

# Objective perimetry in patients with Retinitis Pigmentosa using Chromatic pupilloperimetry

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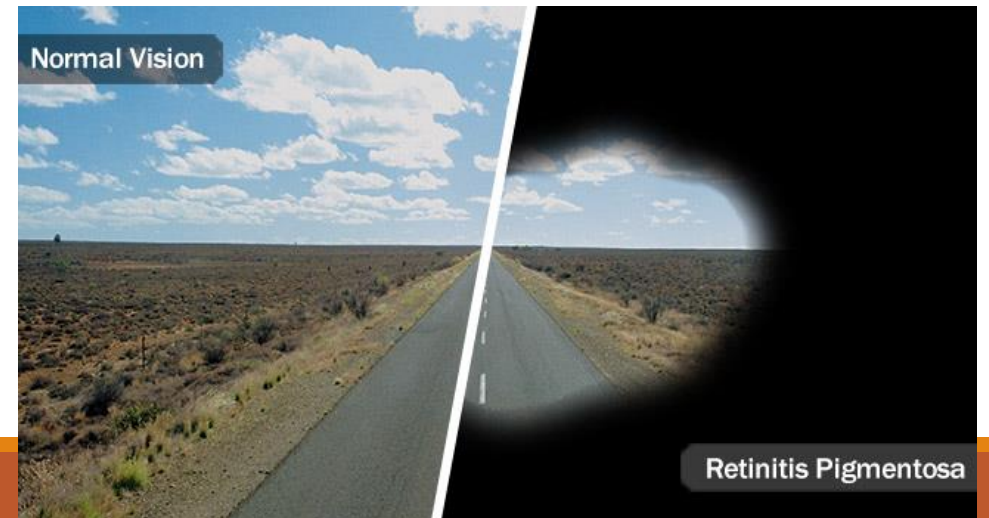
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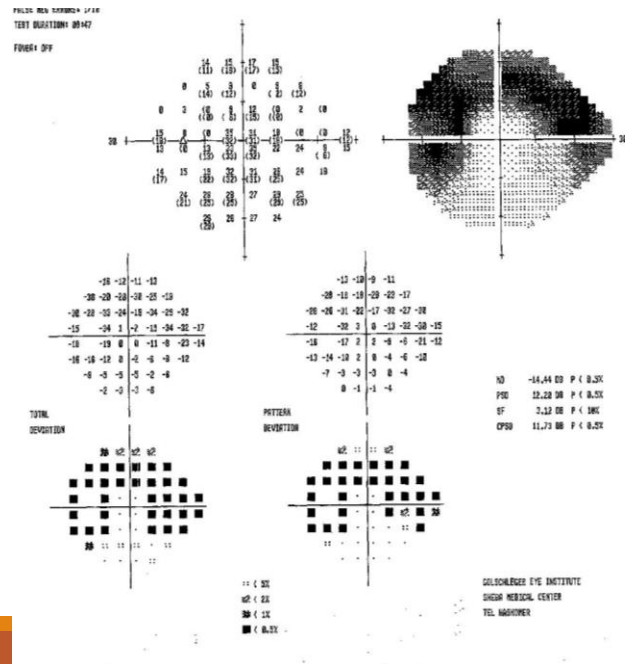
# Retinitis Pigmentosa

- A group of inherited disorders characterized by progressive peripheral vision loss.
- Advanced disease can lead to central vision loss as well.
- Patients usually don't notice the initial stages of loss and present later with night blindness and 'Tunnel vision'.
- Many genes and different modes of inheritance were identified
- To date there is no cure for the disease.



# Perimetry – Visual field testing

- Visual field (VF) testing is part of the current clinical standard for evaluating retinal degeneration and optic nerve damage
- The most common test is Humphrey automated perimetry.
- The tests is subjective and depends heavily on the patient.



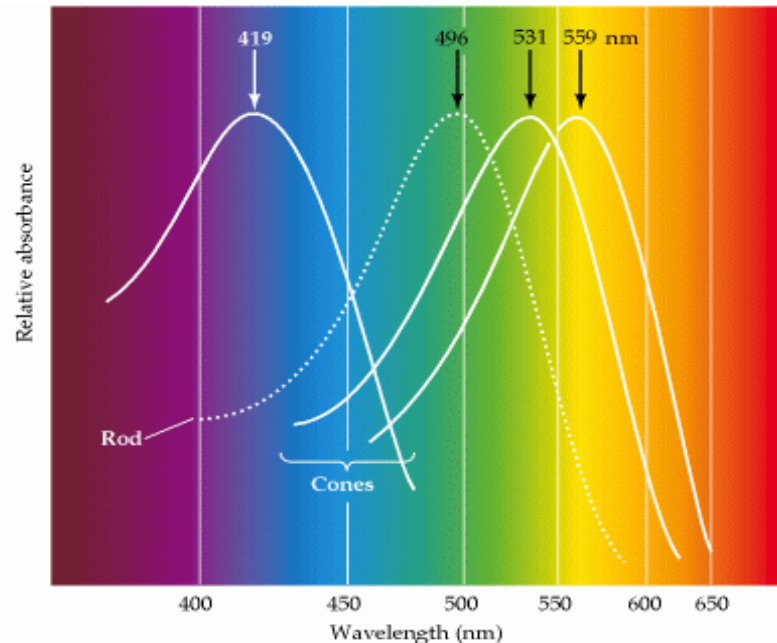
# Limitations of subjective perimetry

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- Relies on patient cooperation and attention
- Affected by patient's communication skills, attention, fatigue etc.
- Stressful for patients that need to make conscious decisions in identifying the stimuli.
- Test-retest variability. In particular in peripheral locations and areas with VF defects.

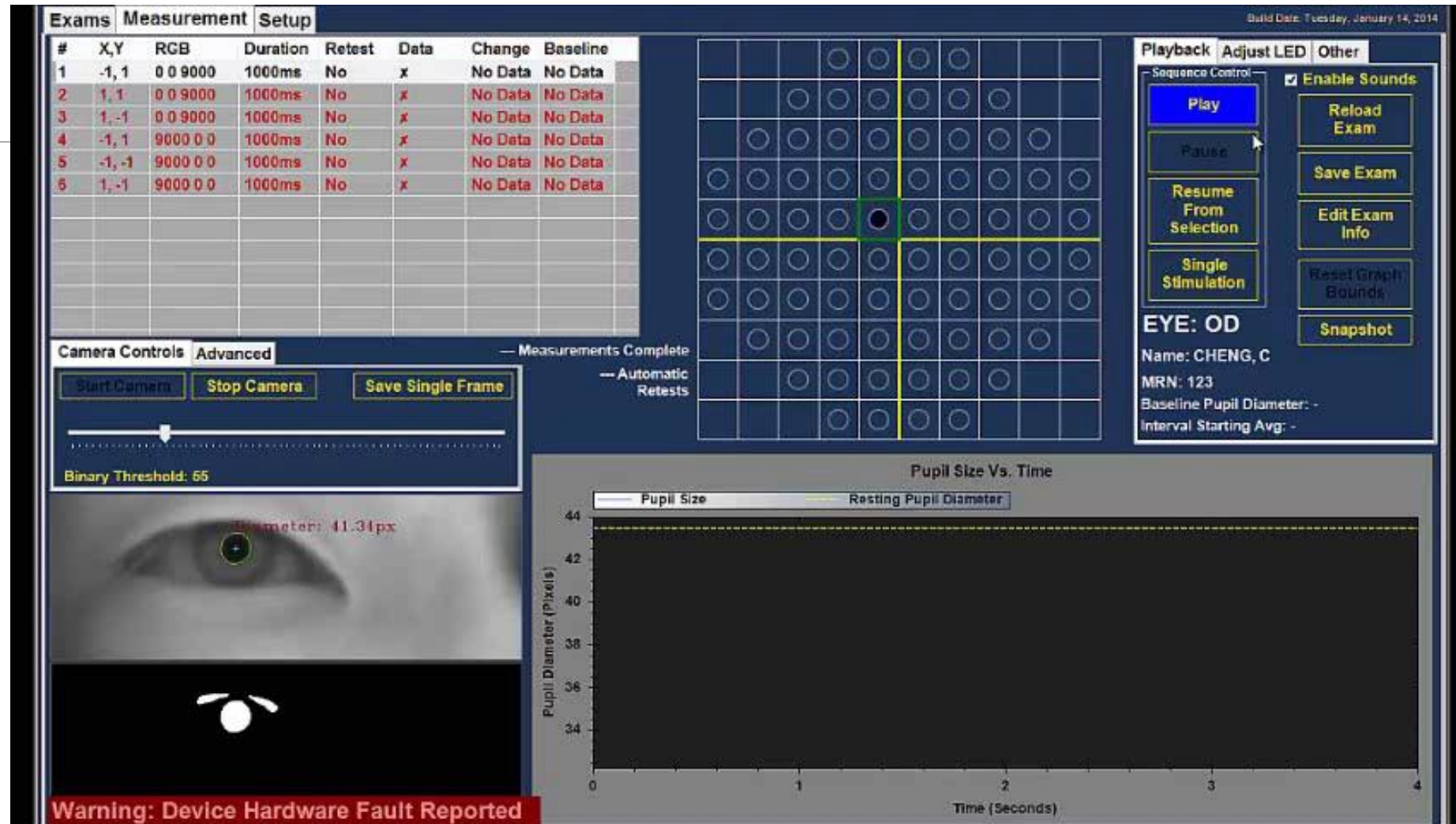
# Perimetry based on pupillary light reflex to focal chromatic stimuli

- ✓ Objective
- ✓ More informative
- ✓ Applicable to various pathologies and patients



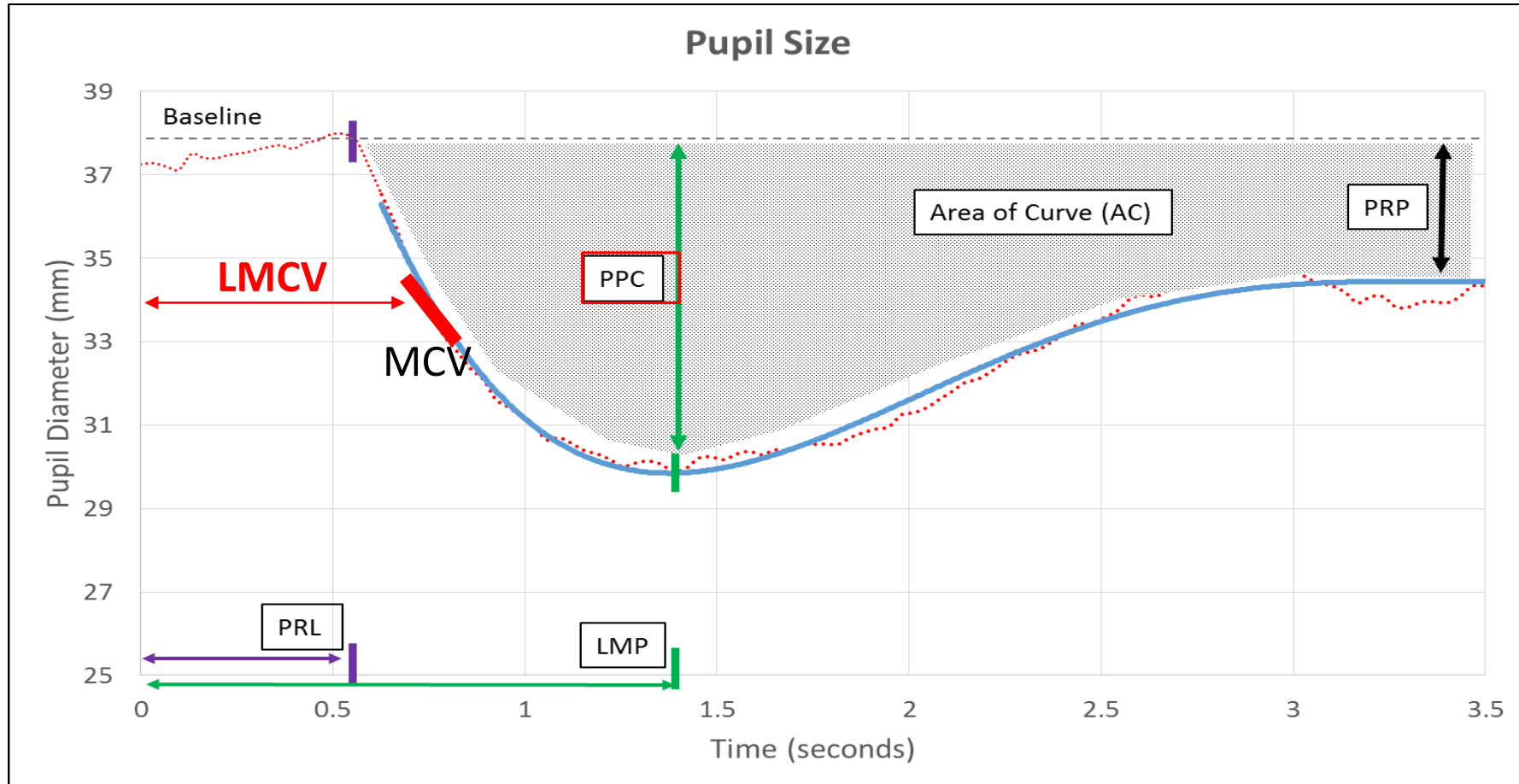
Cell Type	Stimulus
Cones	Low-intensity red (624nm)
Rods	Low-intensity blue (485 nm)
ipRGCs	High intensity blue (485 nm)

# OCP – Objective Chromatic Pupilometer





# Pupillary responses – 15 parameters



- **PPC** - % pupil contraction
- **LMCV** – Latency of maximal contraction velocity
- **MCV** - Maximal contraction velocity

# Aim of the study

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- To perform an objective perimetry in patients with Retinitis Pigmentosa using Chromatic pupilloperimetry.
- Identify patterns of pupillary response and VF damage in RP patients.

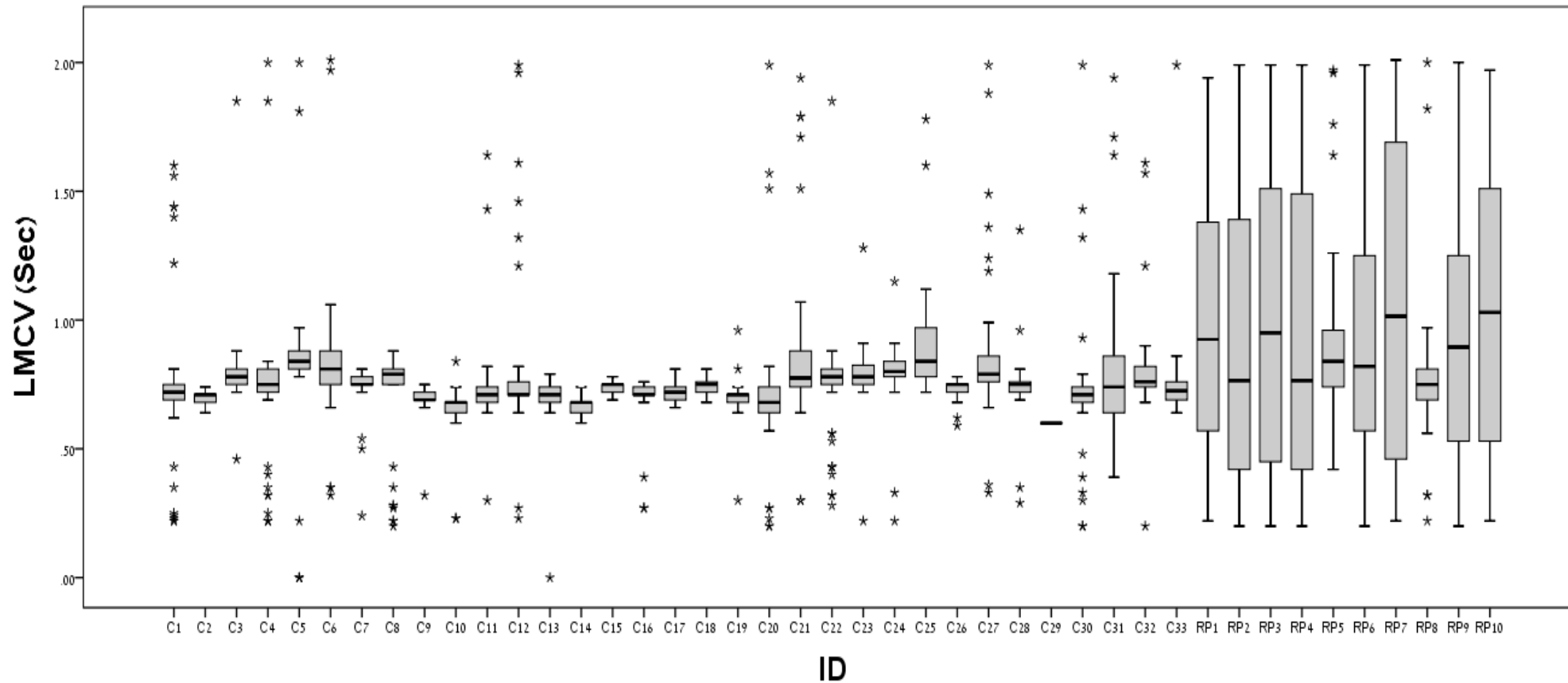


# Study design

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- 10 RP patients (2 females & 8 males, age:  $41.3 \pm 16.2$ , mean  $\pm$  SD)
- 33 healthy age-matched controls were enrolled
- The pupillary responses of patients were compared with the pupillary responses obtained from controls.
- Results of patients were also compared with their findings on Humphrey 24-2 perimetry (SITA-STD) and SD-OCT

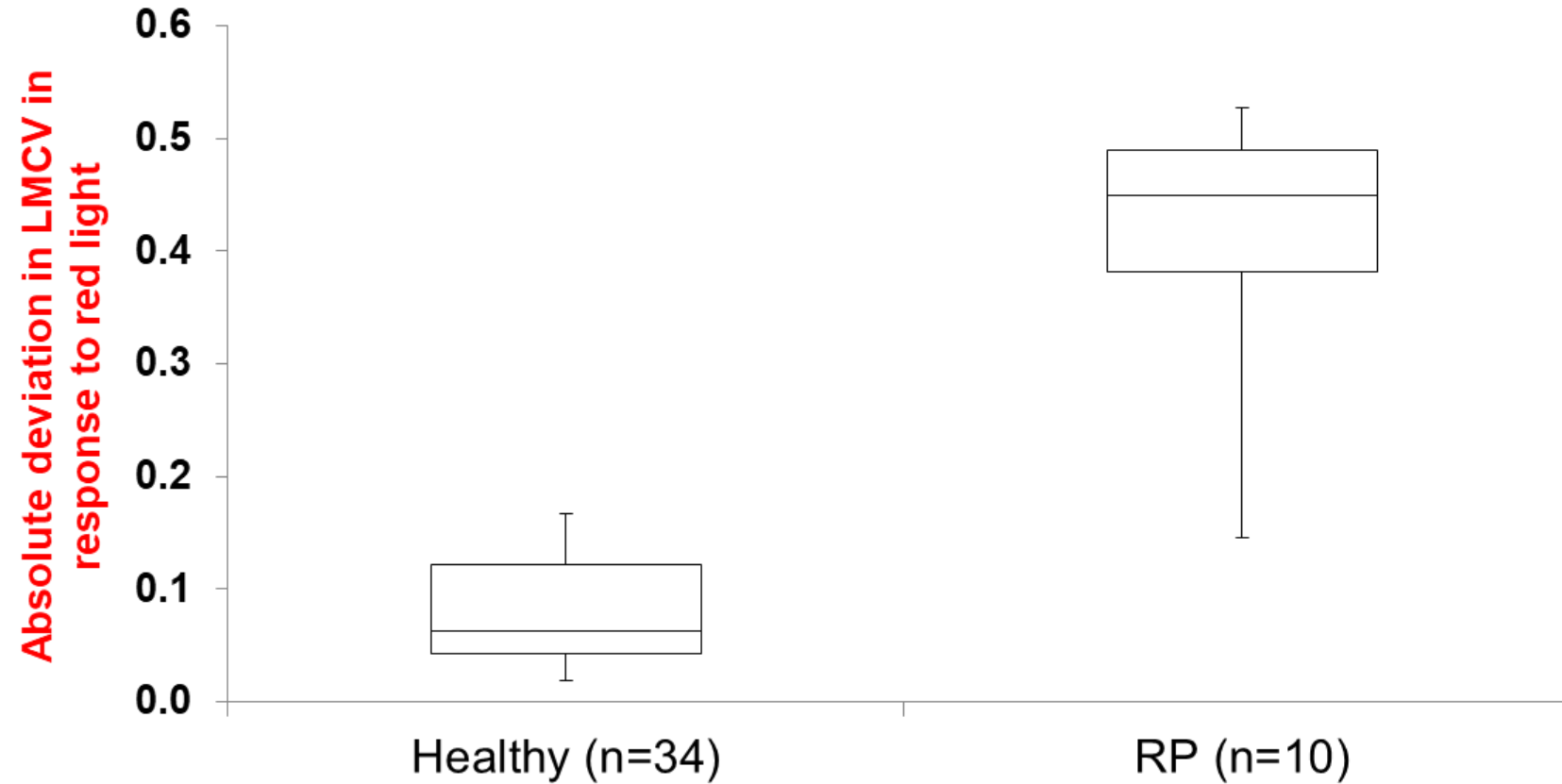
# LMCV in response to red light is more variable in RP patients



			1	2	3	4			
		5	6	7	8	9	10		
	11	12	13	14	15	16	17	18	
19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58
	59	60	61	62	63	64	65	66	
		67	68	69	70	71	72		
		73	74	75	76				

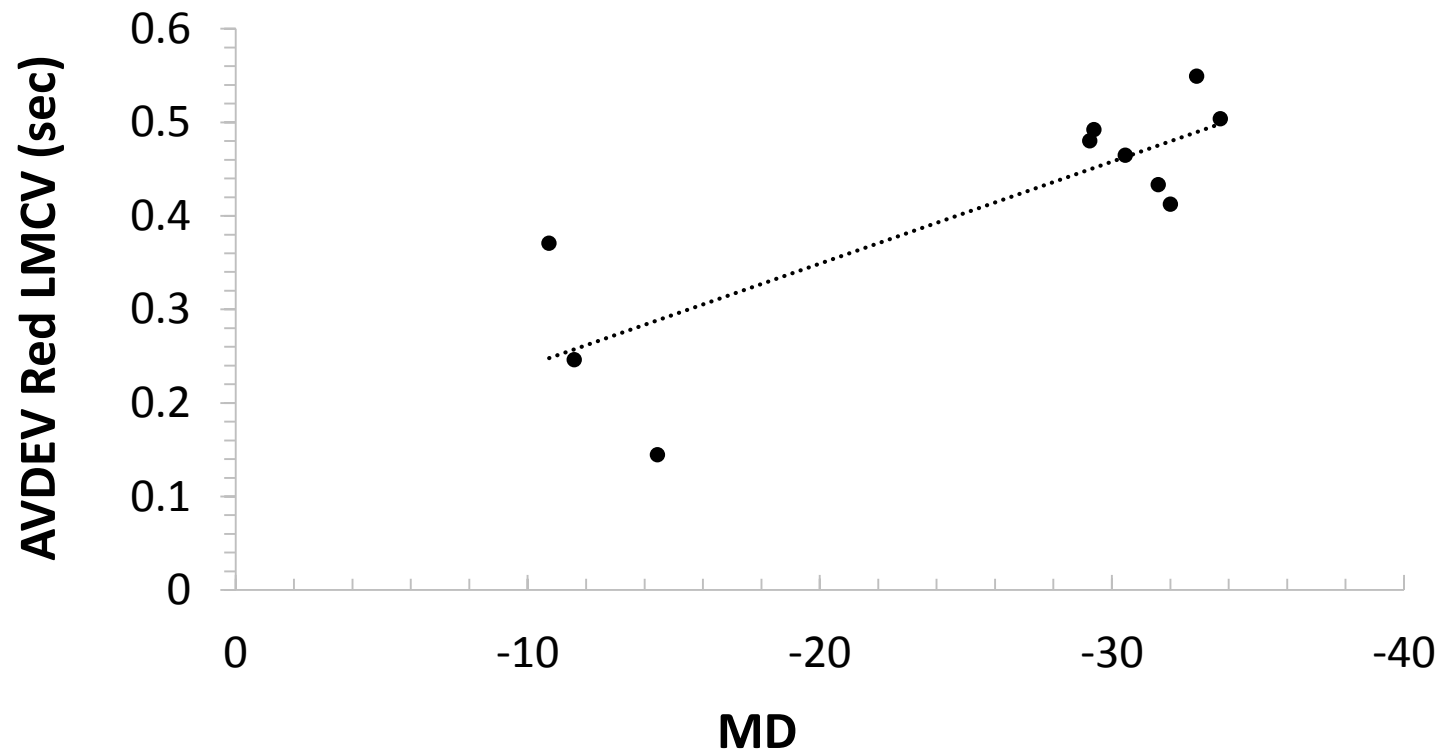
- The Absolute deviation from the median of LMCV is higher in RP patients.

RP patients – Absolute deviation in LMCV in response to red light is significantly higher and more variable in RP patients Vs. control ( $p=0.000006$ )



# High correlation between chromatic pupilloperimetry red LMCV score and Humphrey MD score

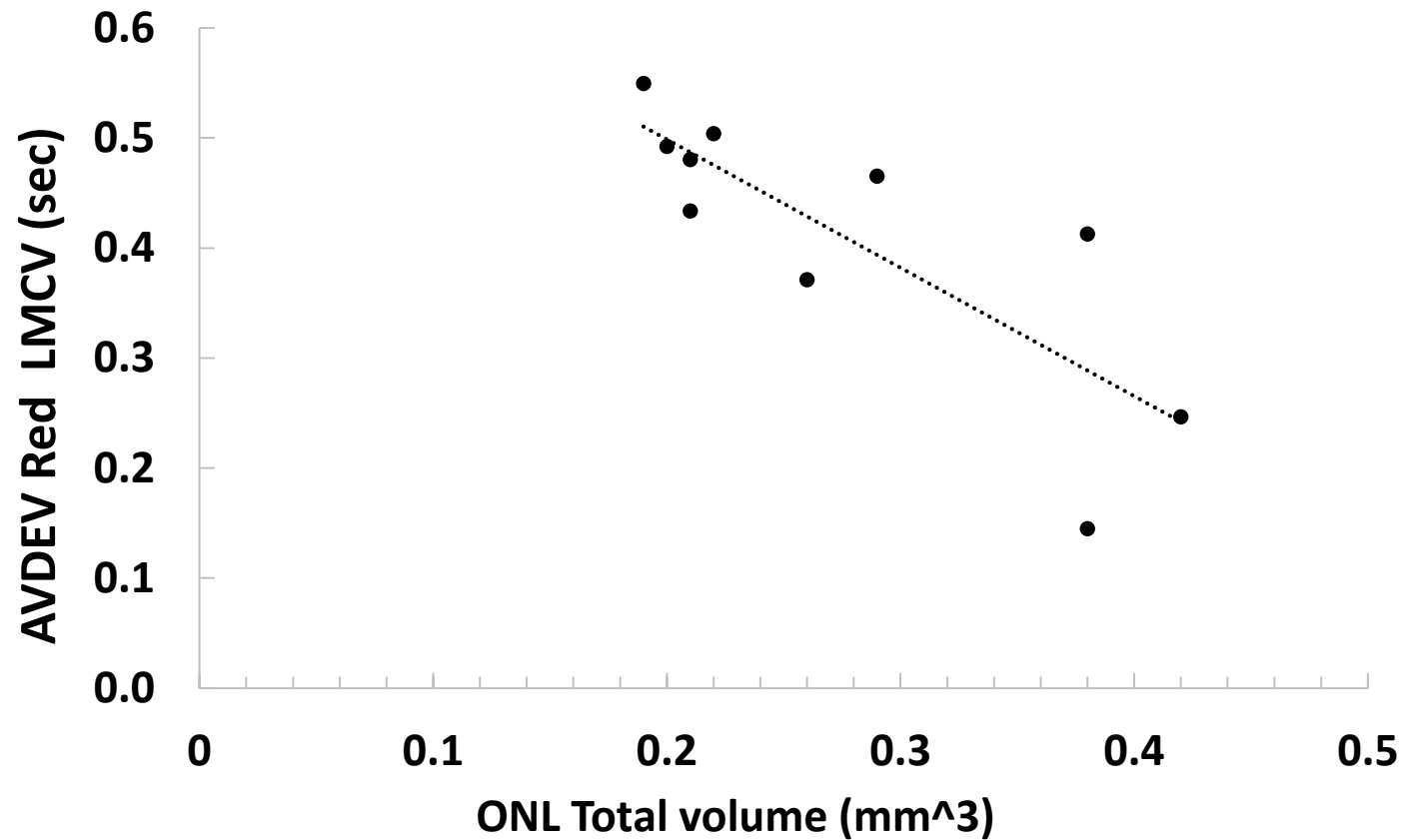
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**(Spearman's rho = 0.709, p=0.22)**

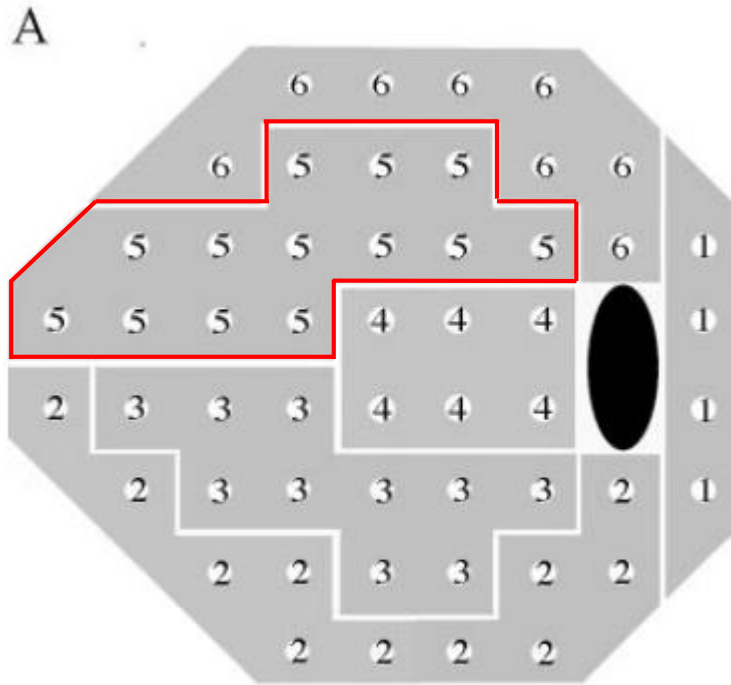
# High correlation between chromatic pupilloperimetry red LMCV score and SD-OCT ONL volume

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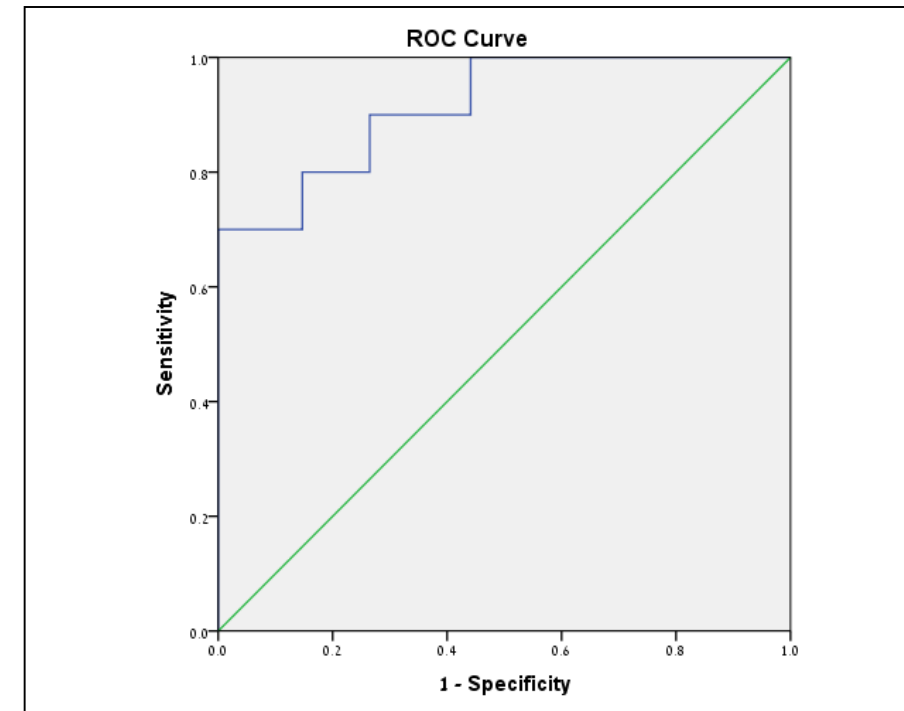
(Spearman's rho = -0.817, p=0.004)

# GH-based cluster analysis: Identification of RP with high sensitivity & specificity



Garway-Heath sector map

## Sector 5 - Red LMCV , AUC=0.971



# Conclusions

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- The absolute deviation in LMCV in response to red light is significantly higher and more variable in RP patients and may be used a diagnostic marker with high specificity and sensitivity (AUC=0.971).
- This study demonstrates the potential feasibility of using chromatic pupilloperimetry for objective assessment of VF defects and diagnosis in Retinitis Pigmentosa patients.



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## Current Team

- Dr. Ygal Rotenstreich
- Dr. Ifat Sher
- Maya Gurevitch
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- Zachary Weinerman
- Luba Biniaminov
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- Helena Solomon
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- Lori Gueta

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- Dr. Mohamad Mhajna
- Dr. Soad Haj Yahia
- Dr. Asaf Achiron
- Dr. Kolker Andrew
- Dr. Kinori Michael
- Dr. Attar-Ferman Gili
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