

# DRI OCT Triton™ Series

Swept Source Optical Coherence Tomography



**NEW** PixelSmart™

 **TOPCON** Healthcare

SEEING EYE HEALTH DIFFERENTLY

# See. Discover. Explore.

The diagnostic power of Swept Source OCT Deep Range Imaging<sup>1</sup>.



“Swept Source adds a new dimension to OCT. The TOPCON DRI Swept Source OCT is easy to use, provides unique clinical information, and has improved my practice. For the first time, we can in-vivo visualize not only the vitreo-retinal interface but also the cortical vitreous which is important at the time when more and more therapies are delivered via intra-vitreous injections. Deeper imaging brings choroidal thickness, helping guide my clinical decisions. Seeing more helps guide my therapy and allows me to treat more effectively. I find Swept Source OCT an essential tool to look for biomarkers of disease regression or progression.”

Prof. P. E. Stanga

Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at NIHR/  
Welcome Trust Manchester CRF & University of Manchester

<sup>1</sup>) Fabio Lavinsky, Daniel Lavinsky. Novel perspectives on swept-source optical coherence tomography. Int J Retin Vitr (2016) 2:25

# Welcome to the New Frontier in OCT Imaging.

The DRI OCT Triton combines the world's first<sup>2</sup> Swept Source OCT technology with multimodal fundus imaging.

## Image Quality

Triton's Swept Source with its 100 kHz scanning speed and 1,050nm wavelength results in a clear and detailed images even for the deepest layers of the eye with short acquisition time. Visualize not only the retina and vitreous, but also the choroid and sclera<sup>1</sup>.

## Diagnostic capability

Seeing deeper makes it possible to have a better understanding of many ocular pathologies!.With features such as OCT angiography, fundus autofluorescence and en face OCT, Triton empowers clinicians with multimodal imaging capability to help assess and preserve patient's eye health.

## Practice efficiency

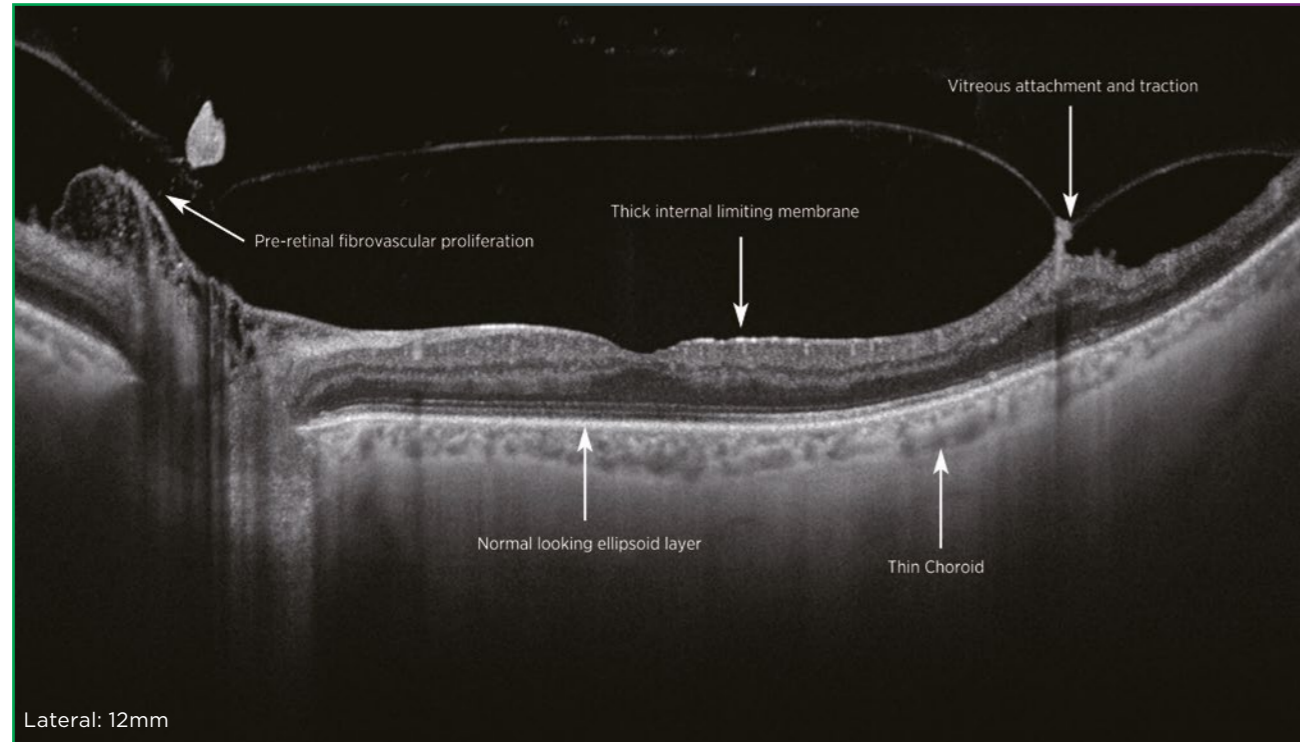
The Triton's automated functions, including single scan captures and SMARTTrack™ system, are designed to optimize your practice workflow by simplifying data capture, analysis and follow-up.



<sup>1</sup>) Fabio Lavinsky, Daniel Lavinsky. Novel perspectives on swept-source optical coherence tomography. Int J Retin Vitr (2016) 2:25  
<sup>2</sup>) 2015 Comprehensive Report on The Global Ophthalmic Diagnostic Equipment Market

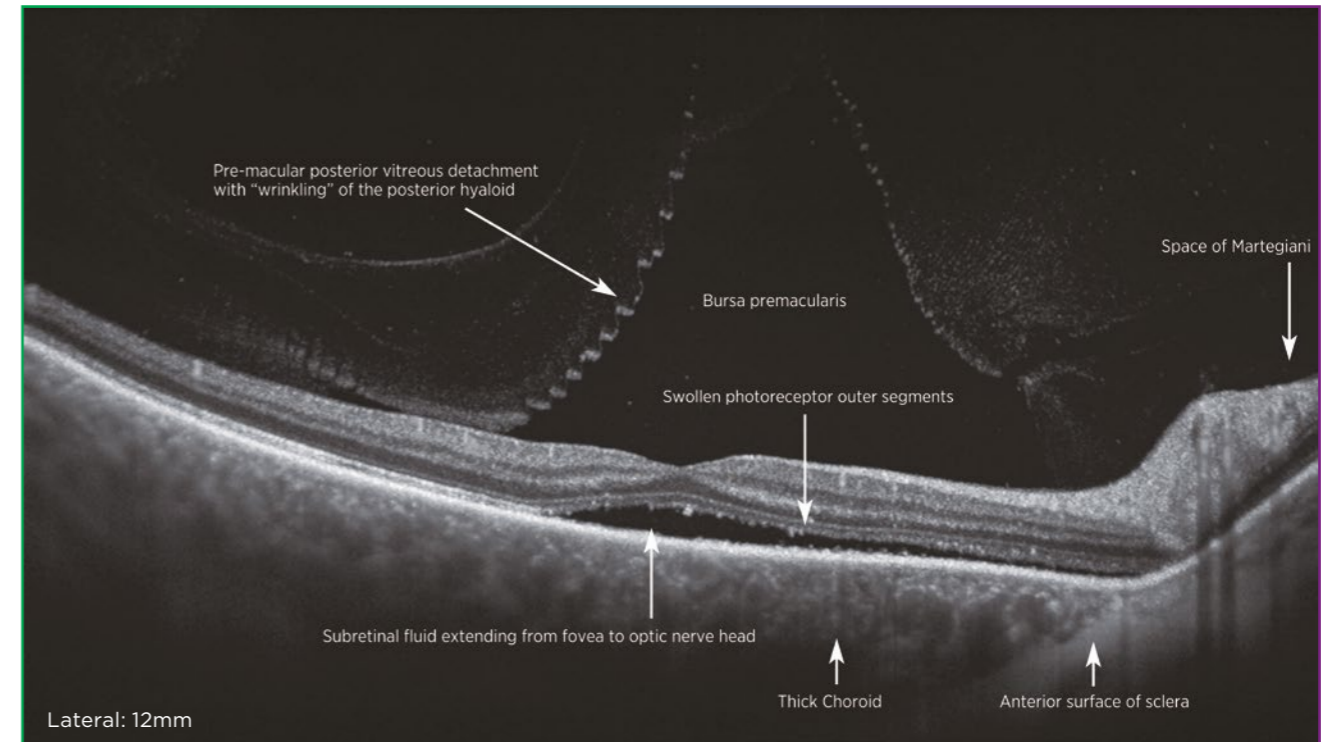
# See Deeper<sup>1</sup>. See More.

## Proliferative diabetic retinopathy



Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester

## Central serous chorioretinopathy

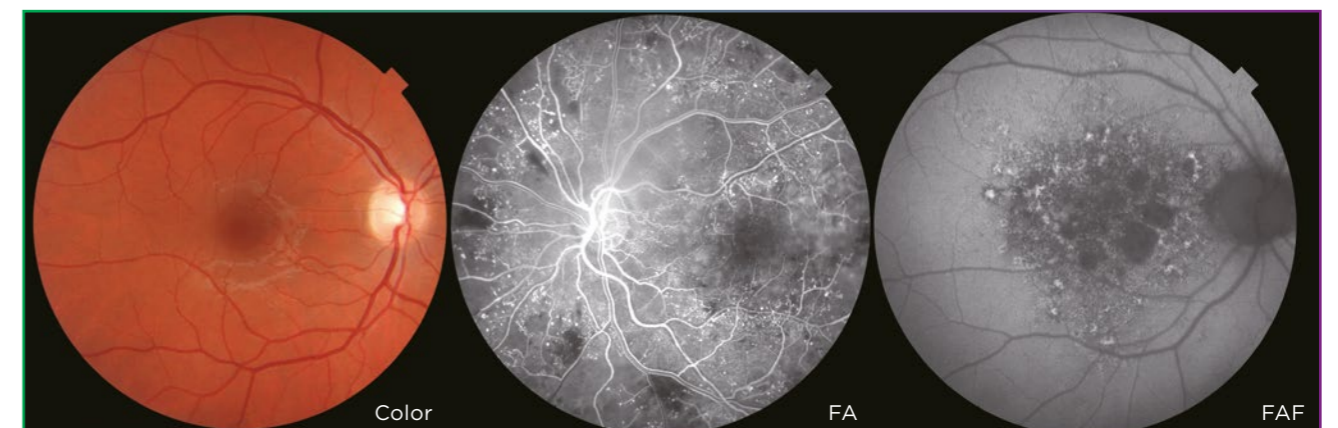


Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester



Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester

\* FA photography and FAF photography can be performed using only DRI OCT Triton Plus.

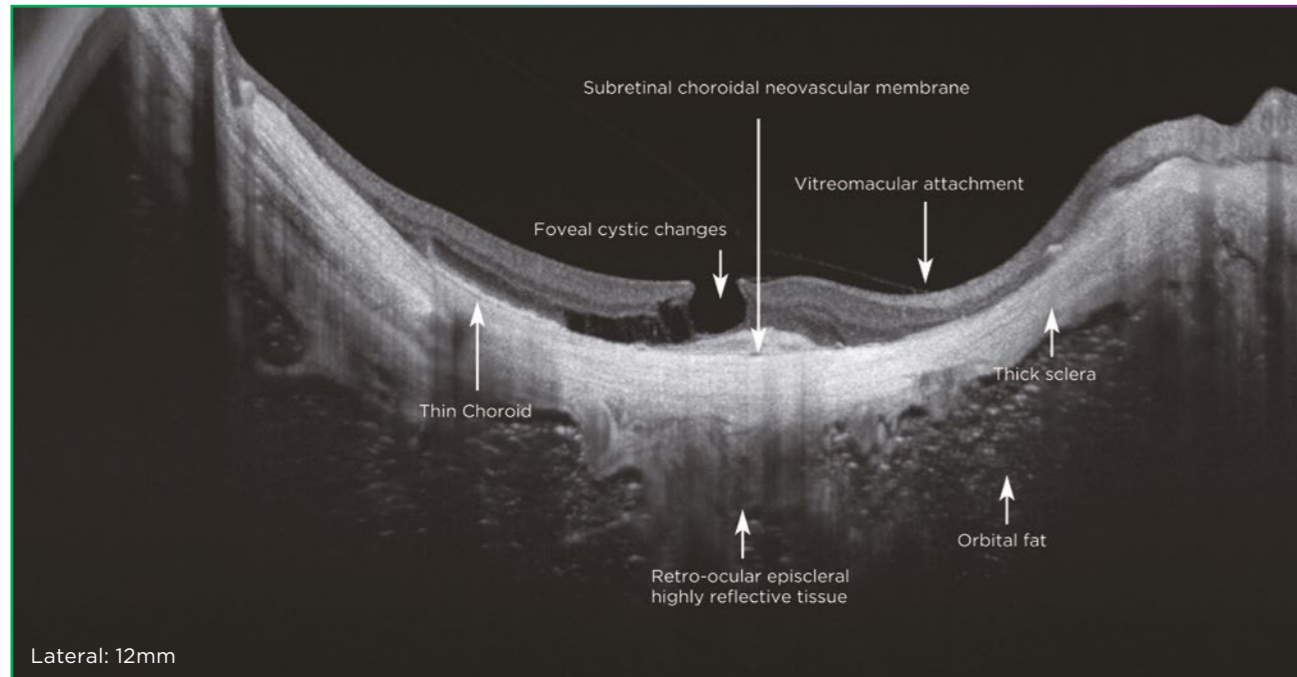


Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester

\* FA photography and FAF photography can be performed using only DRI OCT Triton Plus.

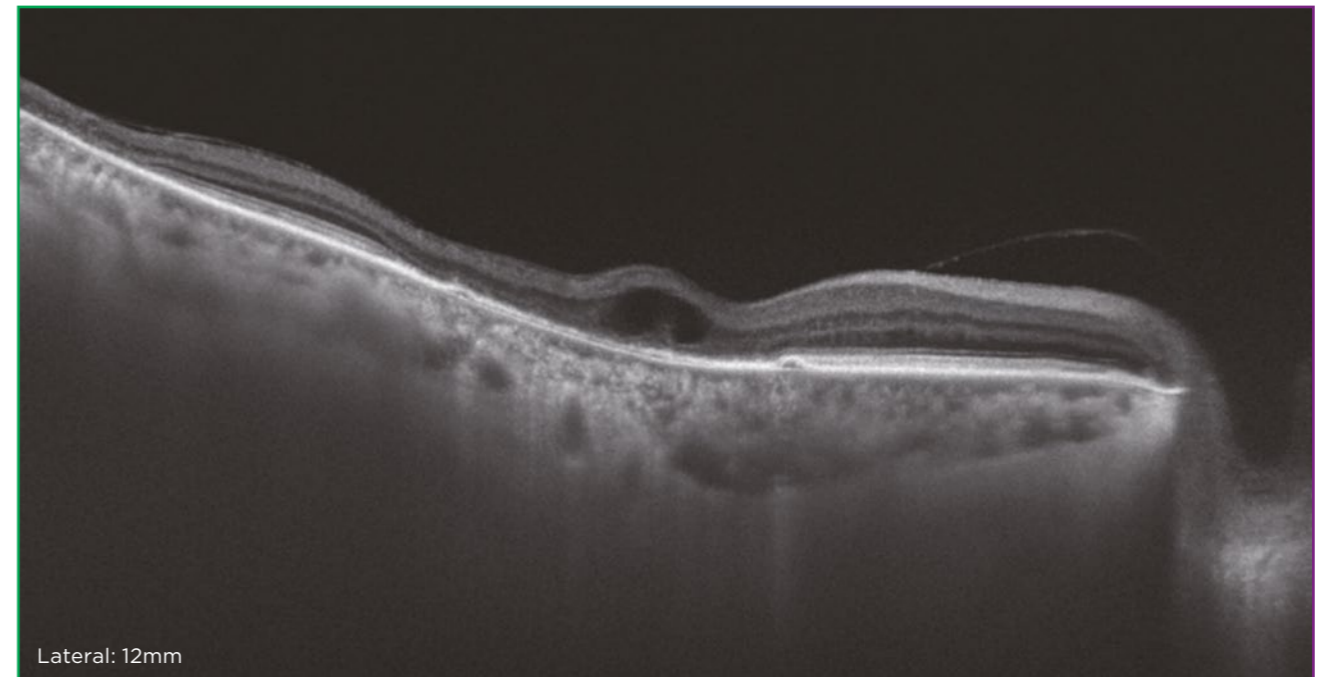
# See Deeper<sup>1</sup>. See More.

## Pathological myopia



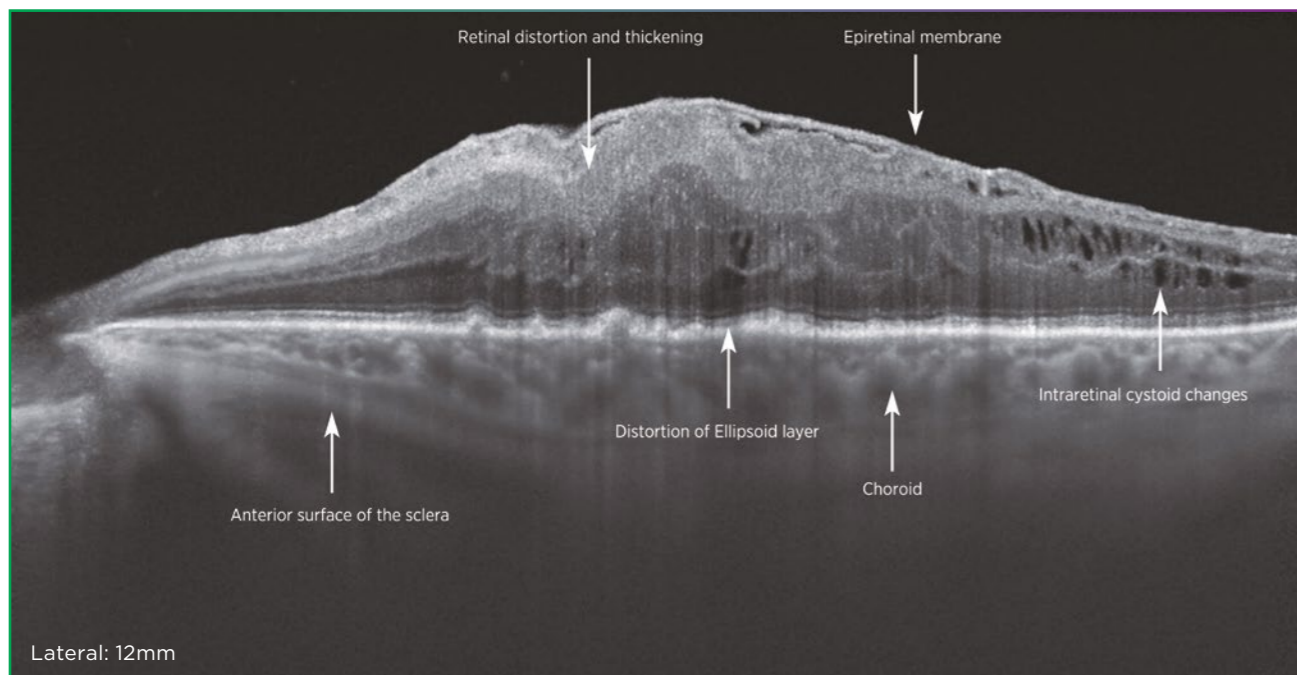
Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester

## Image through cataract

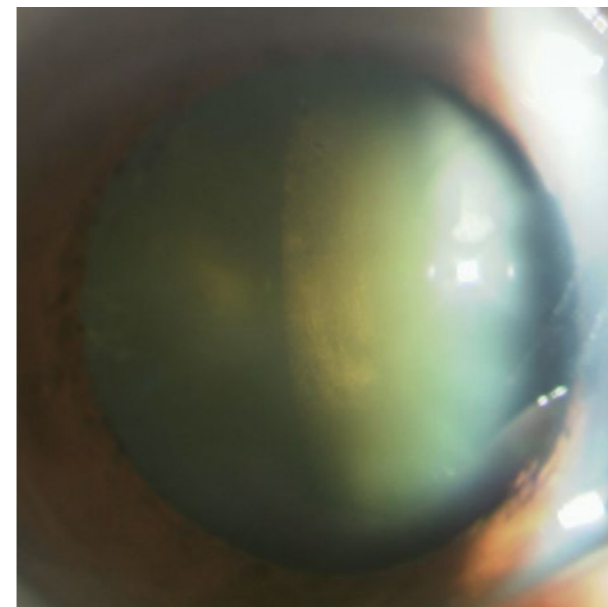


a)

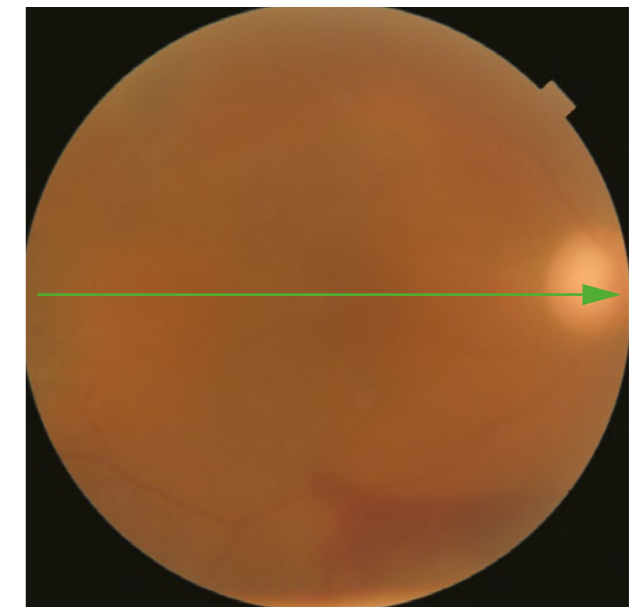
## Macular pucker



Courtesy: Prof. P. E. Stanga, Manchester Royal Eye Hospital, Manchester Vision Regeneration (MVR) Lab at N IHR/ Wellcome Trust Manchester CRF & University of Manchester



b)



c)

a, b, c courtesy of Kazuya Yamagishi, MD (Hirakata Yamagishi Eye Clinic, Japan)

<sup>1</sup>) Fabio Lavinsky, Daniel Lavinsky. Novel perspectives on swept-source optical coherence tomography. Int J Retin Vitri (2016) 2:25

# Discover What Lies Beneath

TOPCON's SS OCT Angio™ combines OCT angiography with a Swept Source OCT.

OCTARA™, a proprietary image processing algorithm, provides highly sensitive angiographic detection<sup>3</sup>, allowing for visualization of vascular structures even in the choroid and deeper retinal layers.

## High-sensitivity Imaging and Deeper Intravascular Flow Visualization<sup>1</sup>

Swept Source technology and OCTARA™ allow the deeper structures to be visualized with less depth-dependent signal roll-off<sup>3</sup>. Additionally, the 1µm wavelength makes OCT Angiography imaging possible for patients with media opacities.

## Rapid Scanning, Real Time Eye Tracking

At 100,000 A-Scans per second coupled with invisible\* scanning lines and the SMARTTrack™ eye tracking system, the Triton quickly captures a dense data set and provides an en face OCT Angiography image of the retinal microvascular flow network<sup>3</sup>.

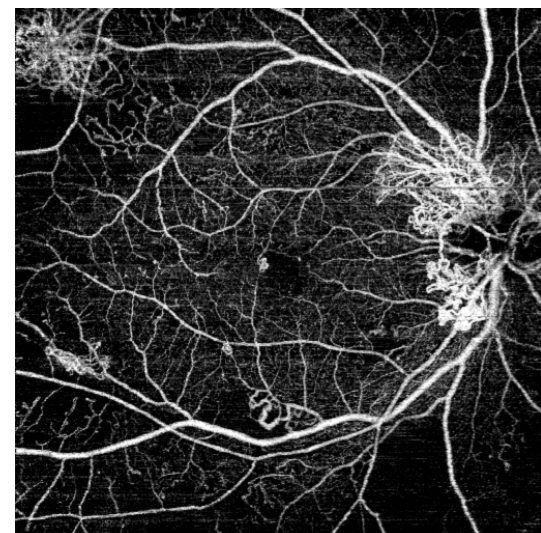
\* OCT Angiography scanning line may be faintly visible during capture to some people with certain conditions

## Efficiency & Workflow Integration

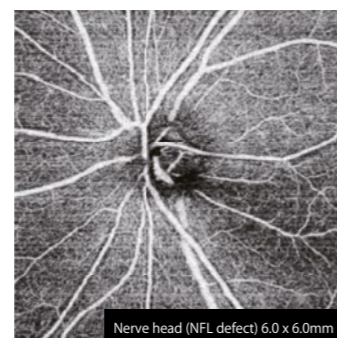
Multimodal platform provides comparison of microvascular impairment with FA, FAF, OCT and true color fundus images in a single device\*.

\*DRI OCT Triton Plus

## 12x12mm 512 pixels

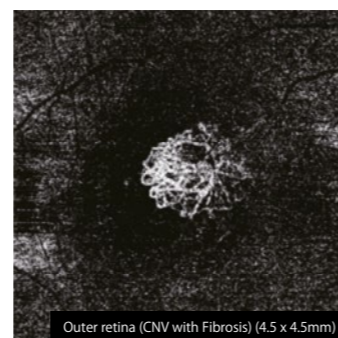


Courtesy: Akihiro Ishibazawa, MD, PhD, Asahikawa Medical University Graduate School of Medical Sciences, Hokkaido, Japan



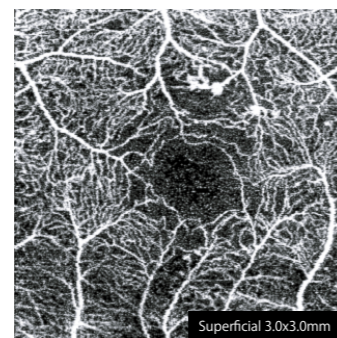
Nerve head (NFL defect) 6.0 x 6.0mm

Courtesy: Kazuya Yamagishi, MD, Hirakata Yamagishi Eye Clinic, Japan



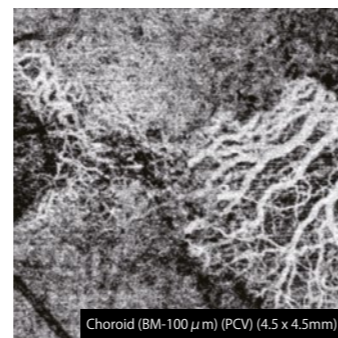
Outer retina (CNV with Fibrosis) (4.5 x 4.5mm)

Courtesy: Dr.Carl Glittenberg, MD, Kari Landsteiner Institute for Retinal Research and Imaging, Austria



Superficial 3.0x3.0mm

Courtesy: Akihiro Ishibazawa, MD, PhD, Asahikawa Medical University Graduate School of Medical Sciences, Hokkaido, Japan

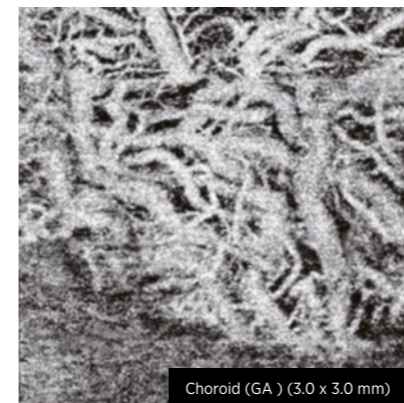


Choroid (BM-100µm) (PCV) (4.5 x 4.5mm)

Courtesy: Dr.Carl Glittenberg, MD, Kari Landsteiner Institute for Retinal Research and Imaging, Austria

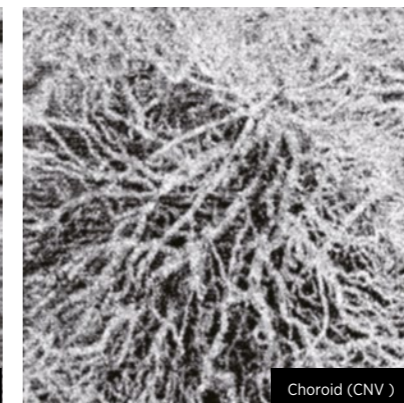
## OCTARA™

OCTARA™ is the image processing technology which extracts the signal changes derived from vascular flow using multiple OCT B-Scans acquired at the same position. It demonstrates high sensitivity for the detection of low blood flow in microvasculature<sup>3</sup>.



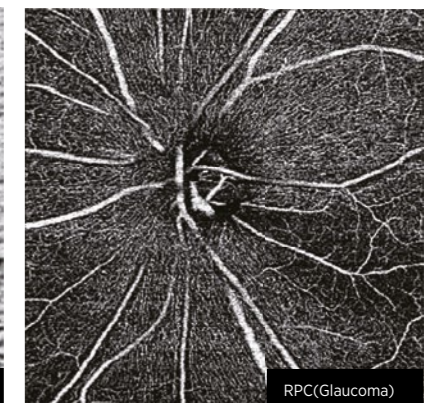
Choroid (GA) (3.0 x 3.0 mm)

Courtesy: Srinivas R. Sadda, M.D., Doheny Eye Institute, UCLA



Choroid (CNV)

Courtesy: Srinivas R. Sadda, M.D., Doheny Eye Institute, UCLA



RPC(Glaucoma)

Courtesy: Kazuya Yamagishi, MD, Hirakata Yamagishi Eye Clinic, Japan

## Multimodal Viewing

En face angiography images, B-scans and fundus photography can all be viewed on a single screen using IMAGEnet®6 and PinPoint™ registration, so that area of interest can be assessed using multiple image modalities. Selected layers can easily be customized to enhance the clarity of specific pathological features.

- Color
- FA
- FAF

Fundus image

SS OCT Angio enlarged

Projection image

- Projection
- En-face
- Retina Thickness
- RNFL Thickness
- GCL++Thickness
- GCL+ Thickness

thumbnails

- Vitreous
- Retina
- Superficial
- Deep

Angio-B

- Outer Retina
- Sub-RPE
- Choriocapillaris
- Choroid

B-scan

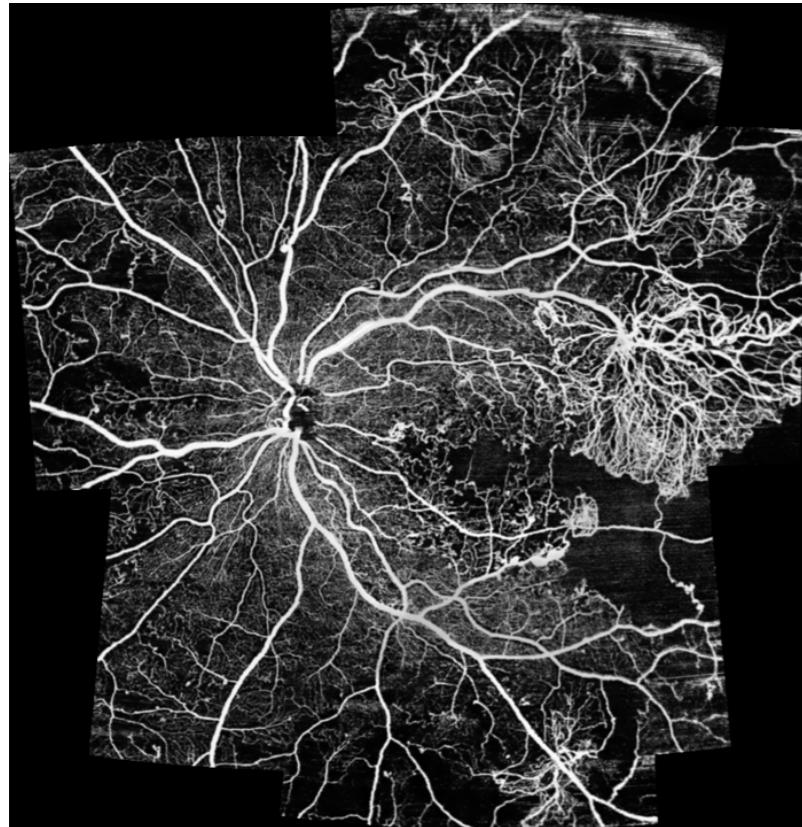
Blood flow signal is overlaid on the B-scan. Flow signal above the RPE is displayed in red; flow signal below the RPE is displayed in pink.

3) Magdy Moussa, Mahmoud Leila, Hagar Khalid. Imaging choroidal neovascular membrane using en face swept-source optical coherence tomography angiography. Clinical Ophthalmology 2017;11:1859-1869

3) Magdy Moussa, Mahmoud Leila, Hagar Khalid. Imaging choroidal neovascular membrane using en face swept-source optical coherence tomography angiography. Clinical Ophthalmology 2017;11:1859-1869

# Discover What Lies Beneath

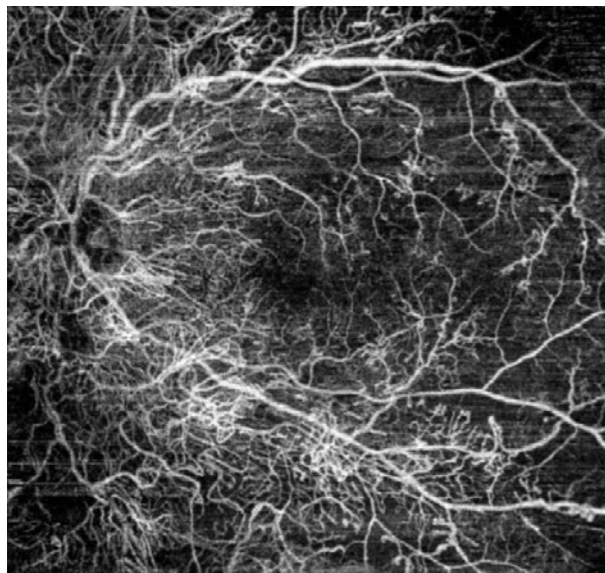
Proliferative diabetic retinopathy



SS OCT Angio™ Montage

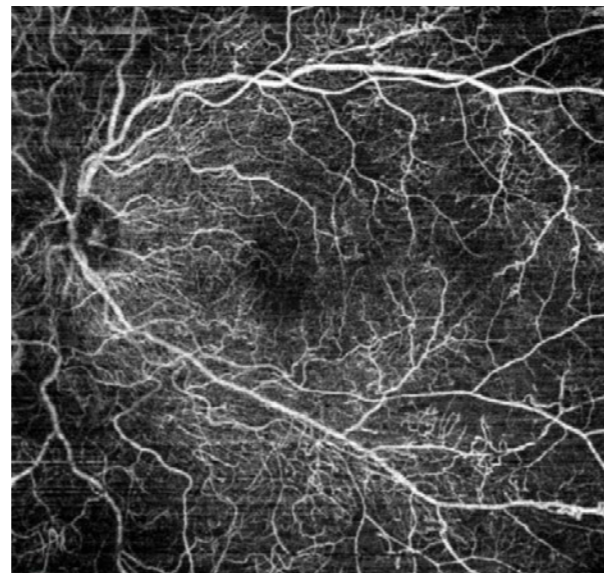
Courtesy: Akihiro Ishibazawa, MD, PhD.  
Asahikawa Medical University Graduate School of Medical Sciences, Hokkaido, Japan

Before treatment



Courtesy: Akihiro Ishibazawa, MD, PhD.  
Asahikawa Medical University Graduate School of Medical Sciences, Hokkaido, Japan

After treatment



Courtesy: Akihiro Ishibazawa, MD, PhD.  
Asahikawa Medical University Graduate School of Medical Sciences, Hokkaido, Japan

Branch retinal vein occlusion



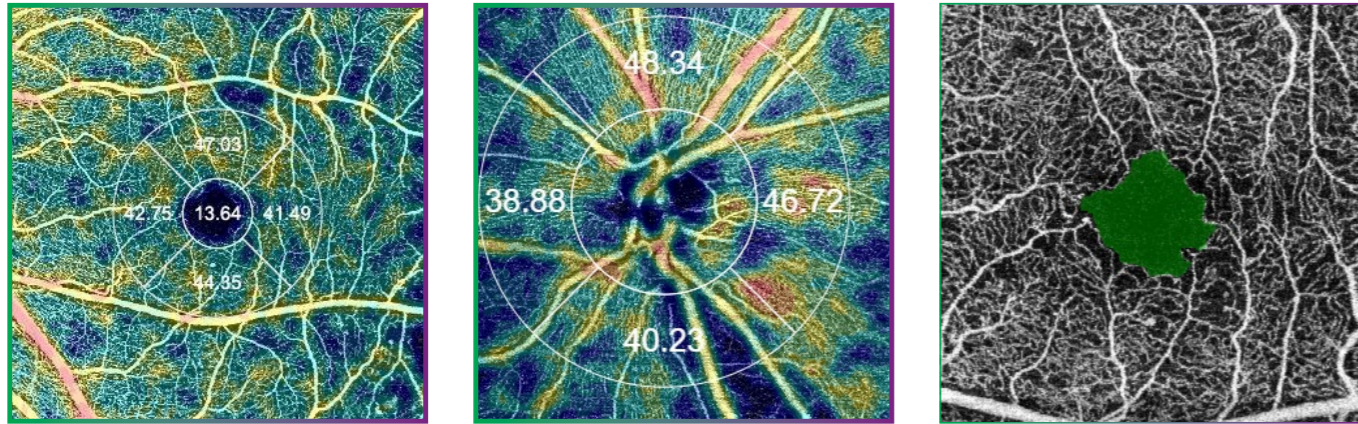
SS OCT Angio™ Montage



Courtesy: Yuichiro Ogura, MD, Professor and Chairman, Department of Ophthalmology and Visual Science, Nagoya City University, Nagoya, Japan

# Discover more possibilities: see beyond and deeper

OCTA metrics on Triton SS OCT Angio allows clinicians to objectively and quantitatively assess retinal vasculature, providing valuable insights into the patient's eye health.

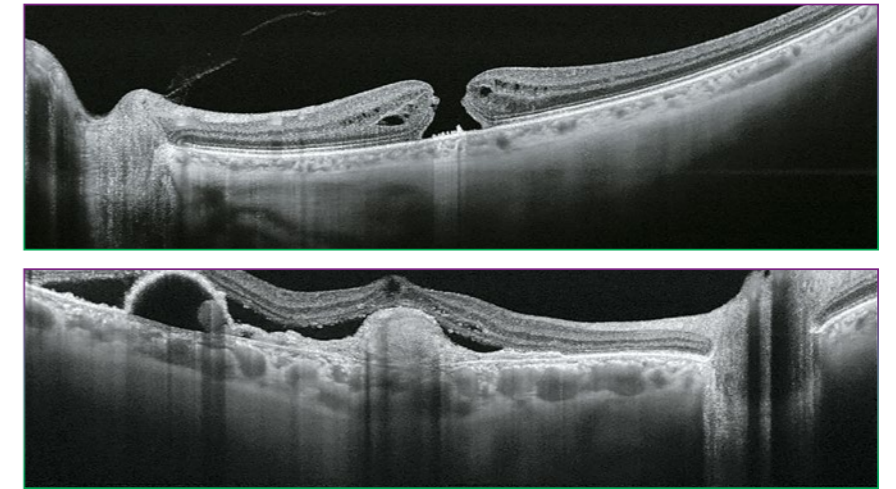


Courtesy: Michael H. Chen, O.D.

# Swept Source OCT Imaging

## 1,050nm wavelength

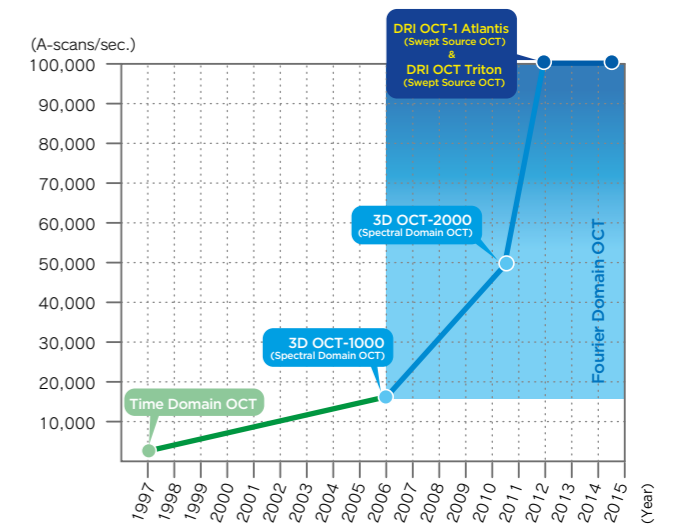
The longer wavelength light provides better tissue penetration, allowing visualization into the deepest layers of the eye!



Courtesy: Professor Jose Maria Ruiz Moreno MD, University of Albacete, Spain

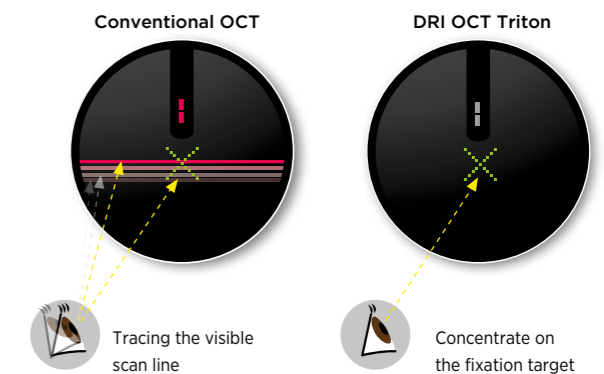
## Swept Source OCT technology; scanning speed of 100,000 A-scans/sec

The fast scanning speed of 100,000 A-scans/sec enables capture of clear B-scans<sup>4</sup> by acquiring more A-scans within a given image acquisition time. This helps to reduce artifacts from involuntary eye movements such as saccades and blinks.



## Invisible scan lines

The invisible 1,050nm wavelength light helps patients concentrate on the fixation target during the scan, reducing involuntary eye movement. It supports more efficient workflow in a practice by reducing the need to rescan.

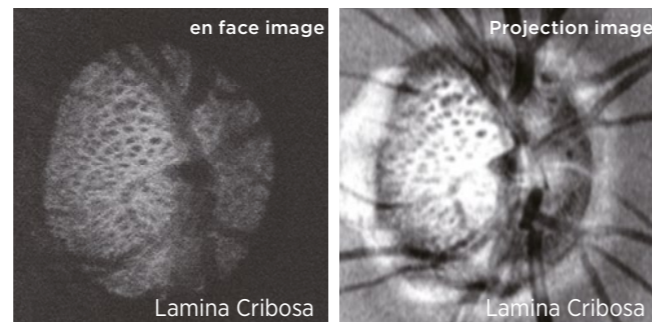
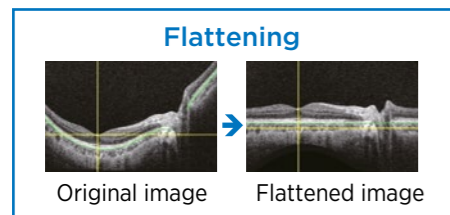


1) Fabio Lavinsky, Daniel Lavinsky. Novel perspectives on swept-source optical coherence tomography. Int J Retin Vitr (2016) 2:25  
4) Shoji Kishi. Impact of swept source optical coherence tomography on ophthalmology. Taiwan Journal of Ophthalmology 6 (2016) 58-68

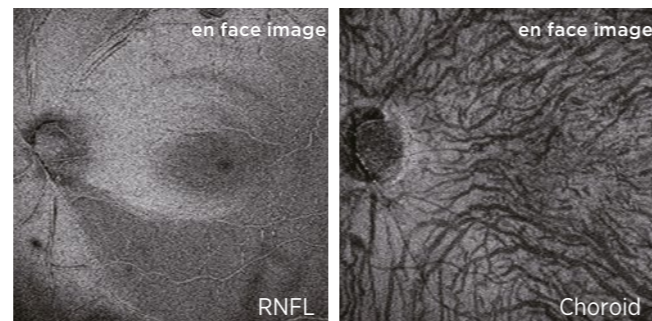
# Discover from Cornea to Choroid

## En face OCT imaging

en face imaging allows for independent dissection of a depth range defined by two boundaries, selected from seven possible boundaries, by flattening the 3D data cube.



Courtesy: Prof. T. Nakazawa, MD, PhD, Tohoku University, Japan



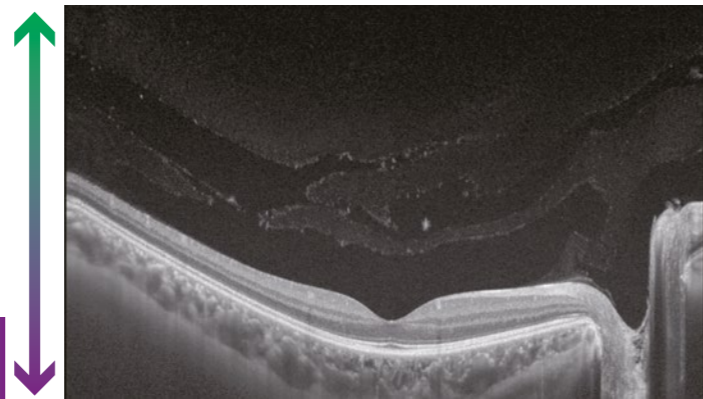
Courtesy: Prof. T. Nakazawa, MD, PhD, Tohoku University, Japan

## Vitreous visualization

### Dynamic Focus™

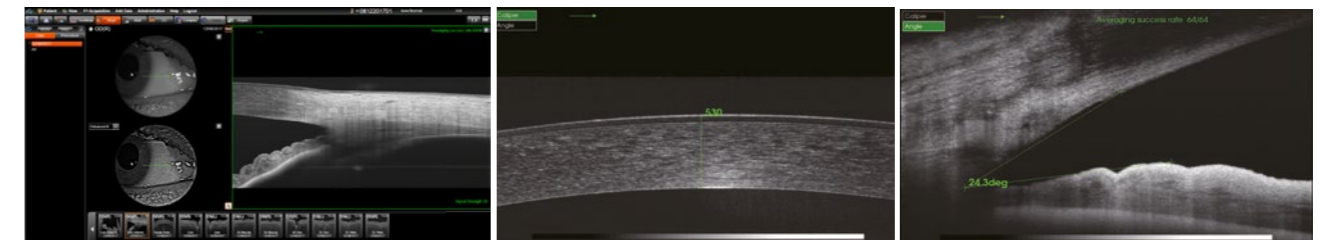
Dynamic Focus™ on Triton allows for acquisition of images with near uniform focus and image quality throughout the entire depth of the image, which helps to enhance the typically weaker signal from the vitreous.

Clear image in all area



### EVV (Enhanced Vitreous Visualization™)

EVV helps clinicians assess vitreous and vitreoretinal interface abnormalities. Contrast can be quickly adjusted to the needs of the physician, depending on the area of greatest interest.



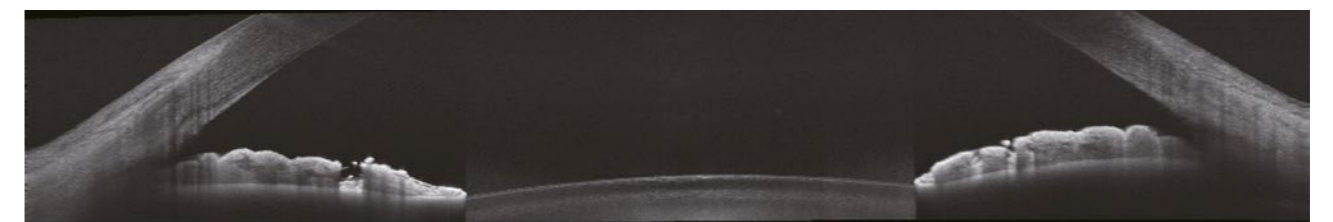
Courtesy: Michael H. Chen, O.D.

## Anterior segment imaging

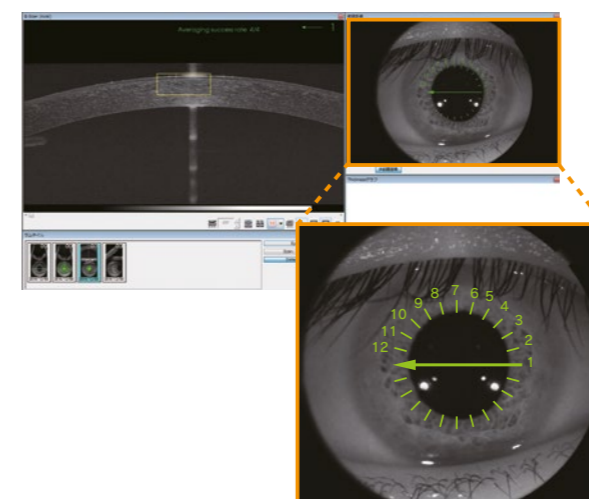
Triton's (optional) anterior segment imaging capabilities allow for visualization of the cornea, anterior chamber angle, iris and sclera<sup>5</sup>.

## Image samples

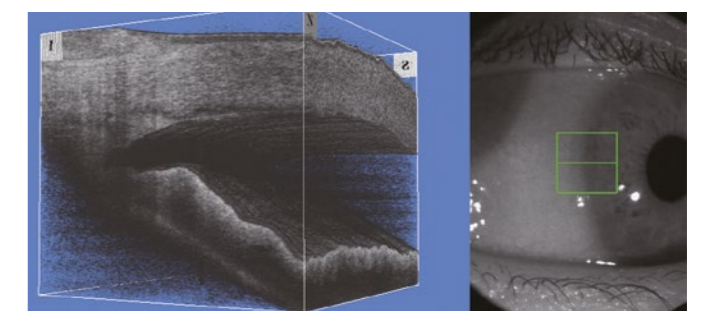
### OCT image B-scan length 16mm



### Anterior segment in Radial scan



### Anterior segment in 3D scan



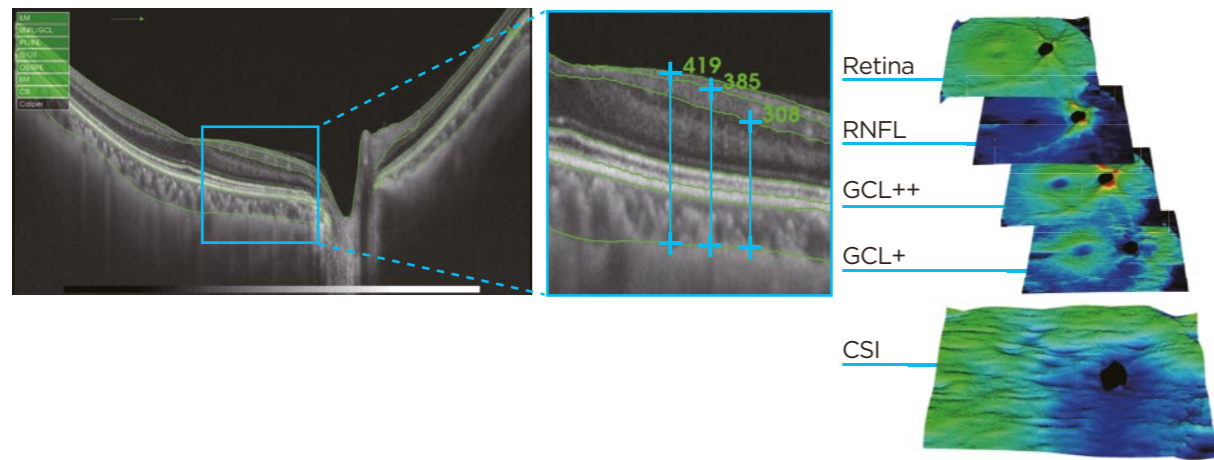
1) Fabio Lavinsky, Daniel Lavinsky. Novel perspectives on swept-source optical coherence tomography. Int J Retin Vitr (2016) 2:25

5) Judyta Jankowska-Szmul, Edward Wylegala. The CLASS Surgical Site Characteristics in a Clinical Grading Scale and Anterior Segment Optical Coherence Tomography: A One-Year Follow-Up. Journal of Healthcare Engineering 2018, Article ID 5909827



### 7 boundary segmentation/5 layer thickness maps/caliper function

Retinal tissue layers are automatically segmented by the Topcon Advanced Boundary Software (TABST™), enabling quantification of retinal thickness and sub layers<sup>6,7</sup>.



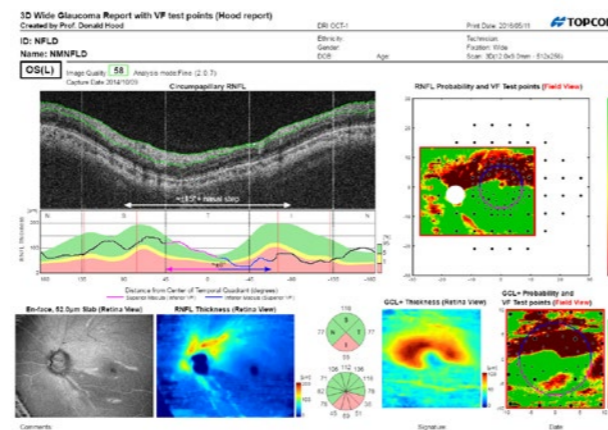
### Choroidal thickness maps

Understanding choroidal structural changes in relation to various disease and disease management, has been of long-standing interest to clinicians<sup>8</sup>. Triton provides clear visualization of the choroid, and generates choroidal thickness maps to aid in the assessment of choroidal structure.

Retina	between the ILM-OS/RPE boundaries
RNFL	between the ILM-RNFL/GCL boundaries
GCL+	between the RNFL/GCL-IPL/INL boundaries
GCL++	between the ILM-IPL/INL boundaries
CSI	between the BM-CSI boundaries or ILM-CSI boundaries

### Hood Report (for Glaucoma)

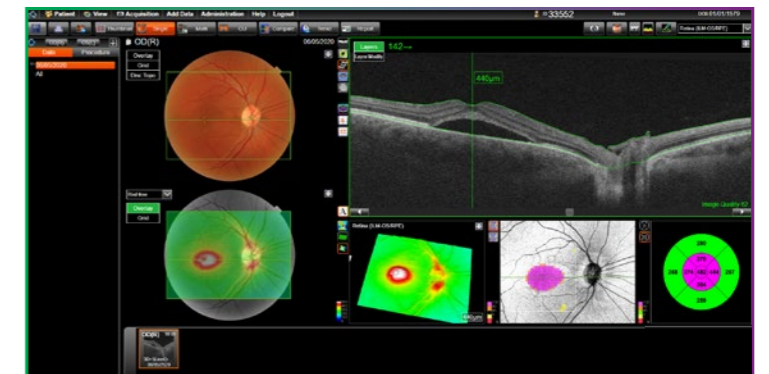
Retinal Thickness/RNFL/GCL and Optic Nerve Metrics in just one scan. This report streamlines the decision-making process through the correlation of structure (GCC/RNFL) with function (overlay of visual field test locations)<sup>6</sup>.



# DRI Meets Multimodal Fundus Imaging: See the Whole Picture

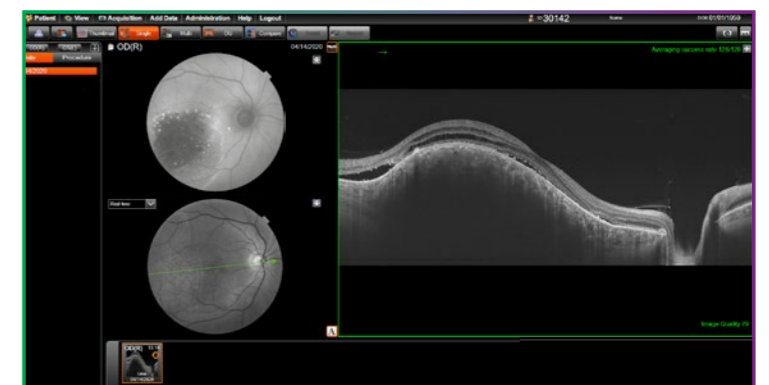
### Swept Source OCT incorporates multimodal fundus imaging

DRI OCT Triton can acquire the OCT and fundus image in a single capture. PinPoint™ Registration identifies the location of the B-scan on the fundus image. Comparison between the B-scan and fundus image can support clinical efficiency during diagnosis.



Courtesy: Jay M. Haynie, O.D.

OCT + Color fundus



Courtesy: Jay M. Haynie, O.D.

OCT + FAF

### True color\* Fundus images

The DRI OCT Triton offers a true color, non-mydratric fundus image. Fluorescein Angiography (FA) and Fundus Autofluorescence (FAF) are available\*\* to enhance the diagnostic capability of Triton Plus. The all-in-one device supports efficient workflow in practice.

\*Color fundus image with white light, with 24-bit color.

\*\*DRI OCT Triton Plus :  
 OCT /Anterior OCT (Option)/ OCT Angiography (Option) /Color / Red-Free / FA / FAF  
 DRI OCT Triton :  
 OCT /Anterior OCT (Option)/ OCT Angiography (Option) /Color/ Red-Free

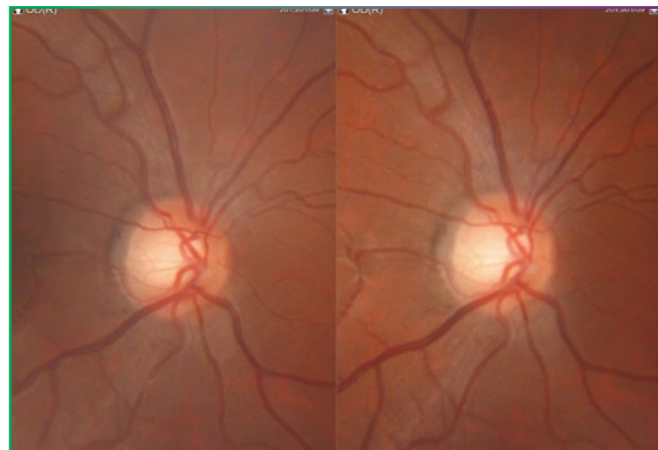


6) Zhichao Wu, Denis S. D. Weng, Rashmi Rajshekhar, Abinaya Thenappan, Robert Ritch, Donald C. Hood. Evaluation of a Qualitative Approach for Detecting Glaucomatous Progression Using Wide-Field Optical Coherence Tomography Scans. Trans Vis Sci Tech. 2018;7(3):5.  
 7) Beatriz Abadia, Ines Suñen, Pilar Calvo, Francisco Bartol, Guayente Verdes, Antonio Ferreras. Choroidal thickness measured using swept-source optical coherence tomography is reduced in patients with type 2 diabetes. PLoS ONE 13(2): e0191977.  
 8) Sushmitha Rao Uppugunduri, Mohammed Abdul Rasheed, Ashutosh Richhariya et al. Automated quantification of Haller's layer in choroid using swept-source optical coherence tomography. PLoS ONE 13(3):e0193324

# Smarter Tracking. Smarter Workflow.

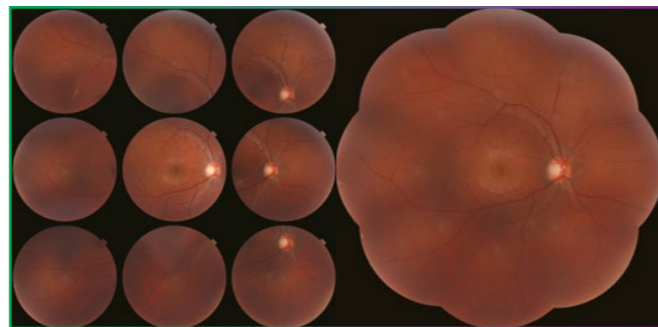
## Stereo photography

Three dimensional visualization of color fundus images can be achieved by acquiring images in stereo photography mode. Triton's on-screen acquisition guidance supports quick and easy operation with auto alignment for capturing stereo pairs.



## Panoramic wide field photography

In addition to macular and disc imaging, the Triton provides wide coverage of the retina. A panoramic graphic can be created from multiple fundus or OCT Angiography images.



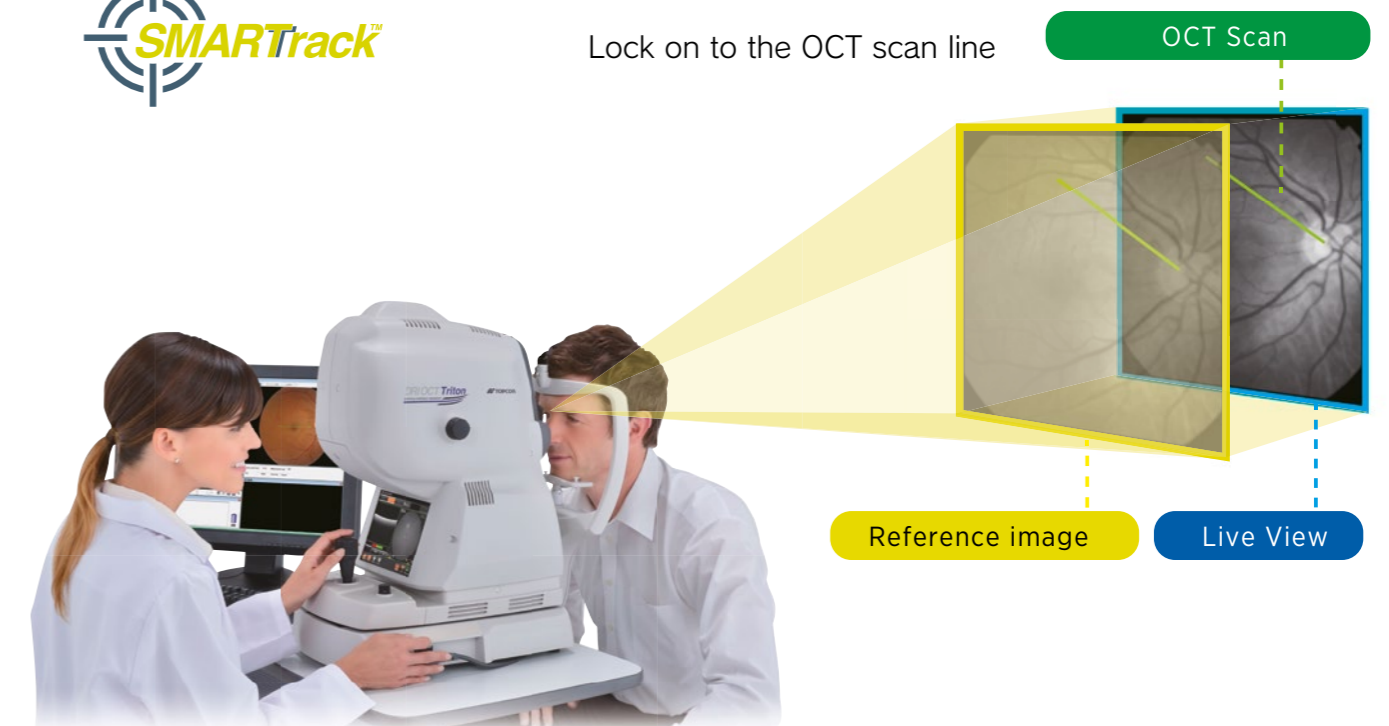
## SMARTTrack™

The SMARTTrack™ system enhances the tracking and follow-up ability of the Triton with a variety of functions designed to enhance its user-friendliness:

- Fundus-Guided Acquisition (FGA)
- Follow-up Function
- Tracking Photography

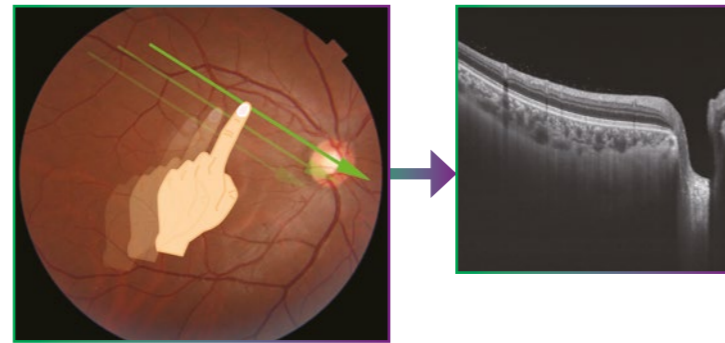


Lock on to the OCT scan line



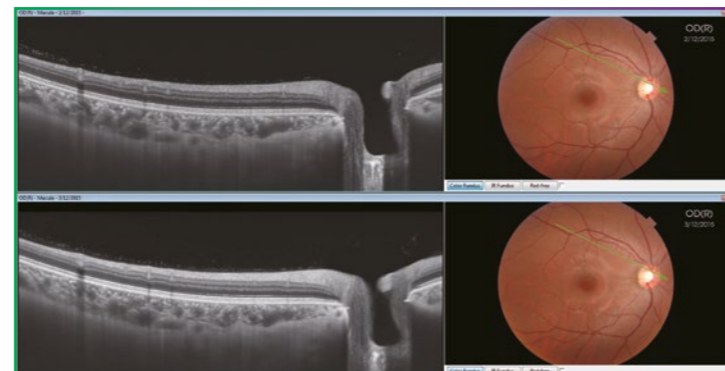
### Fundus Guided Acquisition (FGA)

OCT scan location can be easily set by selecting the scan area on the fundus image. With FGA, the operator can choose to capture or import a fundus image, select the scan location and automatically acquire a B-scan at that location.



### Follow-up Function

This function allows you to retrieve and re-analyze the same location at follow-up, for comparison of past and current images. All an operator needs to do is simply select the past data and Triton automatically captures the same area.



### Motion Correction/Compensation/Rescanning Function

#### Motion Correction

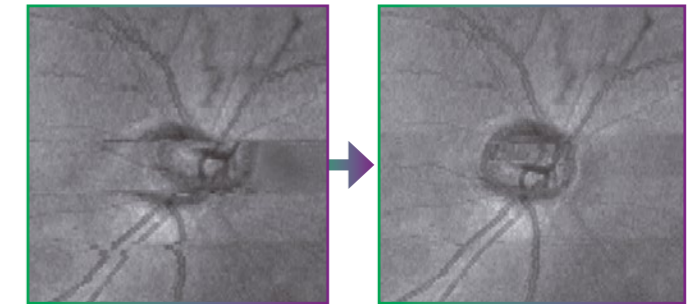
Corrects the Z direction movement

#### Compensation Function

Tracks the eye and then compensates for the X direction movement.

#### Rescanning Function

Parts of the scanning area may be missed due to Y direction eye movement. In such a case, the rescanning function automatically activates to rescan the missing area.



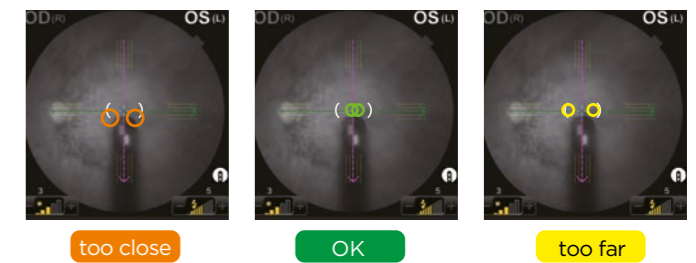
Before compensation

After compensation

### Alignment navigation

When an operator wishes to acquire an image, the Triton's monitor guides the operator to reduce potential errors and make operation simple.

- Auto focus and auto shoot, in color/FAF mode
- Auto focus, auto-Z and Z-lock function, in OCT mode



too close

OK

too far

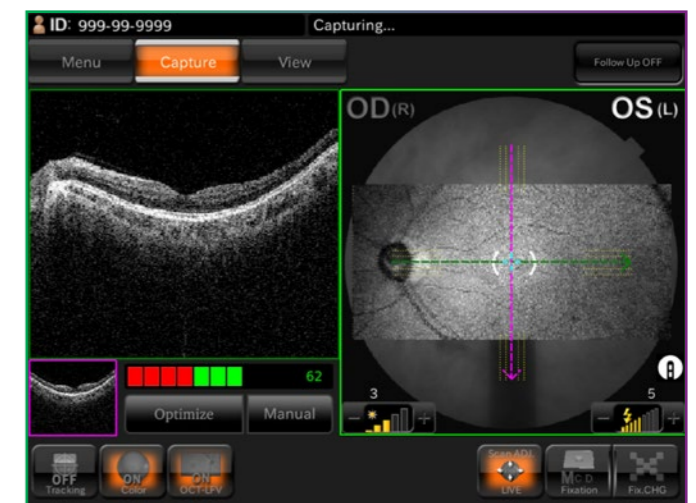
### Small pupil solution

#### Live Fundus View

The fast scanning speed allows the Triton to create a live en face fundus image, an ideal tool for precisely visualizing the scan position. This makes the disc, retinal vessels and scanning position easy to see, even in patients with small pupils.

#### OCT capture mode without retinal photography

Triton can also capture a 3D scan, with or without color fundus photography, to avoid a miotic response and better meet the needs of patients with the smallest pupils.



# Reinventing Swept Source Imaging:

Triton with PixelSmart™ is the next stage in Swept Source OCT imaging

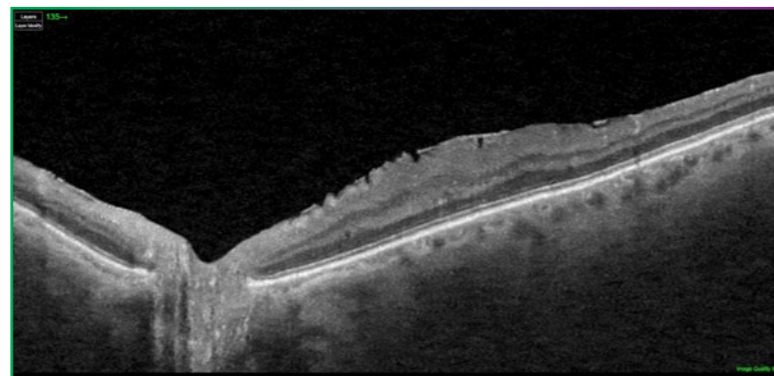
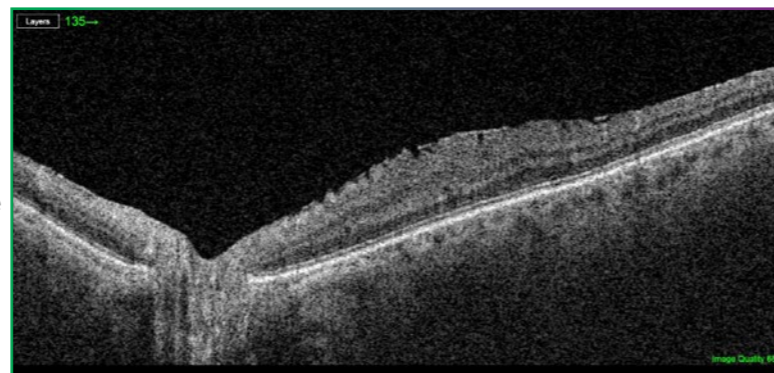
## NEW! PixelSmart™

Triton with PixelSmart  
The next level in Swept Source OCT Imaging

PixelSmart is Topcon's new image processing algorithm which reduces speckle noise to improve contrast, producing a better image quality.

PixelSmart is available for all Triton 3D scans, existing and new:

- 3D Wide
- 3D Macula
- 3D Disc
- Combination scans



# Specifications

Observation & Photography of Fundus Image	
Photography Type	Color, FA*, FAF*, Red-free**
Picture Angle	45° Equivalent 30° (Digital Zoom)
Operating Distance	34.8mm
Photographable Diameter of Pupil	Normal: φ4.0mm or more Small pupil mode diameter: φ3.3mm or more
Observation & Photography of Fundus Tomogram	
Scanning Range (on fundus)	Horizontal Within 3 to 12mm Vertical Within 3 to 12mm
Scan Pattern	3D scan Linear scan (Line-scan/Cross-scan/Radial-scan/Raster-scan)
Scan Speed	100,000 A-Scans per second
Lateral Resolution	20μm
In-depth Resolution	Digital: 2.6μm Optical function: 8μm
Photographable Diameter of Pupil	φ2.5mm or more
Observation & Photography of Fundus Image / Fundus Tomogram	
Fixation target	Internal fixation target : Dot matrix type organic EL The display position can be changed and adjusted. The displaying format can be changed. Peripheral fixation target : This is displayed according to the internal fixation target indicated position. External fixation target
Observation & photography of anterior segment***	
Photography type	IR
Operating distance	17mm
Observation & photography of anterior segment tomogram***	
Operating distance	17mm
Scan range (on cornea)	Horizontal Within 3 to 16mm Vertical Within 3 to 16mm
Scan pattern	3D scan Linear scan (Line-scan/Radial-scan)
Scan speed	100,000 A-Scans per second
Fixation target	Internal fixation target External fixation target
Electric Rating	
Power Source	Voltage: 100-240V Frequency: 50-60Hz
Power input	250VA
Dimensions / Weight	
Dimensions	320-359 mm(W) X 523-554 mm(D) X 560-590 mm(H)
Weight	21.8kg (DRI OCT Triton) 23.8kg(DRI OCT Triton Plus)

\* FA photography and FAF photography can be performed only with the DRI OCT Triton Plus.

\*\* In this digital red-free photography, the color image is processed and is displayed as a pseudo red-free photographed image.

\*\*\* Observation & photography of anterior segment can be performed only when the anterior segment attachment is used.

**IMPORTANT** In order to obtain the best results with this instrument, please be sure to review all user instructions prior to operation.

*Not all products, services or offers are approved or offered in every market, and products vary from one country to another.  
Contact your local distributor for country-specific information and availability.*

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