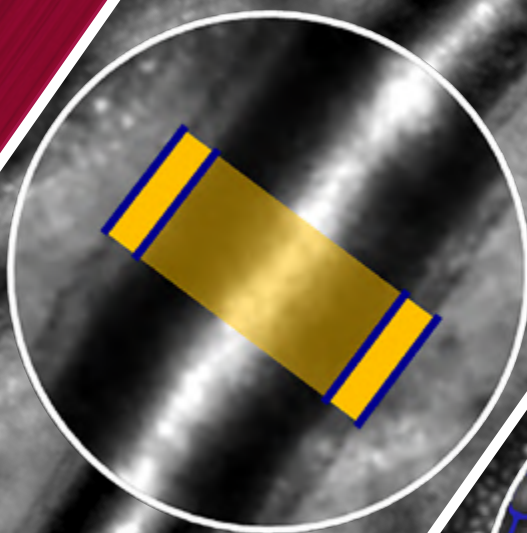Add investigational value to the rtx1™ AO Retinal Camera
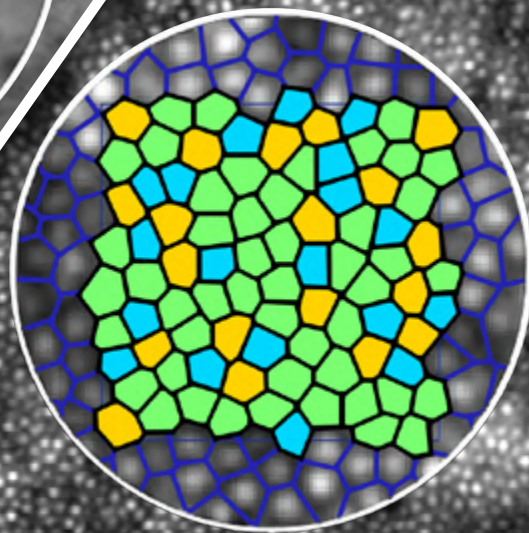
imagine eyes®

AOdetect™

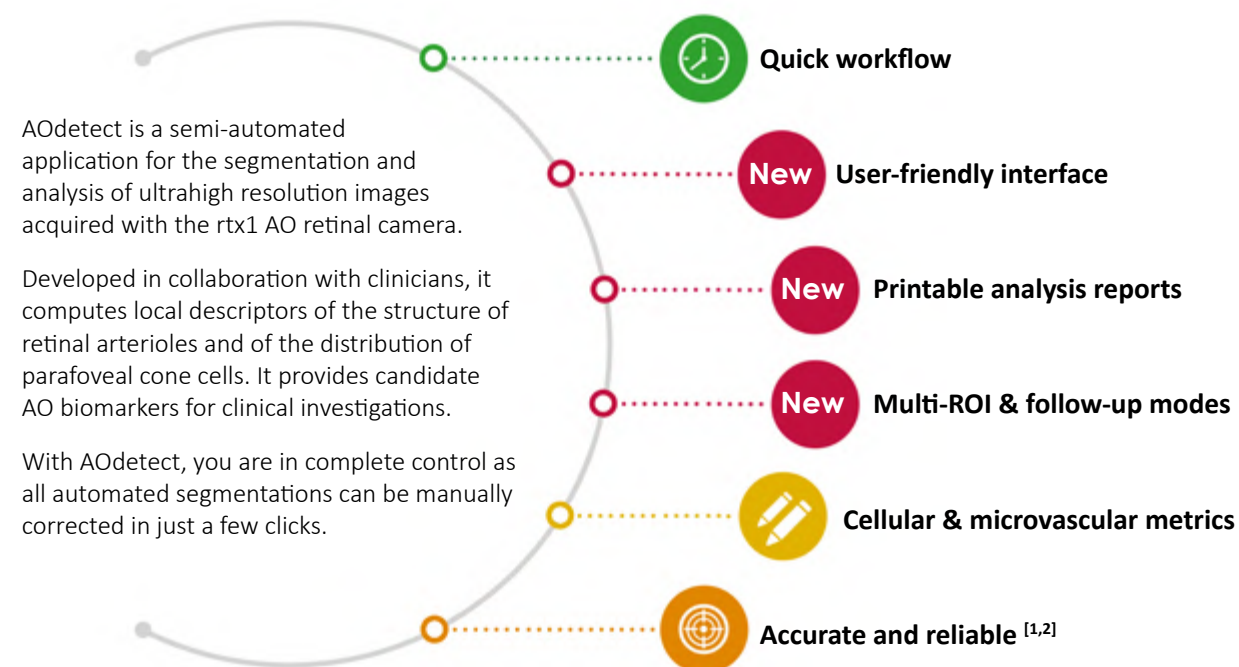Segmentation software for Adaptive Optics images

Walls

Mosaic

AOdetect™

Quick and simple analysis of rtx1™ Adaptive Optics Retinal Images

Adopted by rtx1 users to analyze AO retinal images

AOdetect is a semi-automated application for the segmentation and analysis of ultrahigh resolution images acquired with the rtx1 AO retinal camera.

Developed in collaboration with clinicians, it computes local descriptors of the structure of retinal arterioles and of the distribution of parafoveal cone cells. It provides candidate AO biomarkers for clinical investigations.

With AOdetect, you are in complete control as all automated segmentations can be manually corrected in just a few clicks.

- Quick workflow
- **New** User-friendly interface
- **New** Printable analysis reports
- **New** Multi-ROI & follow-up modes
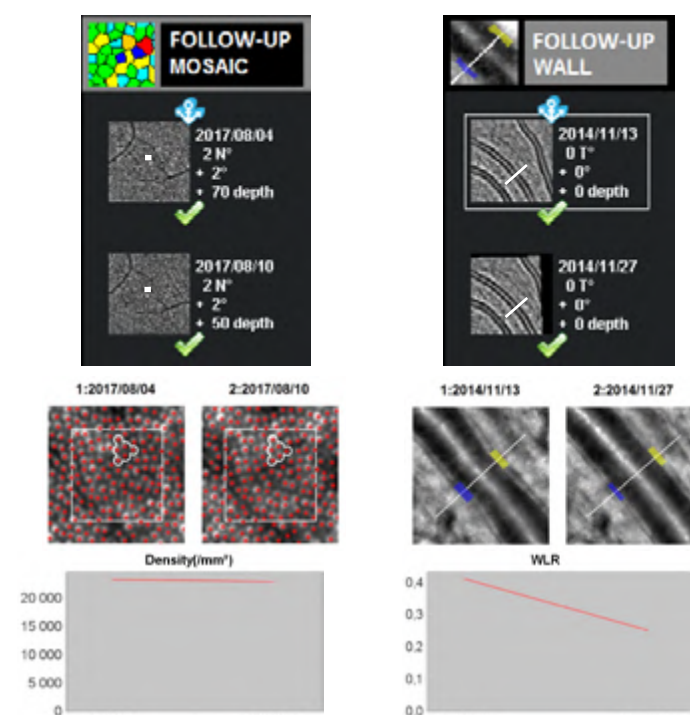- Cellular & microvascular metrics
- Accurate and reliable [1,2]

rtx1 + AOdetect : cellular follow-up made easy

The rtx1 delivers distortion-free images which are aligned with micrometer precision.

AOdetect enables analyzing the exact same region of interest in baseline and follow-up images.

New Your follow-up analysis is automatically updated with each new visit.

This is how you can easily monitor a specific group of cells or vascular section over time.

FOLLOW-UP MOSAIC
2017/08/04 2 N° + 2° + 70 depth
2017/08/10 2 N° + 2° + 50 depth
1:2017/08/04 2:2017/08/10
Density(/mm²)

FOLLOW-UP WALL
2014/11/13 0 T° + 0° + 0 depth
2014/11/27 0 T° + 0° + 0 depth
1:2014/11/13 2:2014/11/27
WLR

Walls — For images of small retinal arteries

Automated wall segmentation and thickness computation

Manual correction : click-and-drag to displace the wall borders while monitoring their position in the gradient profile
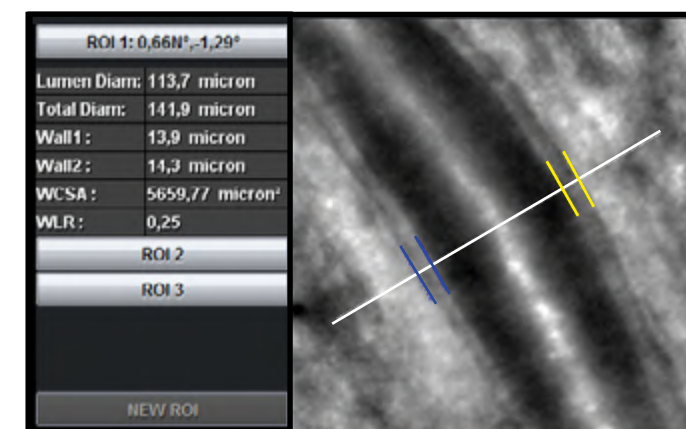
Walls descriptors
- Internal and external diameter
- Wall thickness
- Wall Cross Section Area (WSCA)
- Wall to Lumen Ratio (WLR)

Reproducibility
0.7% for internal diameter [1]
3.3% for Wall to Lumen Ratio [1]

ROI 1: 0,66N°,-1,29°	
Lumen Diam:	113,7 micron
Total Diam:	141,9 micron
Wall1 :	13,9 micron
Wall2 :	14,3 micron
WCSA :	5659,77 micron²
WLR :	0,25

ROI 2
ROI 3
NEW ROI

Example of analysis results in metric units. Visual units are also available.

Mosaic — For images of parafoveal cone cells

Automated mosaic segmentation and Voronoi analysis

Manual correction : simple clicks to add and remove cells while monitoring the Voronoi segmentation
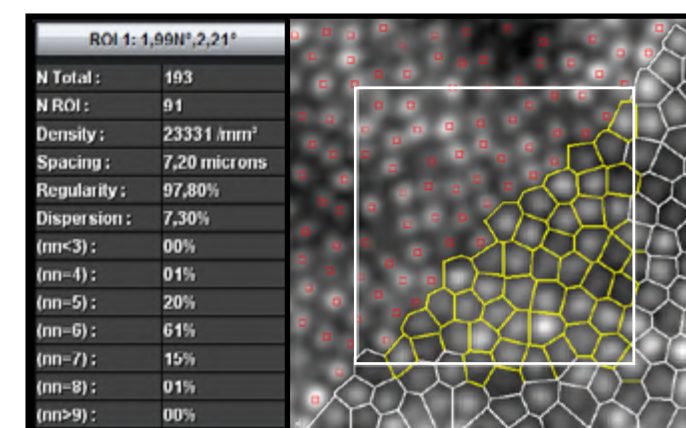
Mosaic descriptors
- Cell density
- Inter-cell spacing
- Regularity index
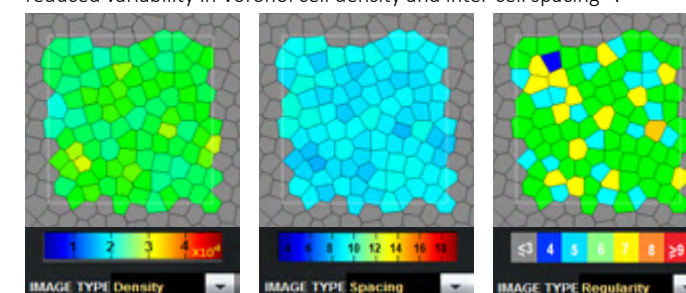- Dispersion index

Reproducibility
4% for cell density [2]

Color-coded Voronoi diagrams
- Density
- Spacing
- Regularity

ROI 1: 1,99N°,2,21°	
N Total :	193
N ROI :	91
Density :	23331 /mm²
Spacing :	7,20 microns
Regularity :	97,80%
Dispersion :	7,30%
(nn<3) :	00%
(nn=4) :	01%
(nn=5) :	20%
(nn=6) :	61%
(nn=7) :	15%
(nn=8) :	01%
(nn>9) :	00%

Example of analysis results in metric units. Visual units are also available for reduced variability in Voronoi cell density and inter-cell spacing [2].

IMAGE TYPE Density
IMAGE TYPE Spacing
IMAGE TYPE Regularity

[1] De Ciuceis et al. Comparison Between Invasive and Noninvasive Techniques of Evaluation of Microvascular Structural Alterations. *Journal of Hypertension 36;* 5:1154-1163
[2] Legras et al. Distribution of Cone Density, Spacing and Arrangement in Adult Healthy Retinas with Adaptive Optics Flood Illumination. *PLOS ONE 13,* e0191141

AOdetect interface and reports

New

Walls x Multi-ROI

> *The retinal image analysis with rtx1 offers a novel noninvasive measurement of early changes in the vasculature that are not detectable on routine clinical examination.*
>
> Zaleska-Żmijewska et al. *J Diab Research,* 2017

> *In arterial hypertension, WLR is a robust, dimensionless parameter that can be measured on large cohorts of nondilated patients.*
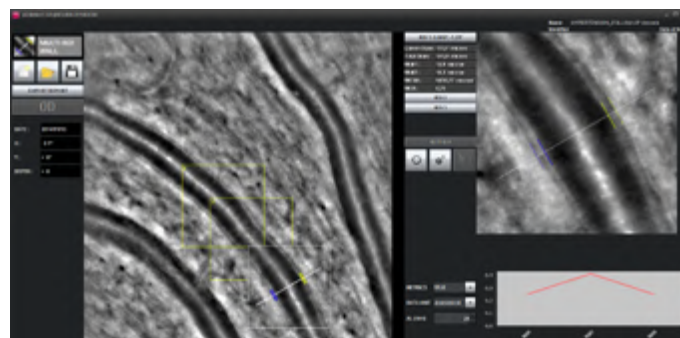>
> Paques et al., *Prog Ret Eye Research,* 2018

Walls x Multi-ROI Report

Mosaic x Follow-up Report

> *The rtx1 retinal image evaluation demonstrated photoreceptors loss in DM1 diabetic patients prior to any clinical changes.*
>
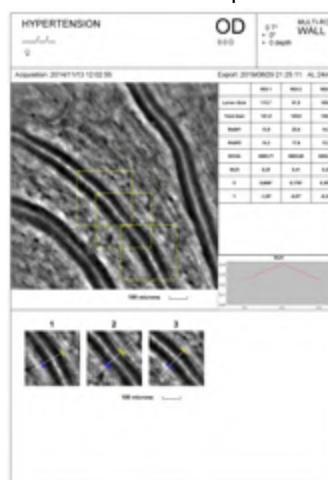> Cristescu et al. *Rom J Ophthalmol,* 2019

> *AO images showed a decrease in the number of foveal cone densities over 2 years in patients with RP. AO may shorten the period required to predict the RP progression rate.*
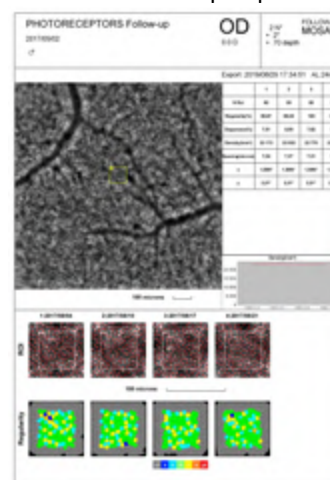>
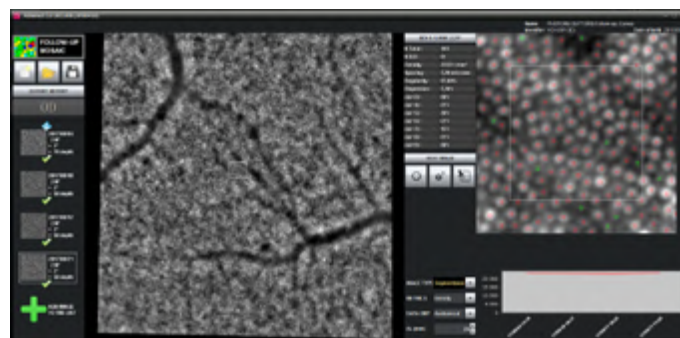> Ueda-Consolvo et al. *Graefes Arc Clin Exp Opht,* 2019

Mosaic x Follow-up

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SPECIFICATIONS ## AOdetect Software

Computer requirements

OS	Windows XP-SP3, 7-SP1, 10
RAM	4 Gbyte or more
CPU	Intel i3 or higher

Export formats

Analysis results	Text file
Printable reports	JPEG

AOdetect is not part of the rtx1 product and is for research use only