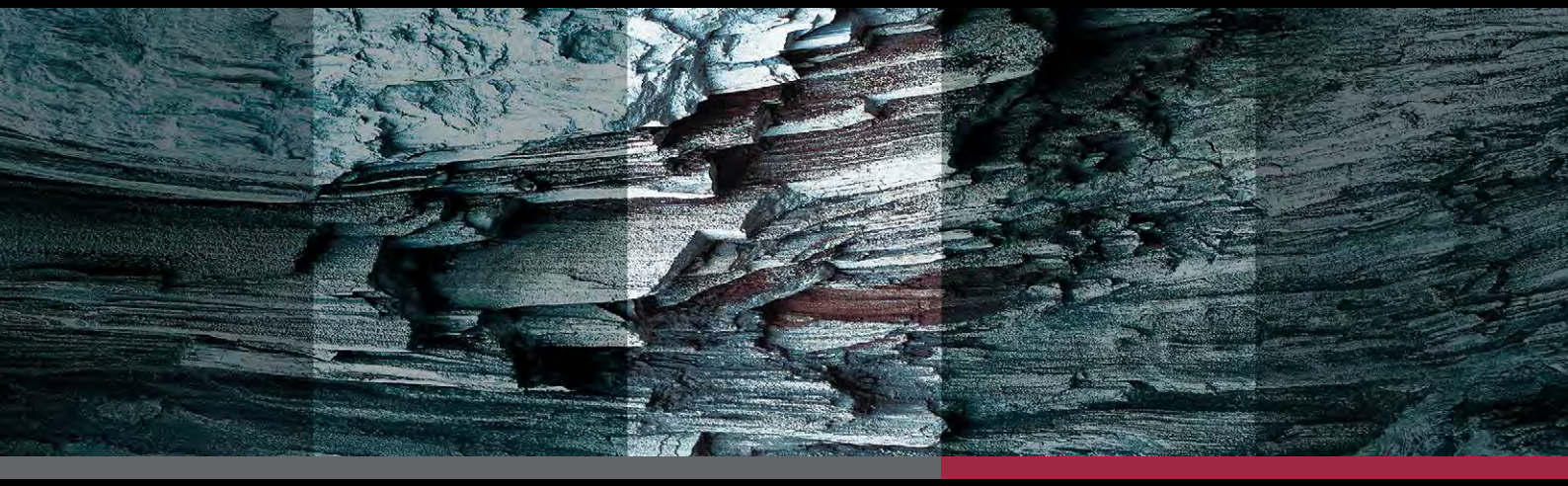
In vivo corneal confocal microscope



HRT 3 RCM

HEIDELBERG ENGINEERING

HRT 3 RCM

In vivo corneal confocal microscope

HRT3 RCM is a compact ophthalmic device that uses confocal scanning laser microscopy to provide **high-resolution images of the cornea and external ocular structures**.

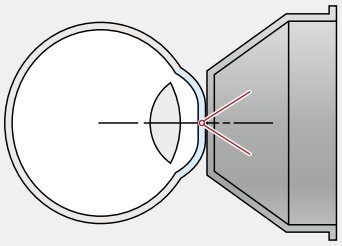
Navigate through the cornea at **the cellular level** and select your preferred scanning depth for a comprehensive in vivo assessment of **all corneal layers** – from epithelium to endothelium, including the quantitative assessment of endothelial cells.

Key benefits

- Acquire high-resolution en face images of corneal cells and structures for a confident diagnosis and follow-up of corneal diseases and dystrophies.
- Investigate the conjunctiva, the limbus, the eye lid, or meibomian glands to assess pathologies that effect these external ocular structures.
- Assess corneal nerves at a microscopic level.
- Combine the diagnostic information of HRT3 RCM with other Heidelberg Engineering devices, using the speed and security of HEIDELBERG EYE EXPLORER **HEYEX 2** image management.

Crosslinking
Endothelial Cell Count
Demodex Infections
Lattice Dystrophy
Infectious Diseases
Bacterial Keratitis
Granular Dystrophy
Dry Eye
Crystals
Diabetic Neuropathy
Lamellar Keratoplasty
LASIK
Fuchs' Endothelial Dystrophy
Fungal Keratitis
Penetrating Keratoplasty
Meibomian Gland Dysfunction
Viral Keratitis
LASEK
Map-Dot-Fingerprint Dystrophy
Acanthamoeba Keratitis
DMEK

Examine, explore, analyze

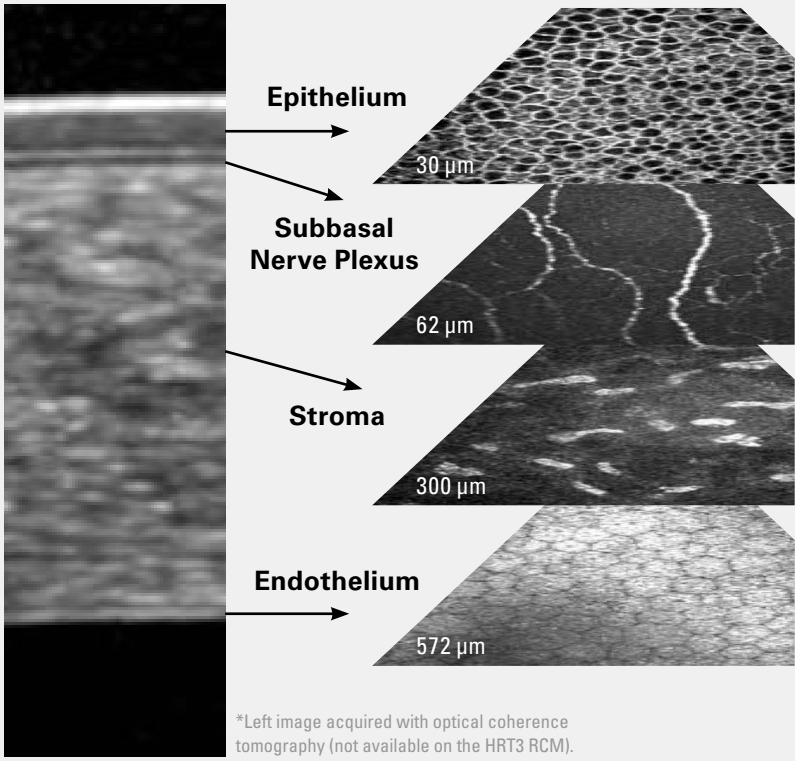


Examine corneal and external ocular structures using in vivo microscopy

HRT3 RCM uses sterile, single-use TomoCaps for rotation-free contact between the ocular surface and the microscope lens. Using the additional live camera, you can monitor the position of the TomoCap on the patient's eye.

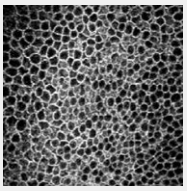
Explore the cornea at the cellular level – layer by layer

Acquire unique en face images of corneal cells and structures, identify keratocytes subpopulations, or visualize details of the subbasal nerve plexus.

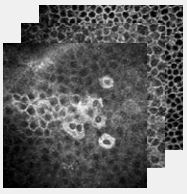


*Left image acquired with optical coherence tomography (not available on the HRT3 RCM).

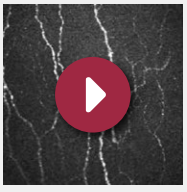
Customized acquisition modes



SECTION SCAN (Scan at selected depth within the cornea)



VOLUME SCAN (Stack of images at different depths within the cornea)



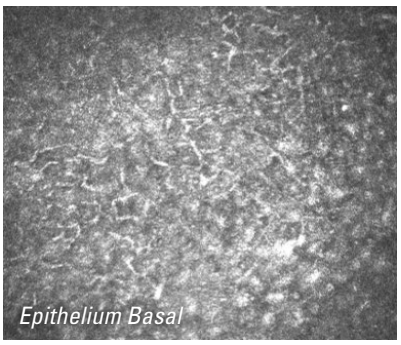
SEQUENCE SCAN (Movie sequence of 1-30 frames/sec)

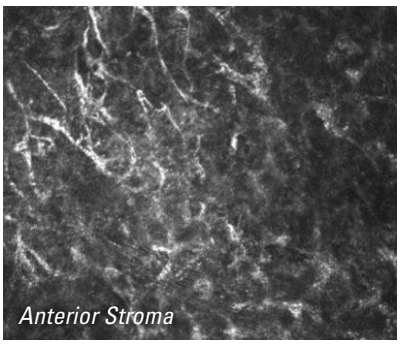
Imaging Specifications

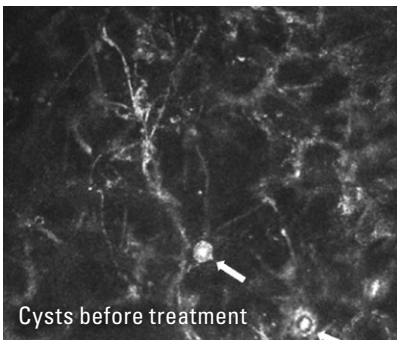
Transversal field of view:	300×300 µm; 400×400 µm (depending on lens)
Focus adjustment range:	3.0 mm
Axial digital image size:	384×384 pixels
Optical resolution:	Transversal: approx. 2 µm; Longitudinal: approx. 4 µm
Digital resolution:	Transversal: 1µm/pixel; Longitudinal: 2 µm/pixel

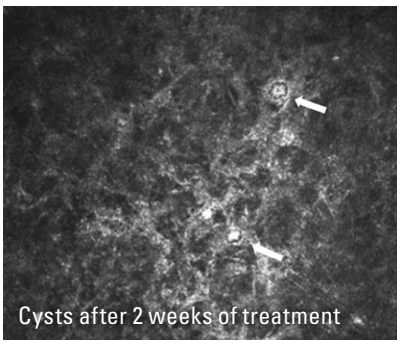
Acanthamoeba Keratitis

Epithelium/Stroma









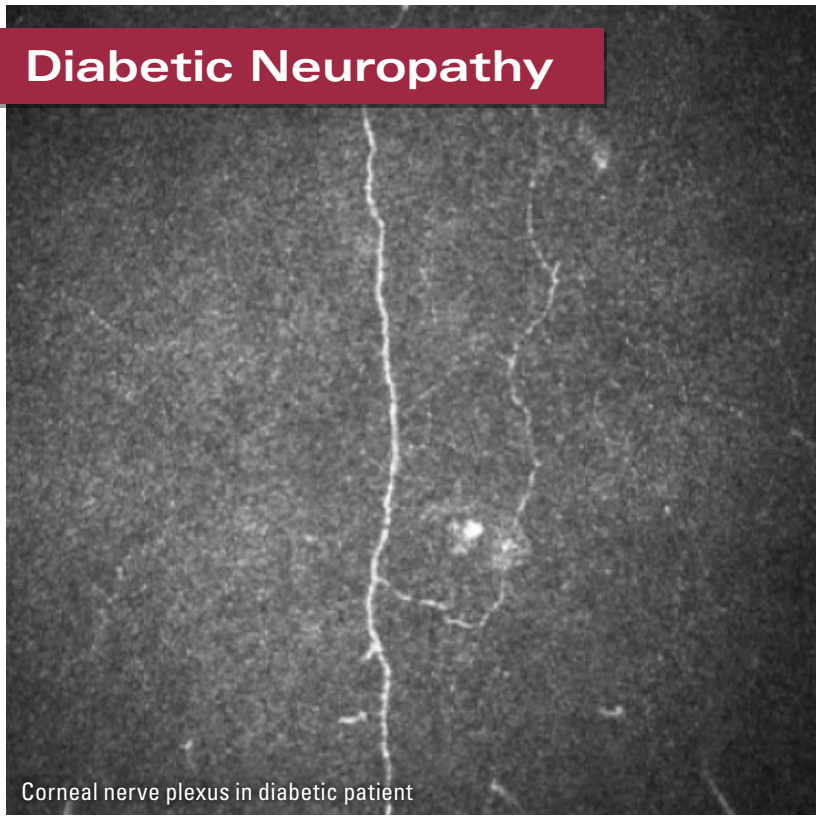
Acanthamoeba is a micro-organism that typically presents in the epithelium but can also infiltrate other layers such as the stroma.

The ability to investigate various corneal layers at a microscopic level enables the detection of Acanthamoeba and assists clinicians in visualizing and monitoring the cysts that are caused as a result of Acanthamoeba Keratitis.

Image courtesy Top panel: Mitra Tavakoli, PhD, MCOptom, FBCLA, FAAO, FHEA DVRC, College of Medicine and Health, University of Exeter, United Kingdom
Bottom panel: Dr. Shijing Deng, Beijing Institute of Ophthalmology, Beijing Tongren Hospital, Capital Medical University, China

Diabetic Neuropathy

Subbasal Nerve Plexus



HRT3 RCM assists you in examining the corneal subbasal nerve plexus. These two images show the contrast in corneal nerve structures of a diabetic eye relative to a healthy eye.

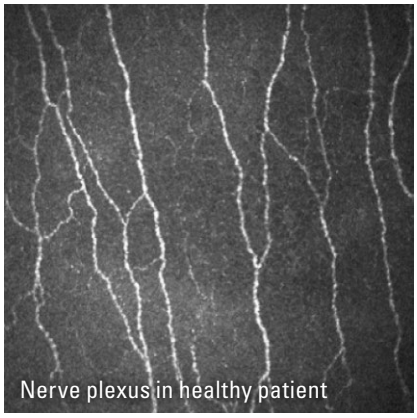
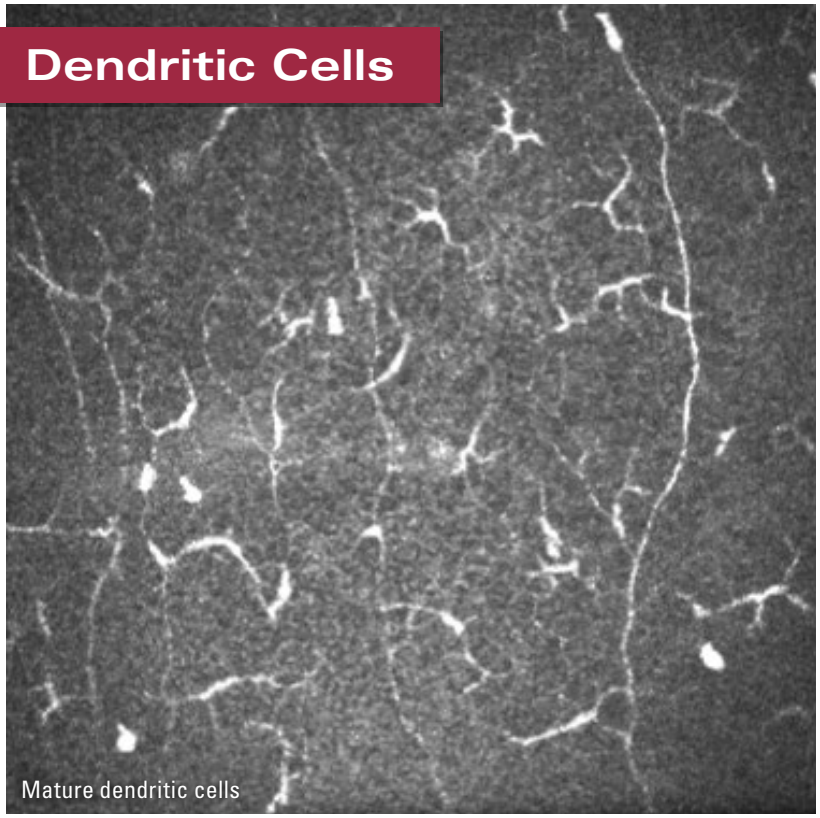


Image courtesy: Prof. Rayaz A. Malik, PhD, MBChB, Weill Cornell Medicine – Qatar, Qatar

Dendritic Cells


Mature dendritic cells

Subbasal Nerve Plexus

With high-resolution in vivo images, you can analyze the details of the corneal nerve structure. The images show mature dendritic cells as well as immature dendritic cells near the nerve endings at the level of the subbasal nerve plexus.

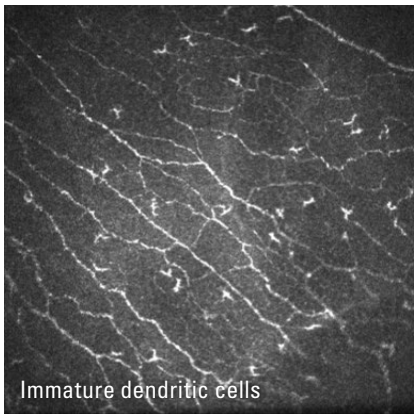
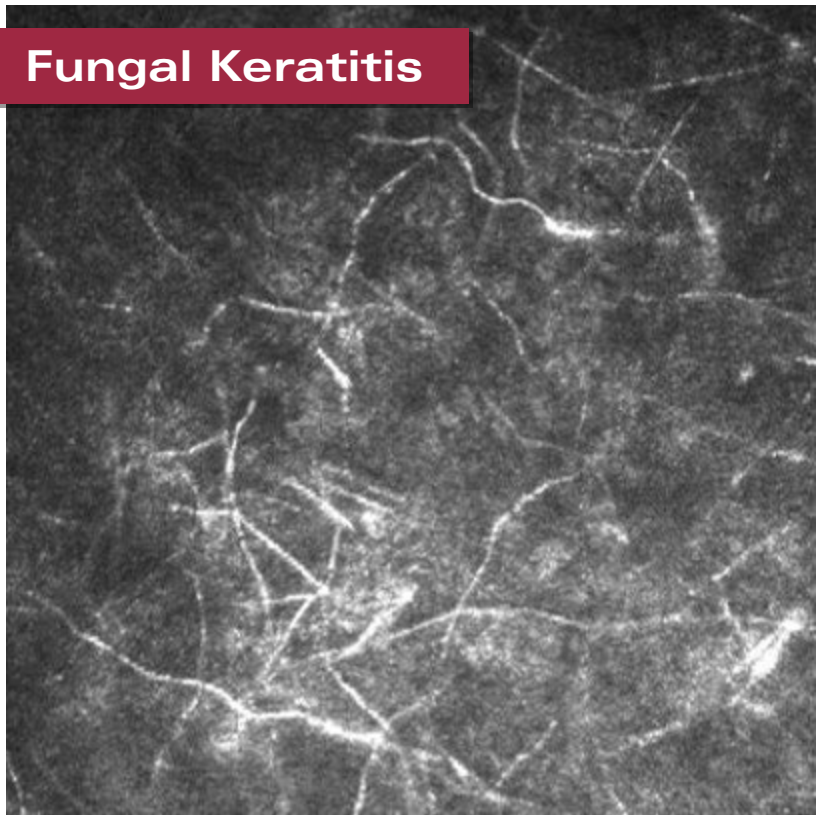

Immature dendritic cells

Image courtesy: Dr. Pooja Khamar & Prof. Dr. Rohit Shetty, DNB, FRCS, PhD, Eye Care Hospital – Narayana Nethralaya, Bangalore, India

Fungal Keratitis



Anterior Stroma

Visualize the characteristic patterns of fungal keratitis with HRT3 RCM. The images show fungal hyphae with typical branch patterns in the anterior stroma.

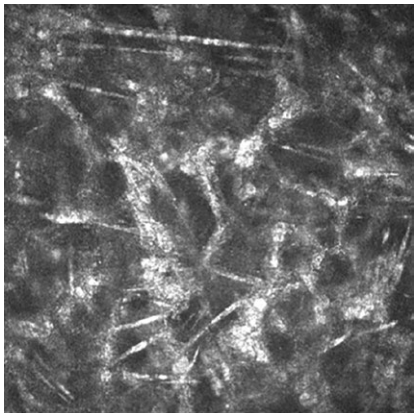
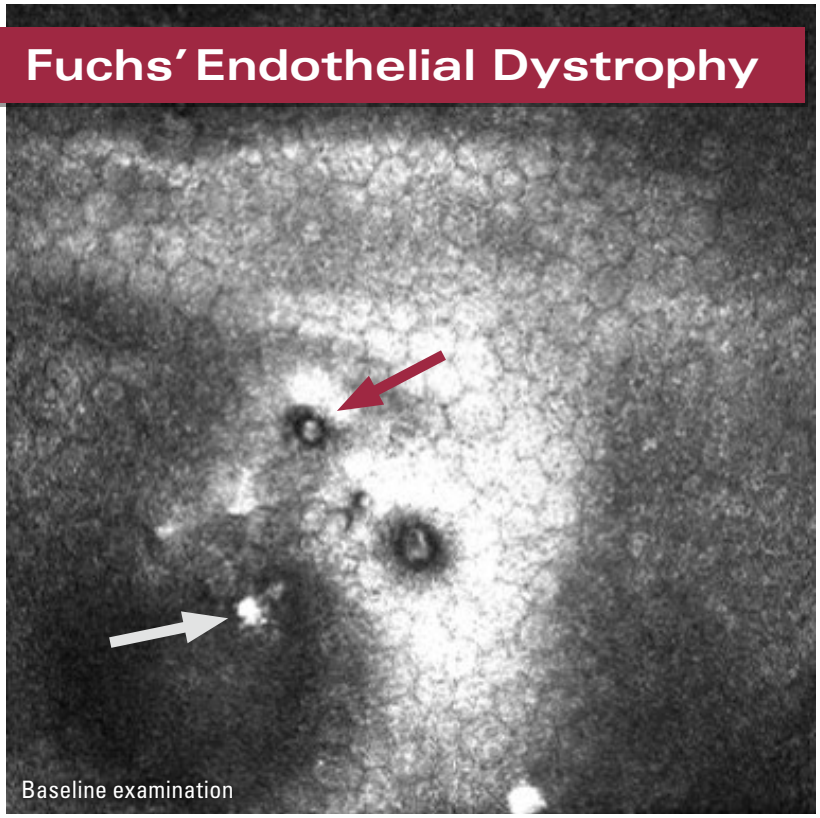


Image courtesy image left: Prof. Rudolf F. Guthoff, MD & Prof. Oliver Stachs, PhD, Klinik und Poliklinik für Augenheilkunde, University of Rostock, Germany
Image right: Ricardo Nosé, MD, Eye Clinic Day Hospital, Sao Paulo, Brazil

Fuchs' Endothelial Dystrophy



Endothelium

Fuchs' endothelial dystrophy is characterized by endothelial cell death, leading to a swelling of the cornea. The images show guttae (red arrow) and hyper-reflective deposits (gray arrow) that serve as an indicator of the dysfunction of the endothelial layer.

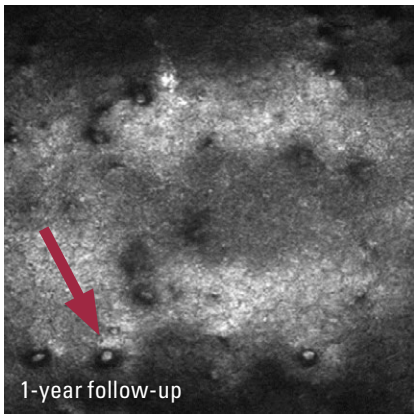
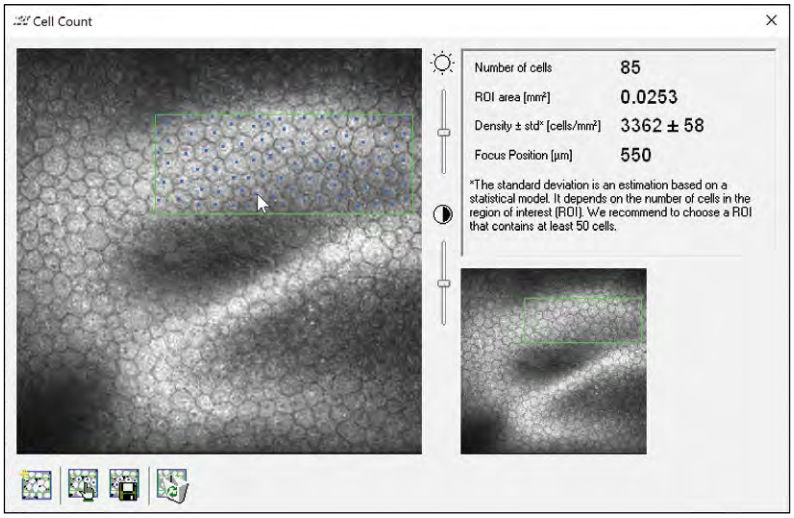


Image courtesy: Mitra Tavakoli, PhD, MCOptom, FBCLA, FAAO, FHEA DVRC, College of Medicine and Health, University of Exeter, United Kingdom

Semi-automated endothelial cell count

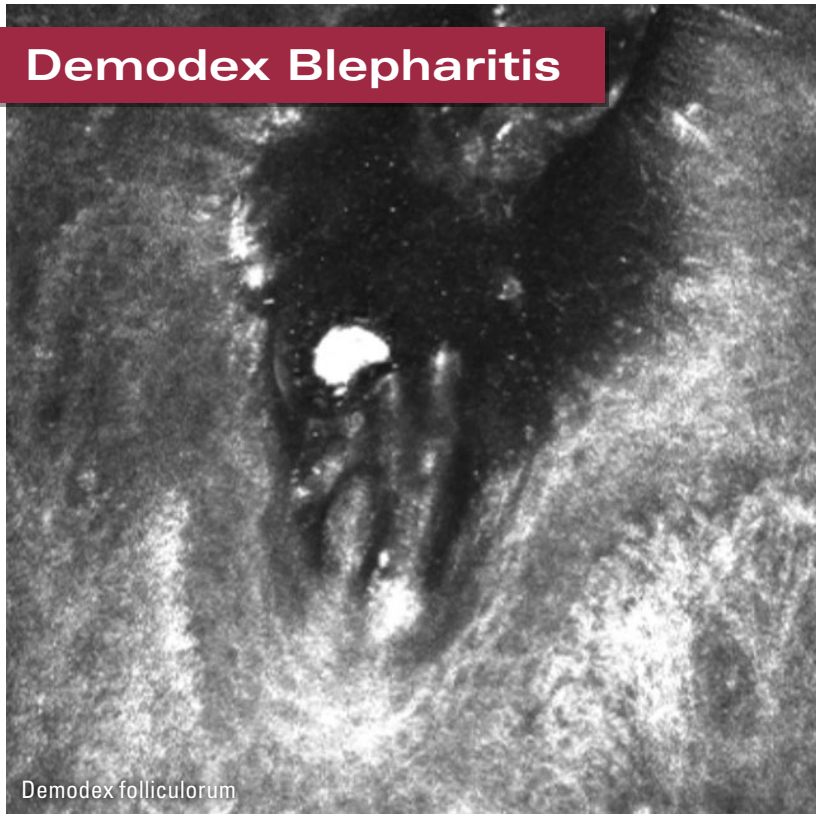


HRT3 RCM offers **semi-automated endothelial cell count** to provide additional information about the morphology of this layer.

After manually marking the endothelial cells in an appropriate frame, the cell density (cells/mm^2) is automatically calculated.

Eyelid

Demodex Blepharitis

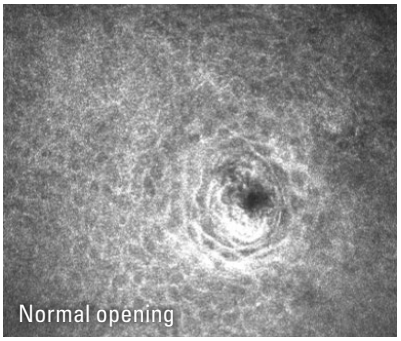


HRT3 RCM can aid in the assessment of Demodex Blepharitis, an external eye disease accompanied by ocular surface inflammation. The images show parts of a demodex folliculorum and the whole body of a demodex sebaceous that climbed out of the meibomian gland orifice.

Image courtesy: Prof. Qingyan Zeng, Hankou Ai'er Eye Hospital, China

Eyelid

Meibomian Gland Dysfunction (MGD)



Top panel: Rete ridges (acinar units) can be an indicator of the health of meibomian glands. The eye with MGD shows a reduced density of rete ridges that are larger in size and have increased reflectivity inside their borders, while the healthy eye shows a high density of smaller sized rete ridges.

Bottom panel: High-resolution images of meibomian glands provide important information about the structure of the orifices. These images show a dilated gland opening relative to the opening in a healthy eye.

Image courtesy: Nanyu Zhou & Katie Edwards, BAppSc (Optom), PhD, Queensland University of Technology, Australia

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