" Determine the closeness of agreement with Westergren methods Determine and indicate the imprecision (reproducibility) of the method List all known interferences and indicate the level at which interference starts as well as the magnitude of the interference Determine age- and gender-specific reference ranges Provide all known information on disease-specific sensitivity and specificity
Performing Laboratories' Obligations:	<ul style="list-style-type: none"> Perform studies to determine the suitability of the method for their patient population Verify the reference ranges provided by the manufacturer Consider adding an interpretative comment to every result stating that "This result was obtained with an ESR instrument that is not based on the standard Westergren method. The sensitivity and specificity of this method for various disease states may be different from the standard Westergren method"

4.1 | Modified and alternate methods to measure the ESR

As outlined, the traditional Westergren method has been replaced in most laboratories with novel instrumentation. Our surveys indicate that worldwide two-thirds of all laboratories now use modified or alternate ESR test methods for the measurement of the ESR (Table 2). These methods include centrifugation or the use of photometric rheology to measure Rouleaux formation. Results obtained with these diverse approaches can differ significantly from observations obtained with the Westergren method and from each other. In particular, while



ESR: The good, the bad & the ugly

Westergren	Starrsed	Diesse	Alifax	Alcor
Pipette dimension	✓	✗	✗	✗
Blood dilution 4:1	✓	✗	✗	✗
Hct compensation	✓	✗	✗	✗
Turn Around Time (TAT)	30 minutes (60 possible)	26 minutes mixing + 18 sec. measuring	x minutes mixing + 20 sec. measuring	x minutes mixing + 20 sec. measuring
Kahler / M. myeloma / Temp. arthritis etc.	✓	✗	✗	✗
Correlation Westergren	✓	✗	✗	✗



6. Starrsed ESR = Westergren automated

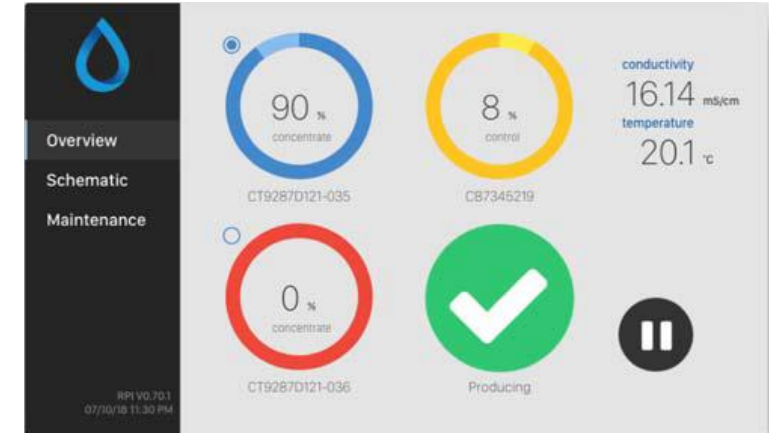


Reagent Processing Instrument



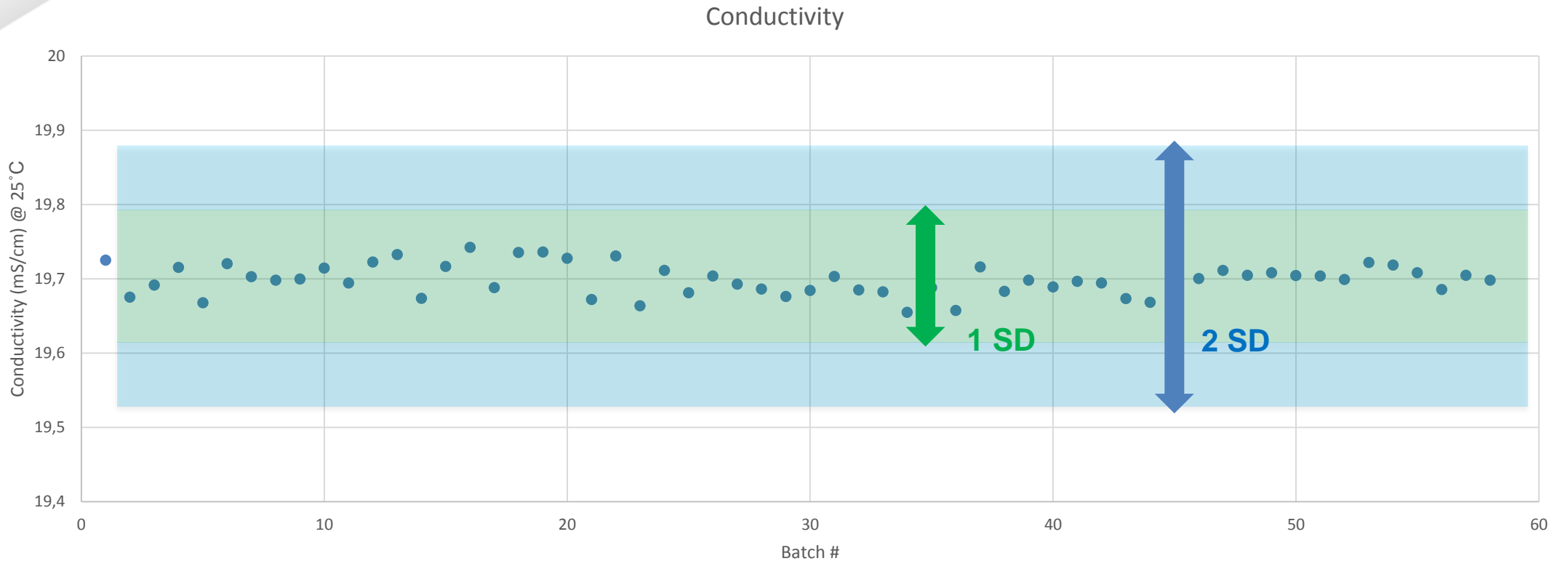
RPI Benefits

1. **Logistics savings** using your concentrated reagent
2. Maximized **uptime** for the analyzers
3. **Lowest cost** of ownership
4. **Minimal** user interaction
5. High product **output**
6. High reconstitution **accuracy**
7. Optimized concentrate **extraction**
8. Autonomous **QC** to ISO/NIST reference standard
9. **User traceability** through clearance levels with ID & PW
10. **Logistics traceability** through NFC tags
11. Retrievable **log** of performance and events
12. Low **energy** consumption
13. Product purity through incorporation of Merck Millipore **AFS-24**
14. Smallest install base **footprint**



Graphical user interface

Reconstitution accuracy & consistency



Final conductivity-distribution shows reconstitution accuracy and consistency well within the required specifications.



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Lorrca platform

Functional Hematology



RR Mechatronics
Masters of Measurement



The Lorrca Platform

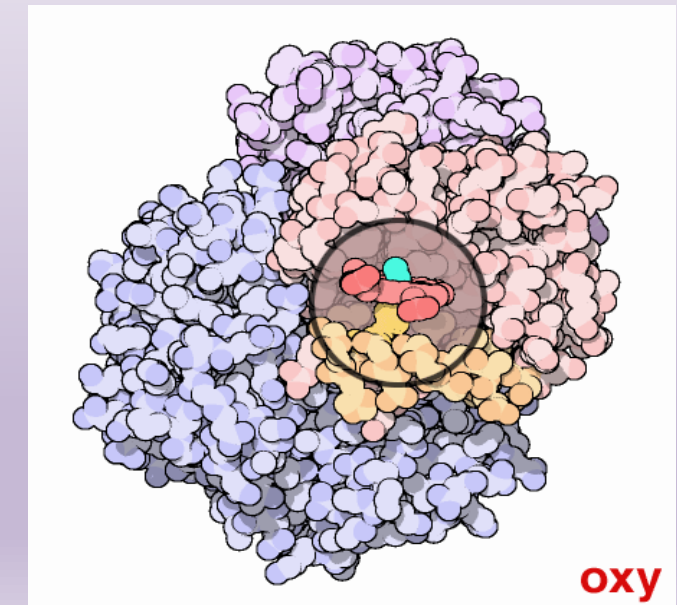
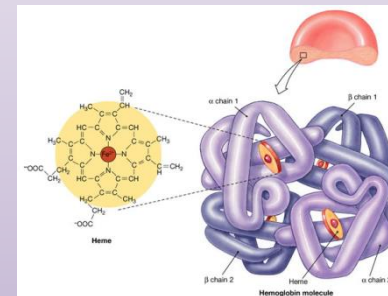
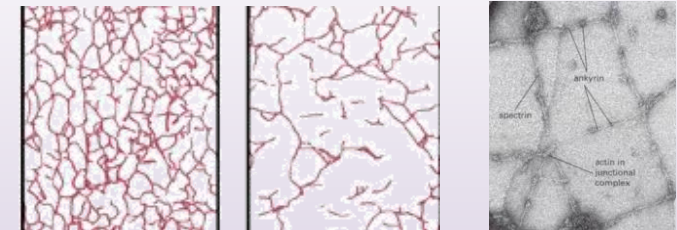


Functional Red Blood Cell
Analysis

Validated Technology

- The Lorrca instrument (ektacytometer) is already on the market for over 10 years.
- For most of these instruments the RBC Deformability and Osmoscan application is used appearing in hundreds of scientific publications.
- Currently the instrument is used as a Research Use Only instrument.
- Several labs are using the Lorrca in a CLIA surrounding.

- Defects of red blood cell membrane production
 - h. Spherocytosis
 - h. Elliptocytosis
 - h. Stomatocytosis
- Defects in hemoglobin production
 - Sickle-Cell disease
 - Thalassemia (alpha/beta)
- Defective red cell metabolism
 - Pyruvate Kinase deficiency
 - G6PD enzyme deficiency (Malaria)



Deformability - RBC
Elongation as a function of shear stress

Osmoscan - RBC
Elongation as a function of osmolarity

Aggregation & disaggregation - as a function of time

Oxygenscan - RBC
Elongation as a function of oxygen pressure

Lorcca is the main platform extended with new applications

Lorcca® Functional RBC Analysis		Lorcca® (Laser-Assisted Rotational Red Cell Analyser) ektacytometer				RR Mechatronics Masters of Measurement
Type of measurement & requirements:						
	Deformability	Osmoscan	Aggregation & Dis-aggregation	Oxygenscan		
Measurement methodology :	laser diffraction, elongation at increasing shear	laser diffraction, at fixed shear stress in osmotic	laser reflection in time, iterative measurement	laser diffraction, at fixed shear stress in oxygen		
Graphic of typical result :						
Human blood, standardized: Blood volume¹⁾ :	25 µl per 5 ml Lorcca ISO Diluent	200 µl (175-350 µl)* in 5 ml Lorcca ISO Diluent	1.5 ml whole blood, for re-oxygenation	25 µl per 5 ml Lorcca ISO Diluent		
Sample (diluted blood) volume/test :	800 µl (diluted)	all, 5 ml (diluted) *customers standardize this on %Hct or amount of cells: appr. 3.0*10 ⁶ cells (in 175-350 µl diluent)	700 µl (whole blood, non-diluted)	800 µl (diluted)		
Test, standardized: Time/test :	80 sec	300 sec	5 sec - 120 sec	1800 sec (deox.) - 1200 sec (reox.)		
Measurement points/test²⁾ :	9	310	12000	164		
Test, characterized: Measuring index/test :	EI	EI, Omin, Omax, Ohyper, AUC**	Isttop, Iscdis, Iteration curve	EImax, PO ₂ S, ΔEI, Elmin		
Excellence:	Accuracy, Reproducibility, Speed, All-on-1 instrument, Easy use, Low maintenance, Solid & Proven technology					
		**area under curve				

¹⁾venous blood, pe. In EDTA (ethylenediaminetetraacetic acid) or ACD (acid citrate dextrose) tubes

²⁾setting, open for adjustment

Research fields

Membrane disorders RBC; Spherocytosis
Enzyme deficiencies; G6PD
Storage / Lesion / RBC Rejuvenation
Sepsis / Oxidative stress

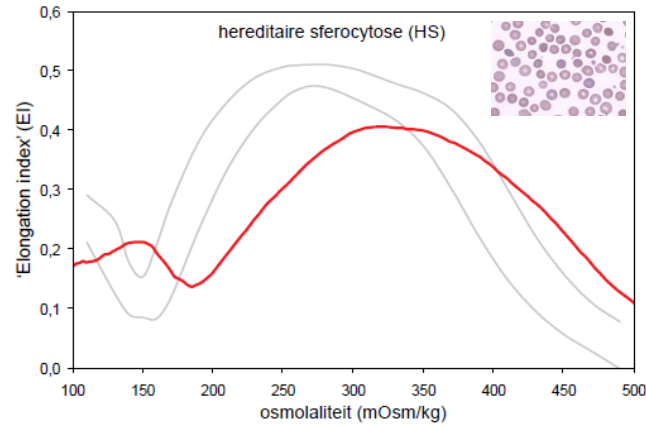
Hereditary anemia
Membrane disorders; Spherocytosis
Enzyme deficiencies; G6PD
Thalassemia
Sickle Cell Disease

Blood storage
Blood quality; defining optimum shear rate for RBC to aggregate (by iteration)
Malaria / RBC Parasites

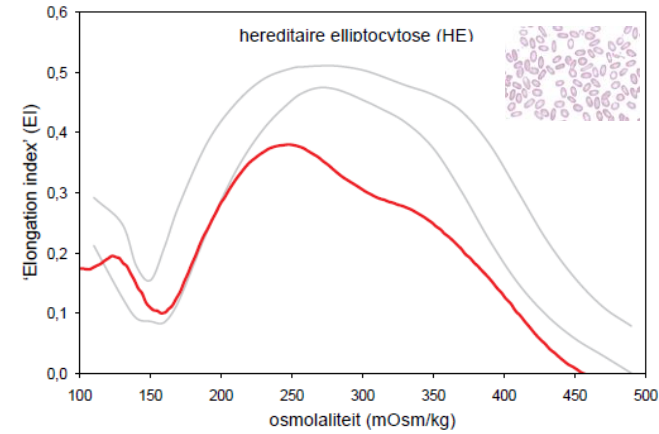
Sickle Cell Disease; patient characterization by severity, patient response and monitoring

Typical results membrane disorders :

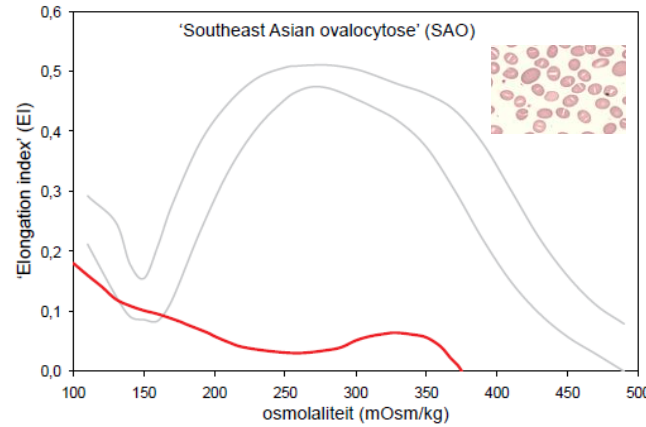
Spherocytosis



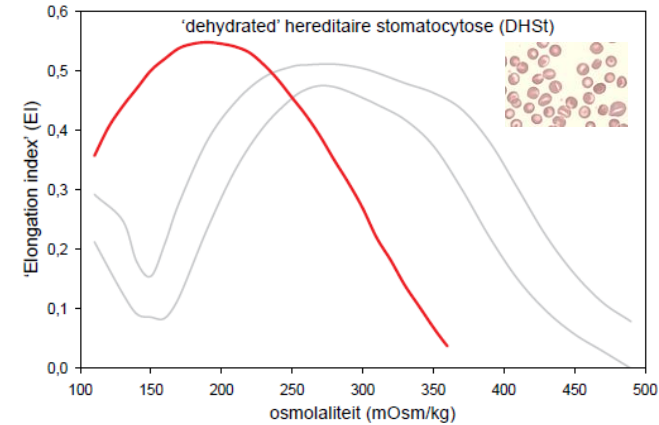
Elliptocytosis



Southeast
Asian
Ovalocytosis



Stomacytosis



Some customers Lorrca



biogen idec



GRIFOLS



Duke
UNIVERSITY



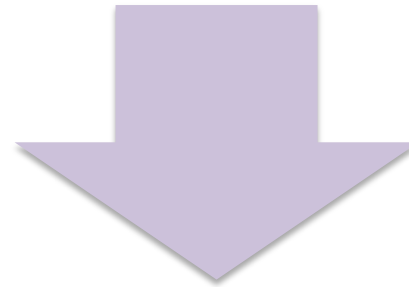
EMORY
UNIVERSITY



Lorrca Oxygenscan

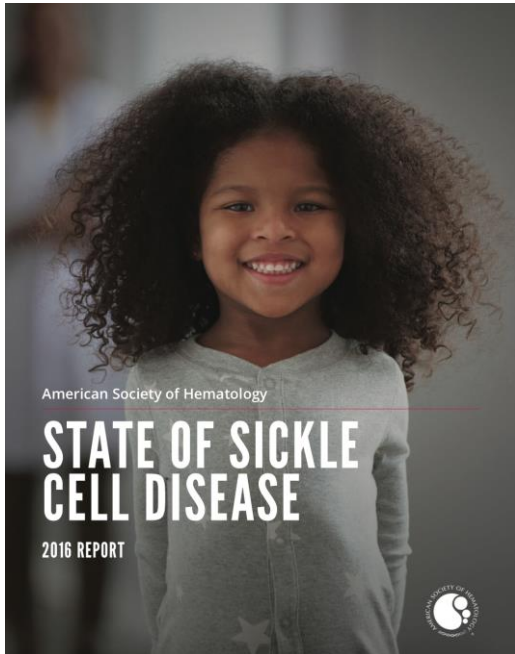
Sickle cell: 500 children die every day

Following requests from the professional field, the unique and patented Oxygenscan technology – dedicated to sickle cell disease (SCD) - is developed by RR Mechatronics



ASH 2016 goal for the future

- Identify predictors of the severity of the disease, including optimizing dosing and treatment response predictors for hydroxyurea, biomarkers for SCD crisis and prognosis, and SCD diagnostic methods.



Lorrcan OxygenScan

Unique patented technology measuring changes in erythrocyte deformability as a function of oxygen level

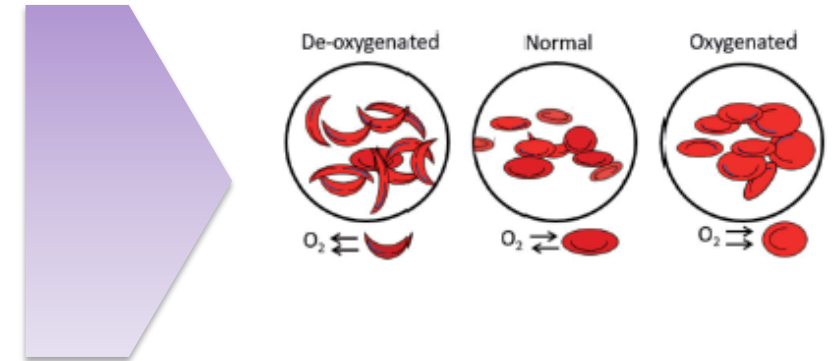
Request from the market develop for Sickle Cell Disease

Methodology

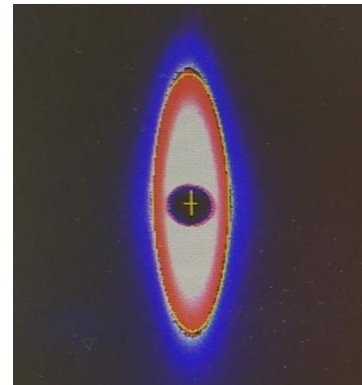
- Measurement of laser diffraction pattern of RBC, while in shear stress

Condition

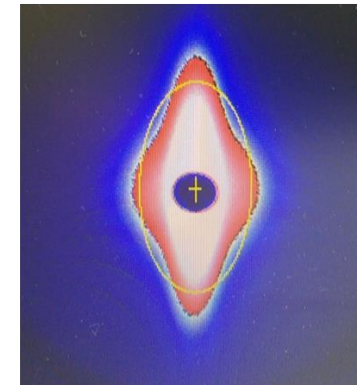
- In shear stress, a pO₂ gradient



RBC diffraction pattern of:
Healthy person



Sickle cell patient



De-oxygenated sickle cells





Lorrca OxygenScan

Important parameters SCD patients:

- Start Deformability (EI)
- Point of Sickling
- Depth Deformability (EI)

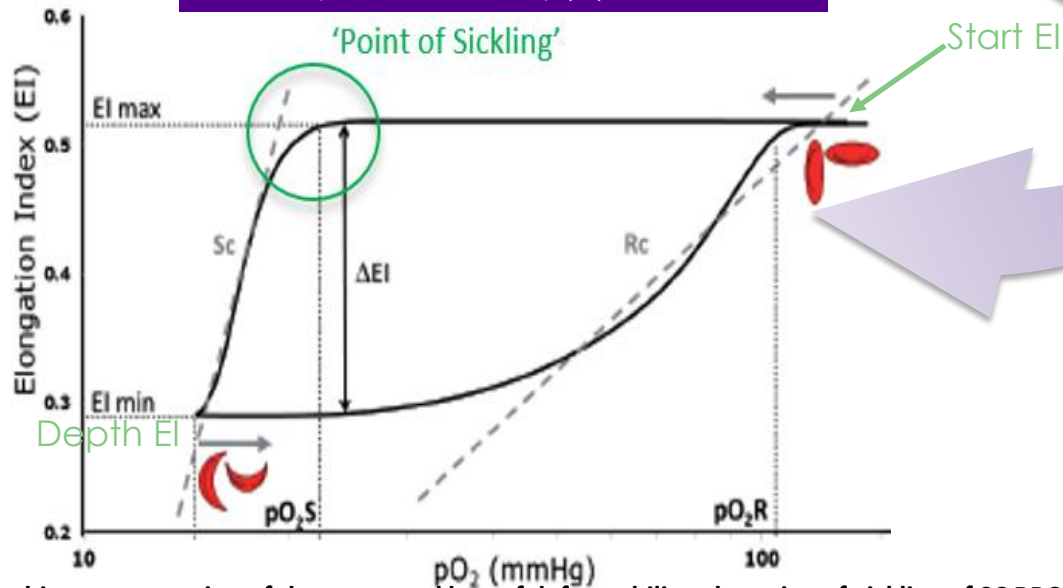


Figure 1. Graphic representation of the measured loss of deformability, the point-of-sickling of SC RBCs, as a result of oxygen-depletion in time, followed by subsequent gain of deformability of RBC's during reoxygenation, as is visualized on the OxygenScan. It is described by pO₂: Oxygen- pressure (controlled, in mmHg), and by EI: elongation index (of the RBCs in shear rate), in SC RBCs: Sickle Cell patients' Red Blood Cells.

Lorrca OxygenScan measures the 'Point of Sickling'

The OxygenScan measures the relative oxygen pressure at the critical point where the RBCs of a SCD patient start to sickle. This so called 'Point of Sickling' quantitatively and reproducibly describes the defined loss of deformability of SCD RBCs and therefore the severity of the disease and the sensitivity of the individual SCD patient in its response to treatment.

Since there are no other technologies capable of detecting the individual patient's 'point of sickling', the OxygenScan is providing a unique technology in the market place.

Poster #1452

THE OXYGENSCAN: CONTINUOUS MEASUREMENT AND QUANTIFICATION OF SICKLING DURING DE- AND REOXYGENATION TO MONITOR DISEASE SEVERITY AND TREATMENT EFFECT IN SICKLE CELL DISEASE.

Minke A.E. Rab^{1,2}, Brigitte A. van Oirschot¹, Tesy H. Merx¹, Annet C.W. van Wesel¹, Sisto Hendriks³, Jan de Zoeten³, Eduard J. van Beers² and Richard van Wijk¹ and others

¹Laboratory of Clinical Chemistry & Haematology, University Medical Center Utrecht, ²Van Creveldkliniek, University Medical Center Utrecht, Utrecht, The Netherlands

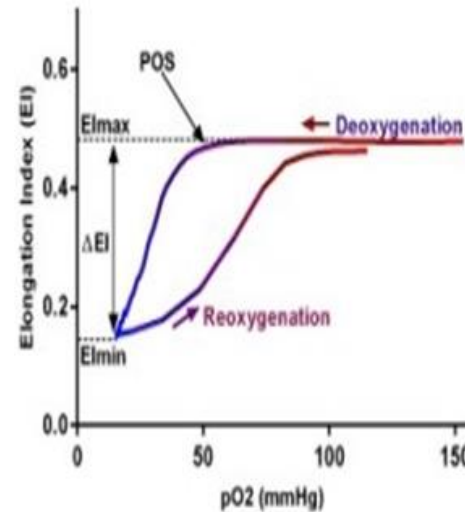
³RR Mechatronics, Zwaag, The Netherlands

Background: In sickle cell disease (SCD) a single point mutation in the gene encoding for beta-globin chain underlies the production of the abnormal hemoglobin S (HbS). Upon deoxygenation HbS can polymerize, resulting in sickling of red blood cells (RBCs). These sickled RBCs have strongly reduced deformability, leading to vaso-occlusive crises and chronic hemolytic anemia. To date, there are no laboratory parameters or assays capable of predicting disease severity or directly monitoring treatment effects.

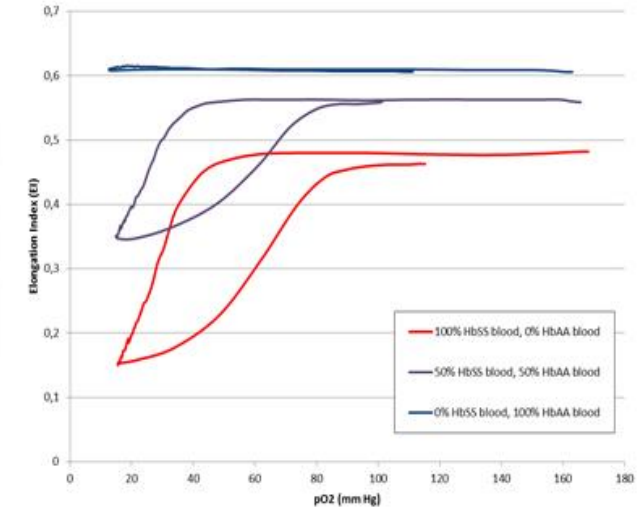
Aims: to develop and validate the OxygenScan: a new method to investigate RBC deformability as a function of oxygen tension and thereby quantify sickling behavior in patients with SCD.

Continuous measurement and quantification of sickling during de- and reoxygenation to monitor disease severity and treatment effect in SCD

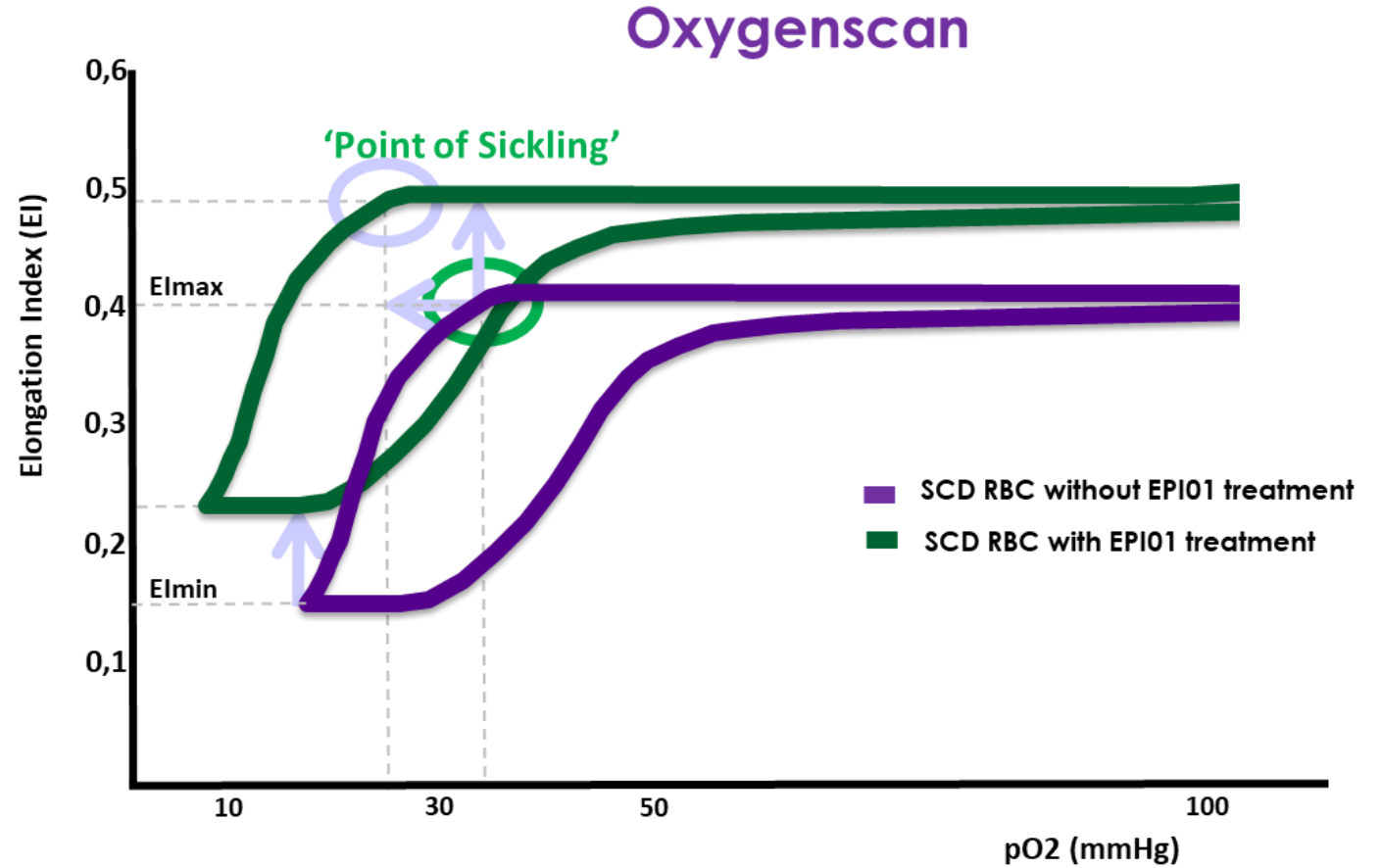
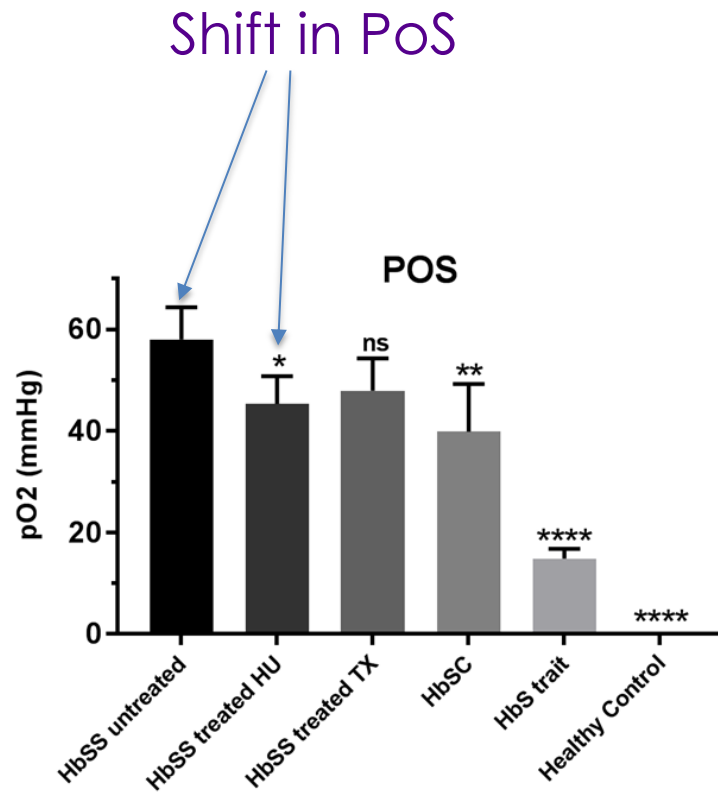
Schematic representation SCD patient



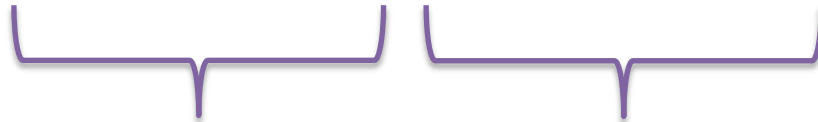
In vitro blood samples



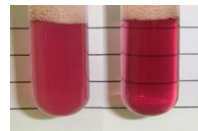
Shift Point of Sickling SCD patient



Workflow SCD patient Diagnosis & Treatment



Blood Count



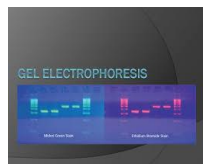
Sickle Cell test



HPLC



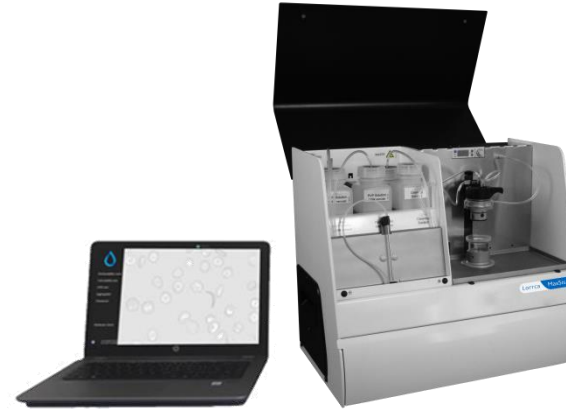
Isoelectric Focusing



Gel Electrophoresis



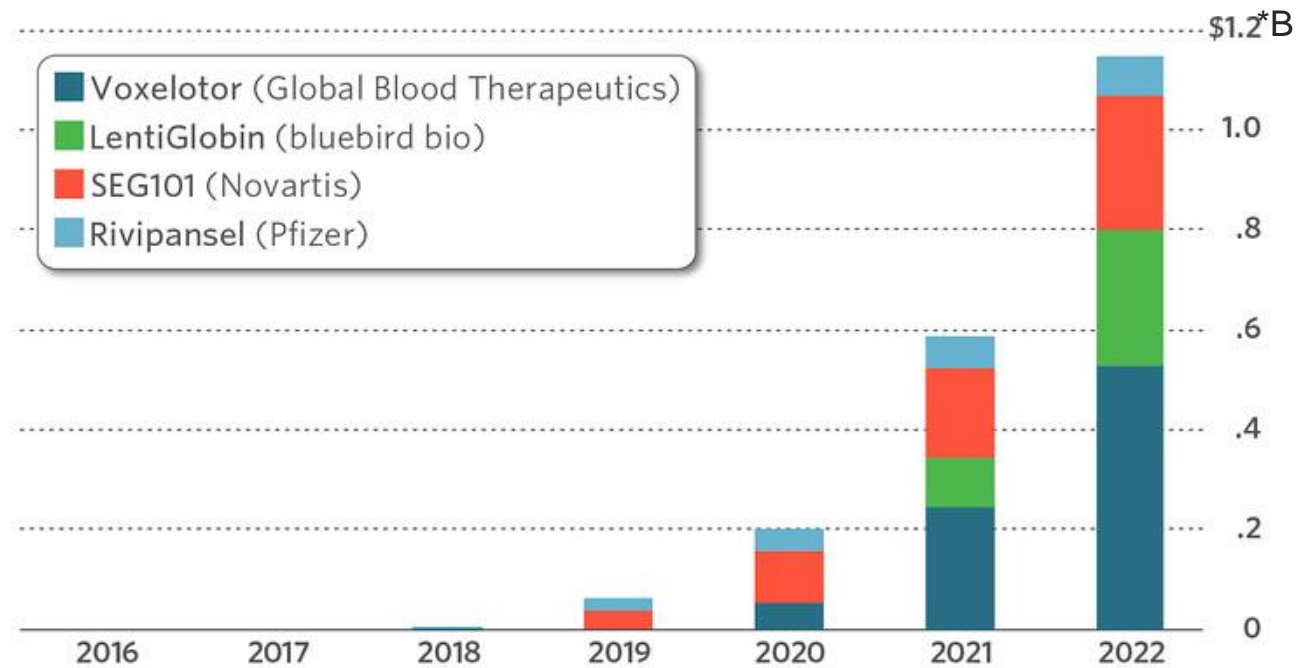
Genetic Testing



Lorrca OxygenScan

1. Confirmation
2. Measures severity of the individual patient's SCD
3. Enables patient specific individual treatment plan
4. Provides lifelong relevant patient monitoring

Projected global sales for top sickle cell anemia products



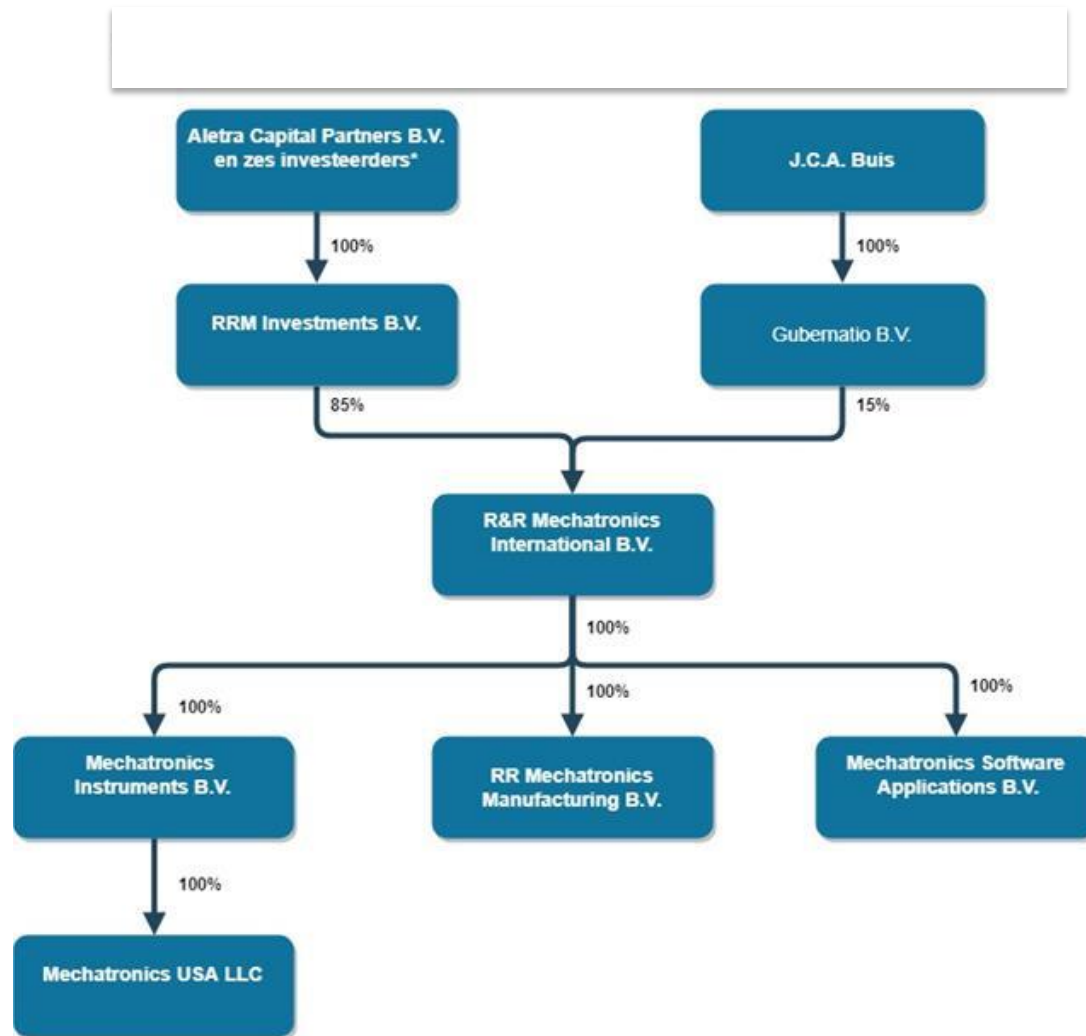


Measuring SCD point of sickling
Defining a patient's individual treatment plan



Prospectus informatie

Organogram RR Mechatronics



RRM Management Team



Vlnr: Maurice de Boer RA (Finance Manager), Jan Buis MBA (CEO), Dr. Ir. Lex Molenaar (Technical Director), Ing. Olaf Smit (Operations Manager), Wouter de Vries B Ec BA (Business Manager), Mr. Brent Kooreman (HR Manager)

Het RRM-Team



In-Vitro Diagnostiek



**BECKMAN
COULTER**

HORIBA



**SIEMENS
Healthineers**



- IVD-marktomvang \$59,8 miljard 2017, CAGR 5,6%
- Hematologie-marktomvang \$3,5 miljard, CAGR 5%
- Bloedbezinkingen: dagelijks > 5 miljoen
- Markt medicijnen SCD naar \$1,15 miljard in 2022

W&V-rekening 2016-2017

Bedragen in €	2016	2017
Brutomarge	6.450.202	7.702.253
Personeelskosten	3.246.653	3.783.467
Afschrijvingen op immateriële en materiële vaste activa	444.616	544.127
Overige bedrijfskosten	2.051.521	2.293.174
Som der bedrijfslasten	5.742.790	6.620.768
Bedrijfsresultaat	707.412	1.081.485
Financiële baten en lasten	-106.109	-281.779
Groepsresultaat uit bedrijfsuitoefening vóór belastingen	601.303	799.706
Belastingen	-249.732	-147.378
Netto groepsresultaat na belastingen	351.571	652.328

Balans per 31 December 2016-2017

Bedragen in €	31-12-2016	31-12-2017
ACTIVA		
Vaste activa		
Immateriële vaste activa	2.980.188	5.021.974
Materiële vaste activa	203.236	297.935
Financiële vaste activa	-	78.210
Vlottende activa		
Vorraden en onderhanden werk	1.785.794	1.911.029
Vorderingen	1.808.755	1.779.378
Liquide middelen	121.789	86.821
Totaal Activa	6.899.762	9.175.347
PASSIVA		
Groepsvermogen	1.337.218	3.816.438
Voorzieningen	410.428	691.537
Langlopende schulden	1.902.598	1.481.764
Kortlopende schulden	3.249.518	3.185.608
Totaal Passiva	6.899.762	9.175.347

W&V-rekening eerste 9 maanden

Bedragen in €	jan-sept 2017	jan-sept 2018
Brutomarge	5.549.296	4.938.851
Personeelskosten	2.659.347	3.282.612
Afschrijvingen op immateriële en materiële vaste activa	347.171	465.496
Overige bedrijfskosten	1.090.805	853.900
Som der bedrijfslasten	4.097.323	4.602.008
Bedrijfsresultaat	1.451.973	336.843
Financiële baten en lasten	-248.699	-54.478
Groepsresultaat uit bedrijfsuitoefening vóór belastingen	1.203.274	282.365
Belastingen	-295.723	-378.049
Netto groepsresultaat na belastingen	907.551	-95.684

Balans per 30 September 17-18

Bedragen in €	30-09-2017	30-09-2018
ACTIVA		
Vaste activa		
Immateriële vaste activa	4.938.979	5.835.577
Materiële vaste activa	270.284	279.173
Financiële vaste activa	-	60.211
Vlottende activa		
Voorraden en onderhanden werk	2.110.798	2.959.164
Vorderingen	1.822.869	2.120.690
Liquide middelen	-	-
Totaal Activa	9.142.930	11.254.815

PASSIVA

Groepsvermogen	1.926.071	3.709.204
Voorzieningen	571.891	936.132
Langlopende schulden	1.379.160	2.145.826
Kortlopende schulden	5.265.808	4.463.653

Solvabiliteit

	2016	2017	2017 (tot en met september)	2018 (tot en met september)
Totaal eigen vermogen	€ 1.337.218	€ 3.816.438	€ 1.926.071	€ 3.709.204
Balanstotaal	€ 6.899.762	€ 9.175.347	€ 9.142.930	€ 11.254.815
Solvabiliteit	19,4%	41,6%	21,1%	33,0%

Besteding obligatie-opbrengst

Waar wij obligatie-opbrengst aan besteden	Bij opbrengst €3.500.000	Bij opbrengst €1.000.000
Loonkosten R&D engineers	€2.975.000	€850.000
Overige kosten productontwikkeling	€ 525.000	€150.000
Totaal	€3.500.000	€1.000.000



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