

RET 2: Update Optische Kohärenztomographie: Grundlagen und klinische Anwendungen

Stattin M

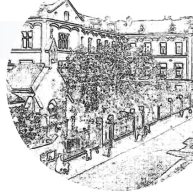
Klinik Landstraße, Wiener Gesundheitsverbund, Augenabteilung
Karl Landsteiner Institut für Retinale Forschung und Bildung
Medizinische Universität Innsbruck

P: Research Grand Topcon Europe BV

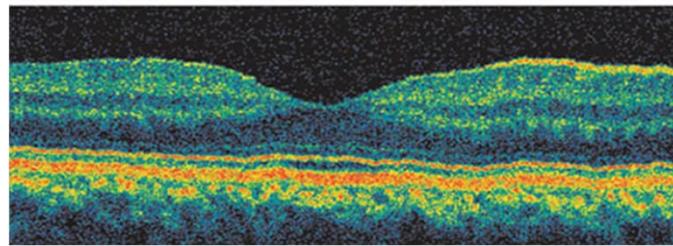
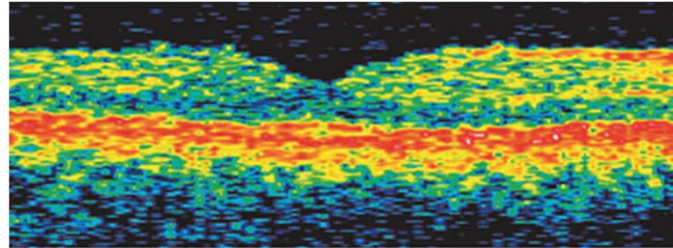
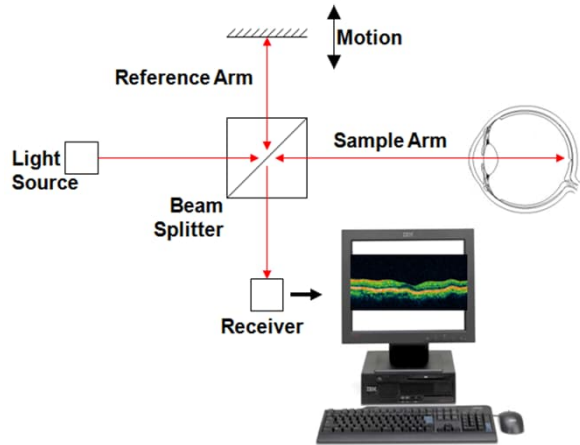


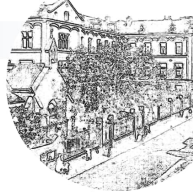


Optische Kohärenztomographie (OCT)

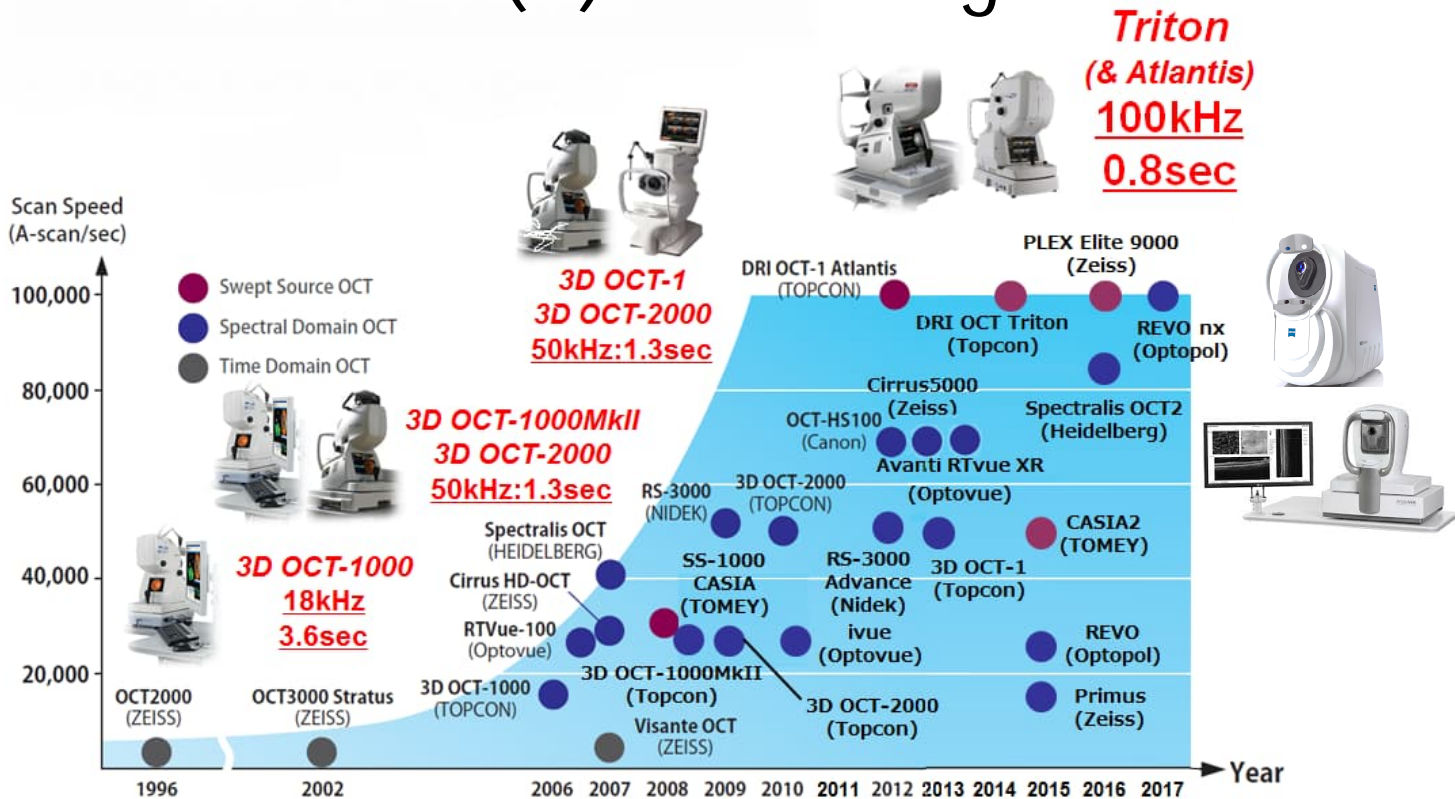


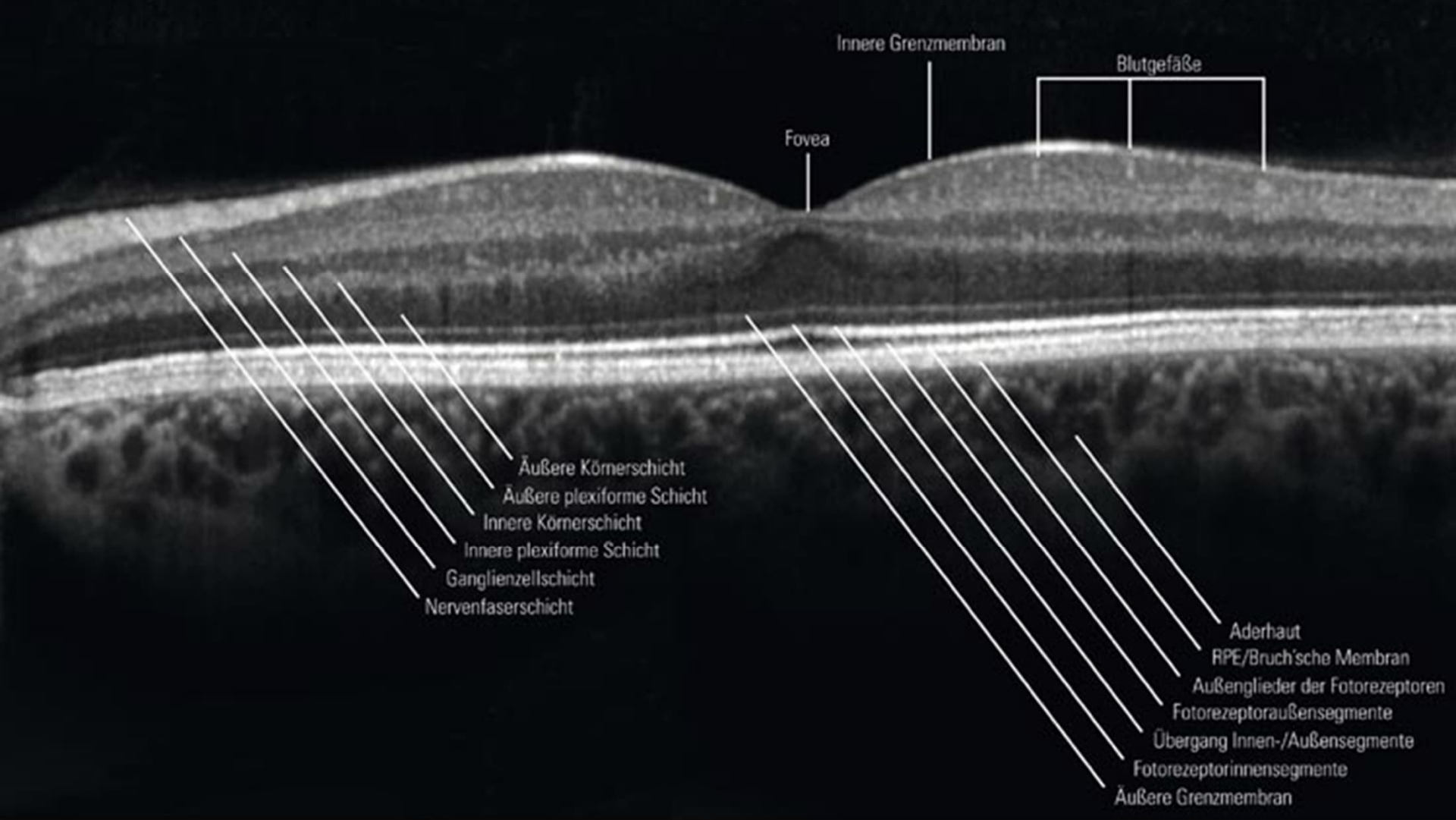
- Licht geringer Kohärenzlänge wird mit Hilfe eines Michelson Interferometers zur Entfernungsmessung streuender Materialien eingesetzt
- Das Untersuchungsobjekt wird punktwise abgetastet

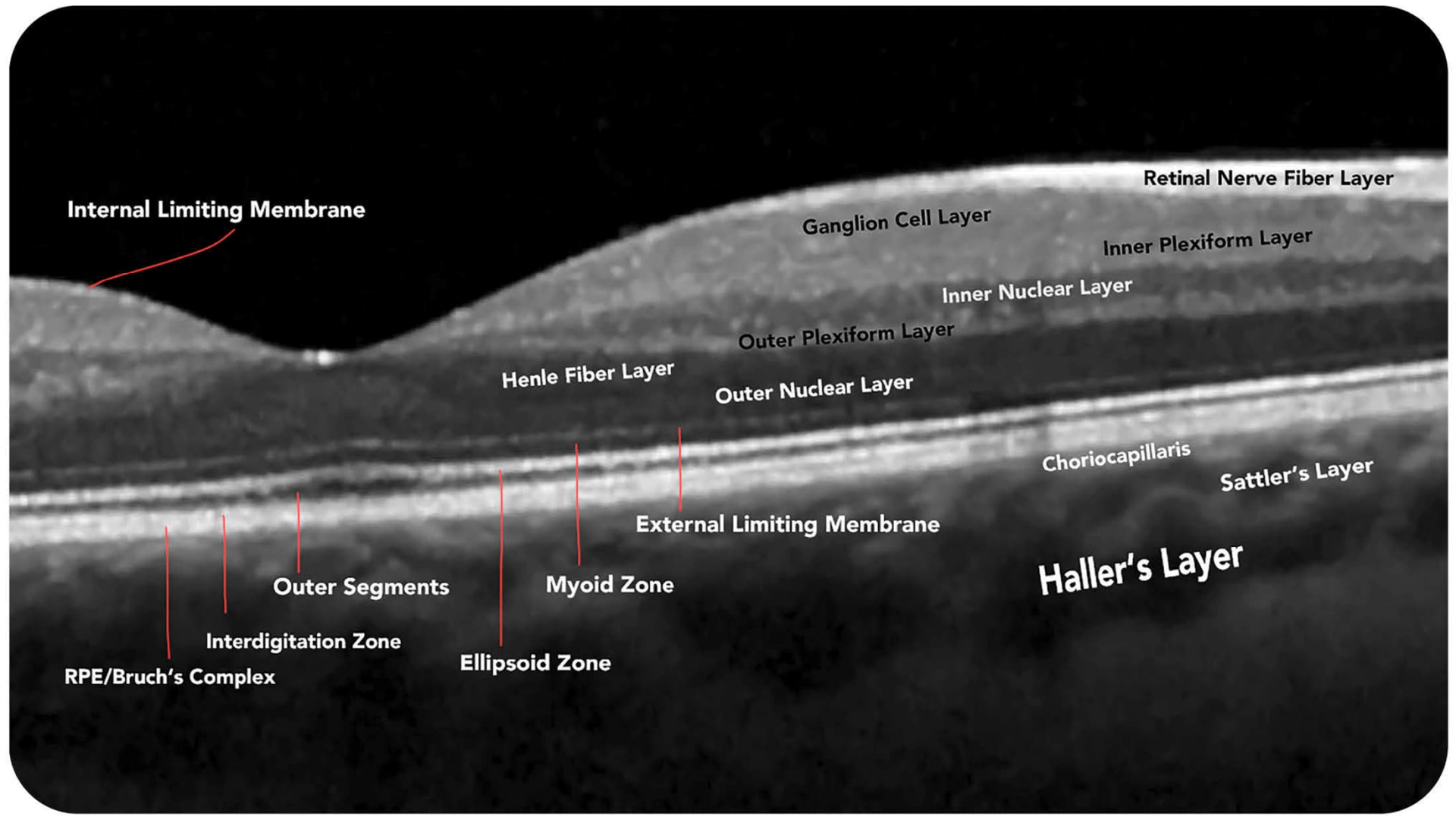




OCT(A) Technologie







Internal Limiting Membrane

Retinal Nerve Fiber Layer

Ganglion Cell Layer

Inner Plexiform Layer

Inner Nuclear Layer

Outer Plexiform Layer

Outer Nuclear Layer

Henle Fiber Layer

Choriocapillaris

Sattler's Layer

External Limiting Membrane

Myoid Zone

Ellipsoid Zone

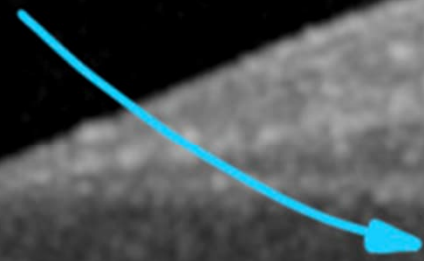
Outer Segments

Interdigitation Zone

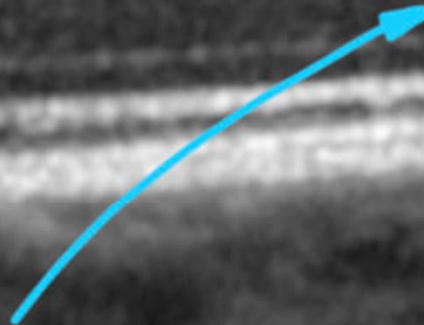
RPE/Bruch's Complex

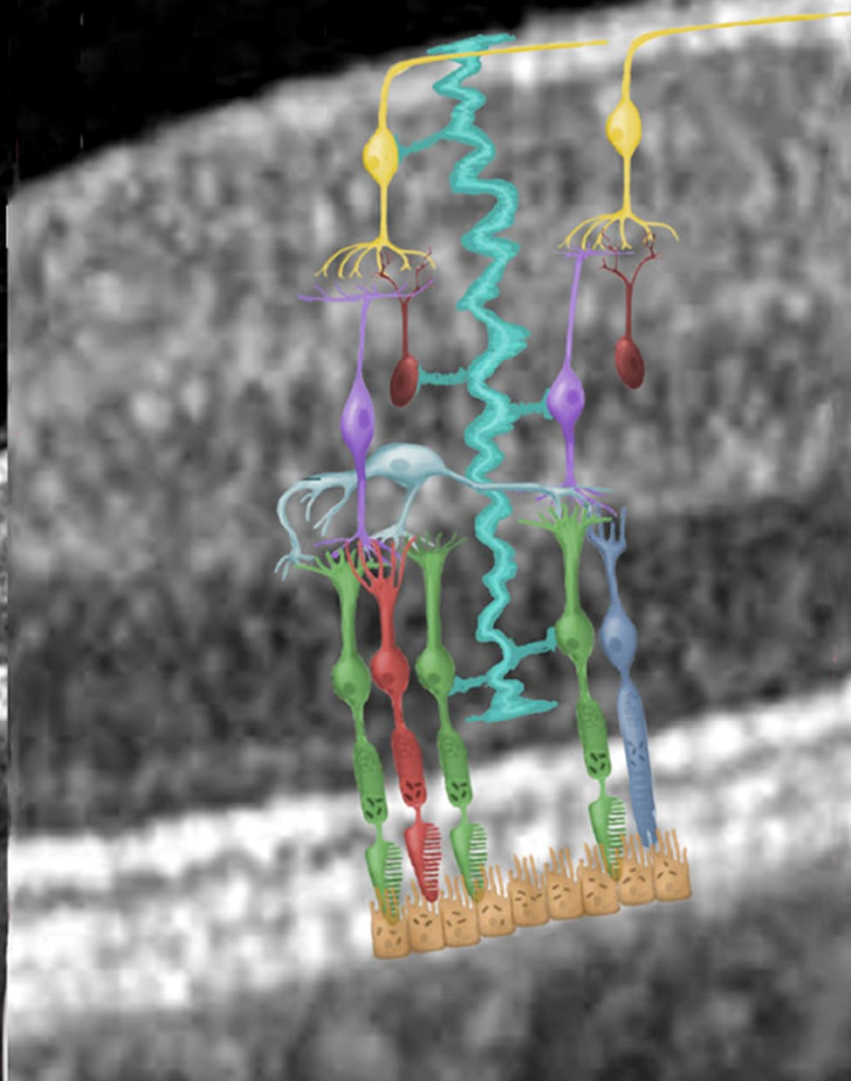
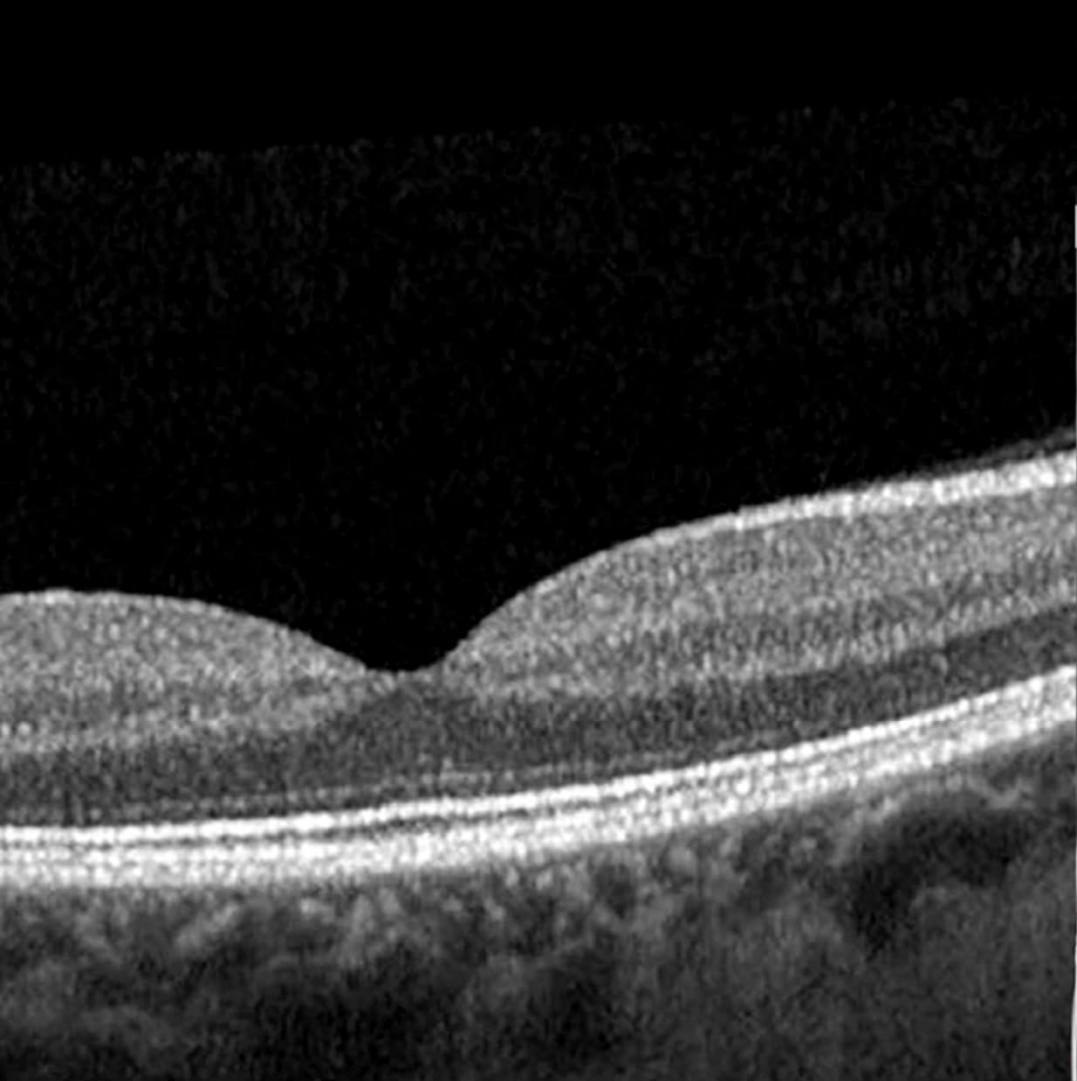
Haller's Layer

HFL



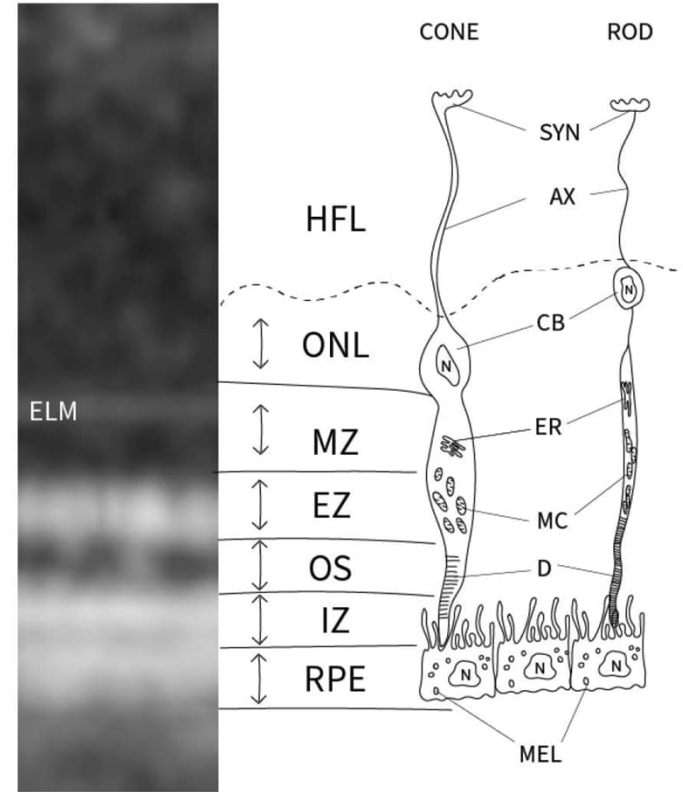
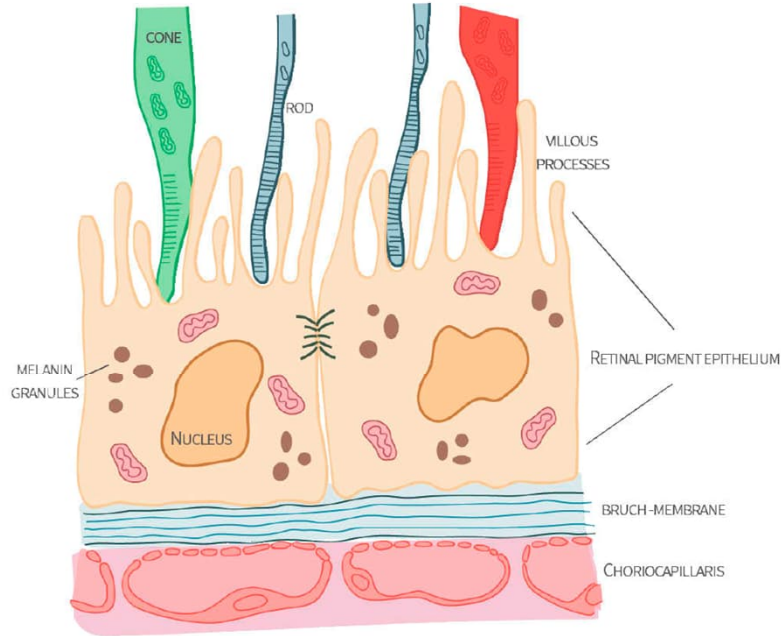
ONL







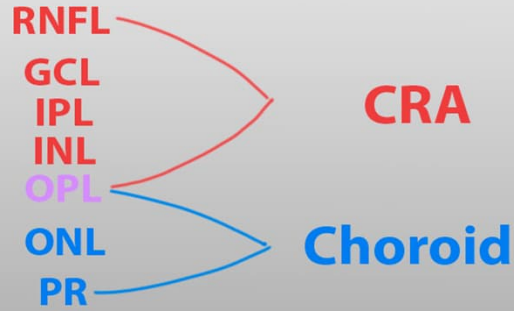
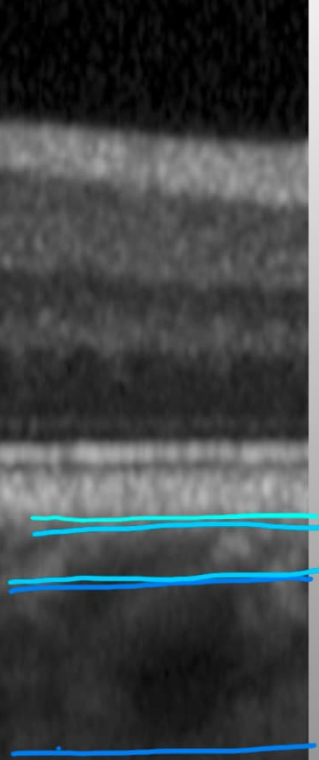
Details



RETINAL BLOOD SUPPLY

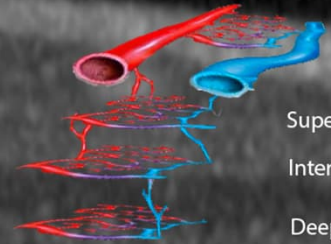
Signal Blockage

Vessel



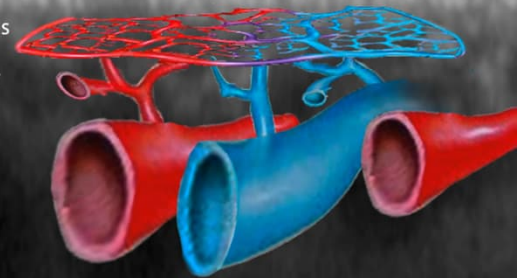
Choriocapillaris
Sattler's Layer
Haller's Layer

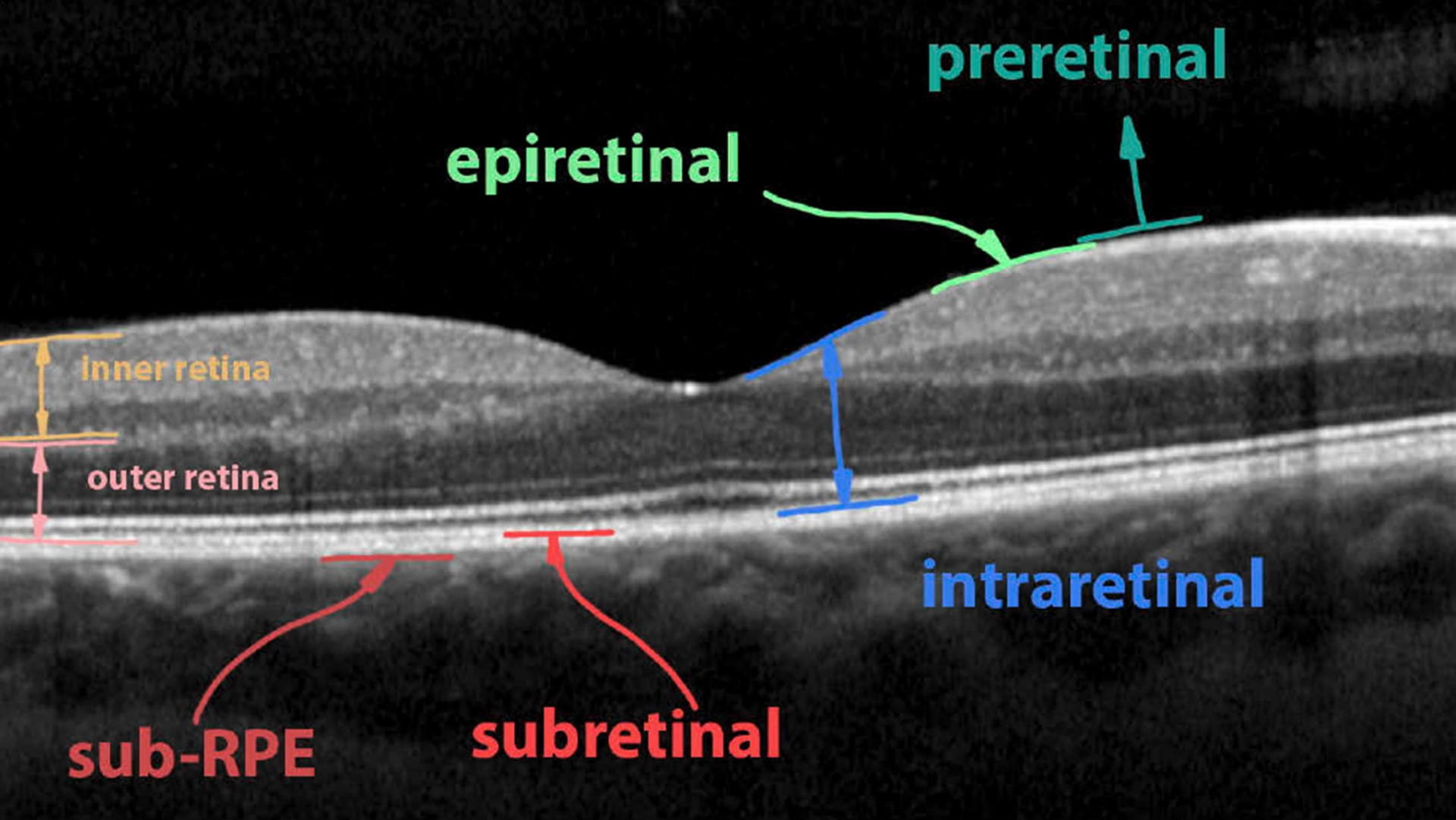
Radial Peripapillary Plexus

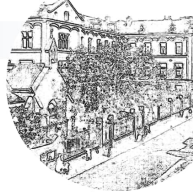


Superficial CP
Intermediate CP
Deep CP

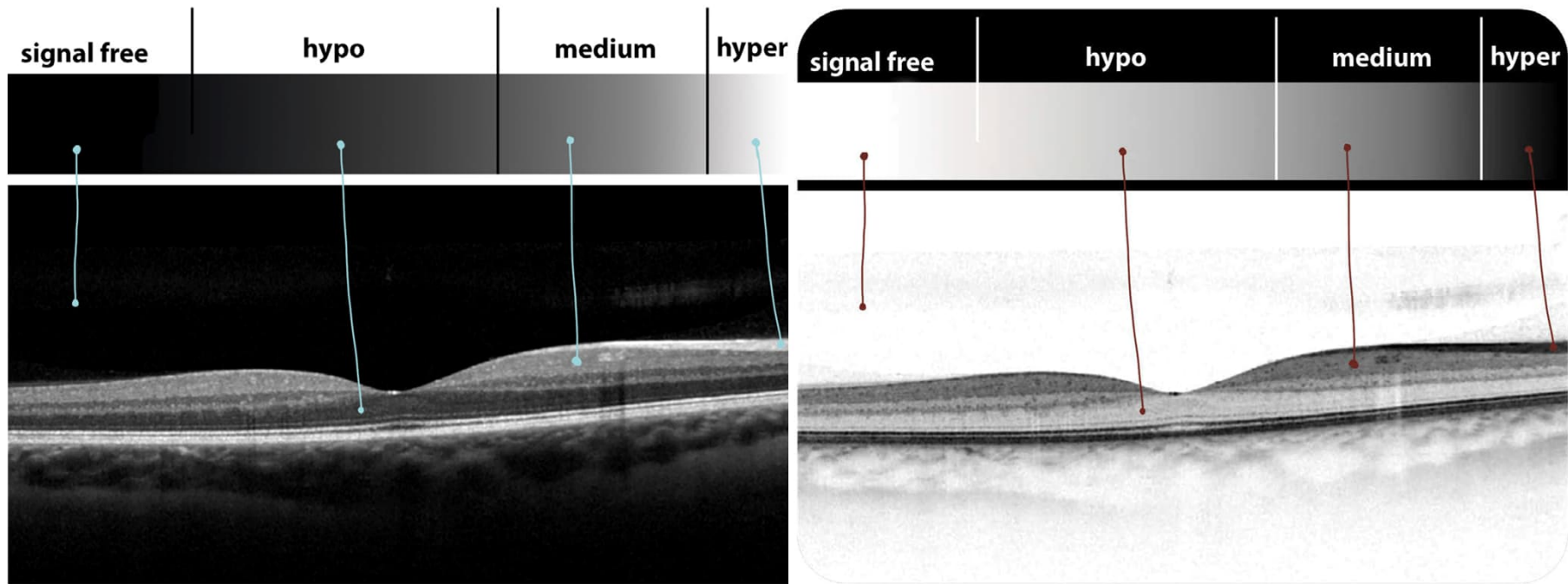
Choriocapillaris
Sattler's Layer
Haller's Layer

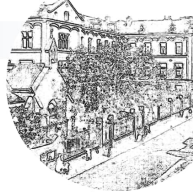




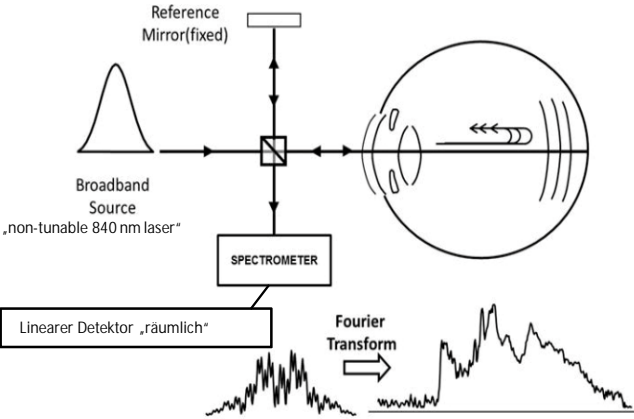


Reflektivität

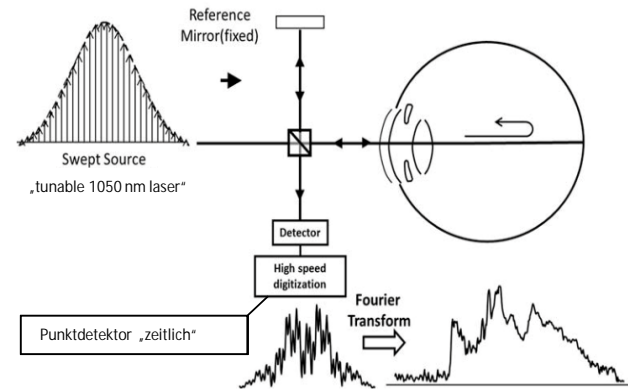




Unterschiedliche Technologien



SD-OCT

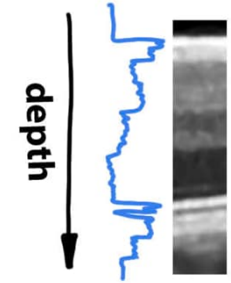


SS-OCT

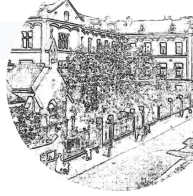
A-Scan



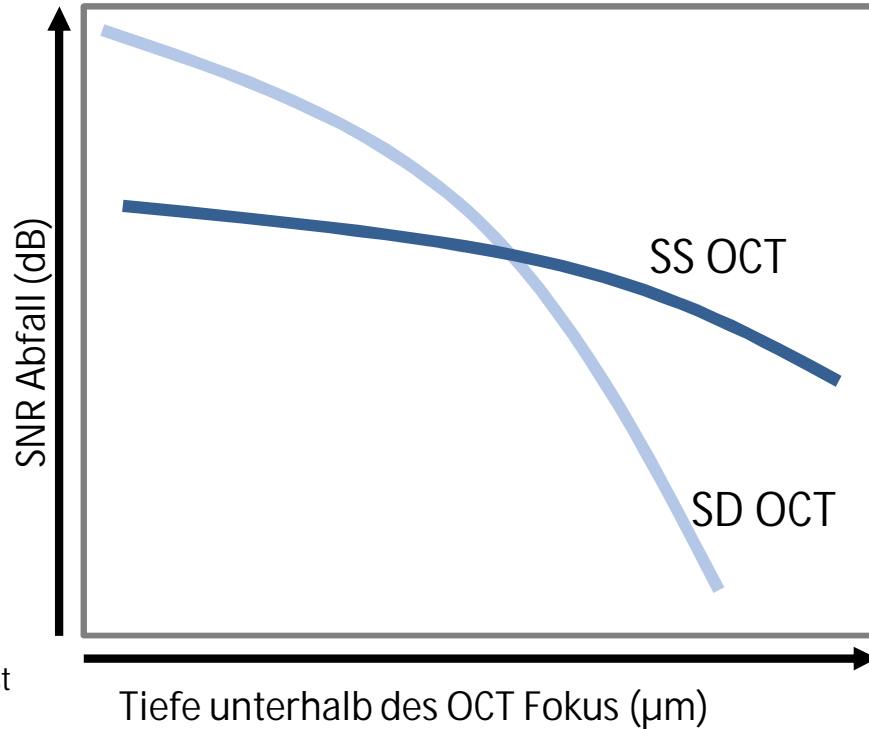
=



Reflektivität vs. Tiefe



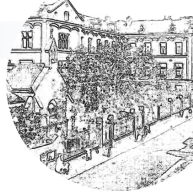
Vorteile von "Swept Source"



Höheres Verhältnis
Signal/Störung (SNR)

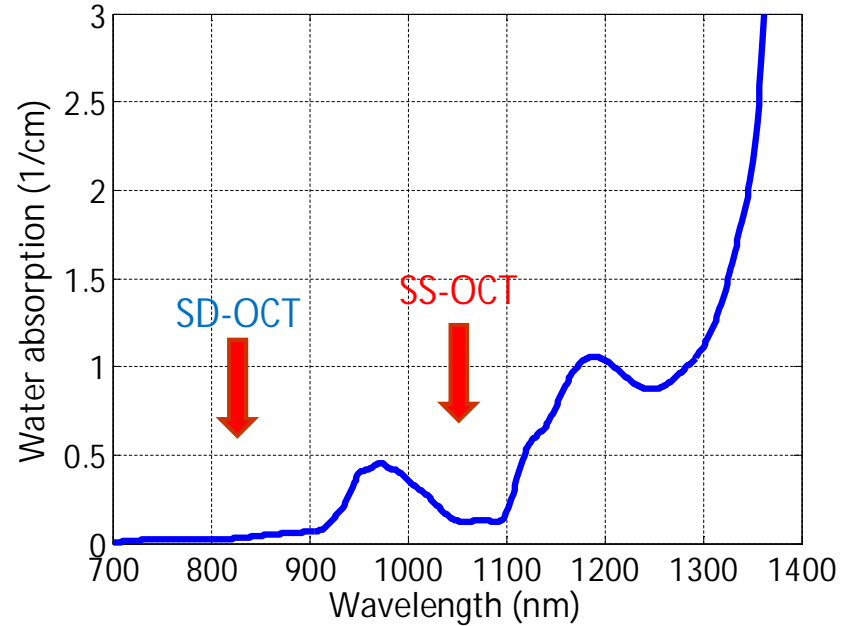
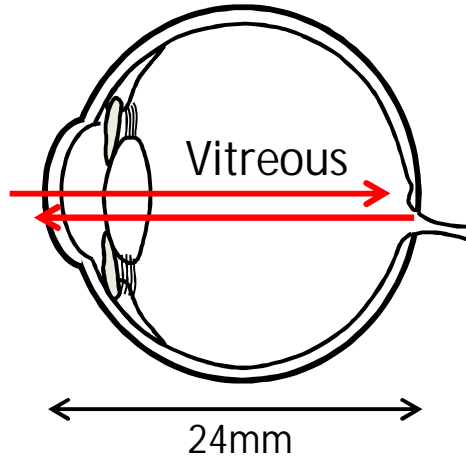


Besserer Bildkontrast in
tieferem Gewebe

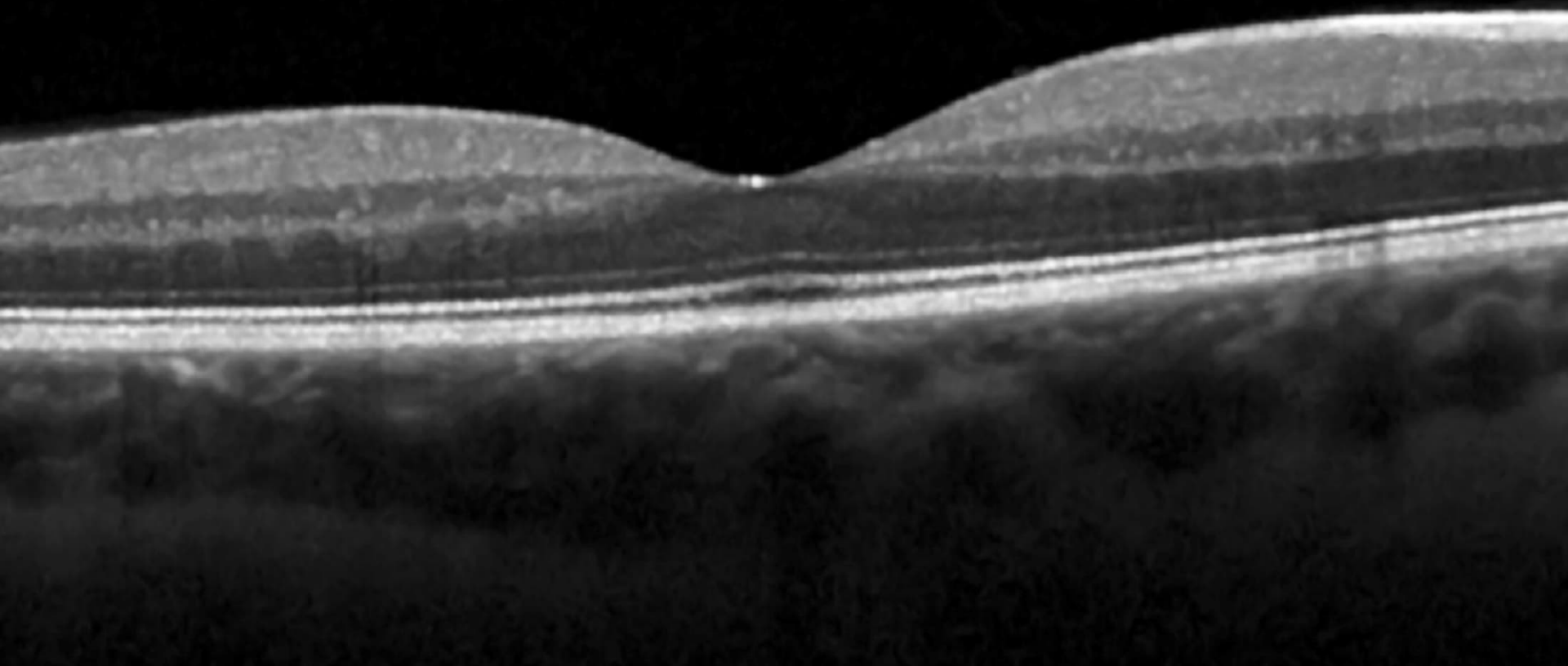


Lichtquelle mit höherer Frequenz

Sowohl 840nm als auch 1050nm Licht dringen gut durch den Glaskörper



Spectral Domain (SD-)OCT



Swept Source (SS)-OCT

A Swept Source (SS)-OCT cross-section of the retina. The image shows a cross-section of the eye with various layers of the retina and underlying structures. The layers are labeled in German: Glaskörper (vitreous body), Netzhaut (retina), Aderhaut (choroid), and Sklera (sclera). The retina shows a distinct dip in the macula area. The vitreous body is the dark, clear area at the top. The sclera is the thick, white layer at the bottom. The choroid is the layer between the retina and the sclera. The retina is the thin, multi-layered structure in the middle.

Glaskörper

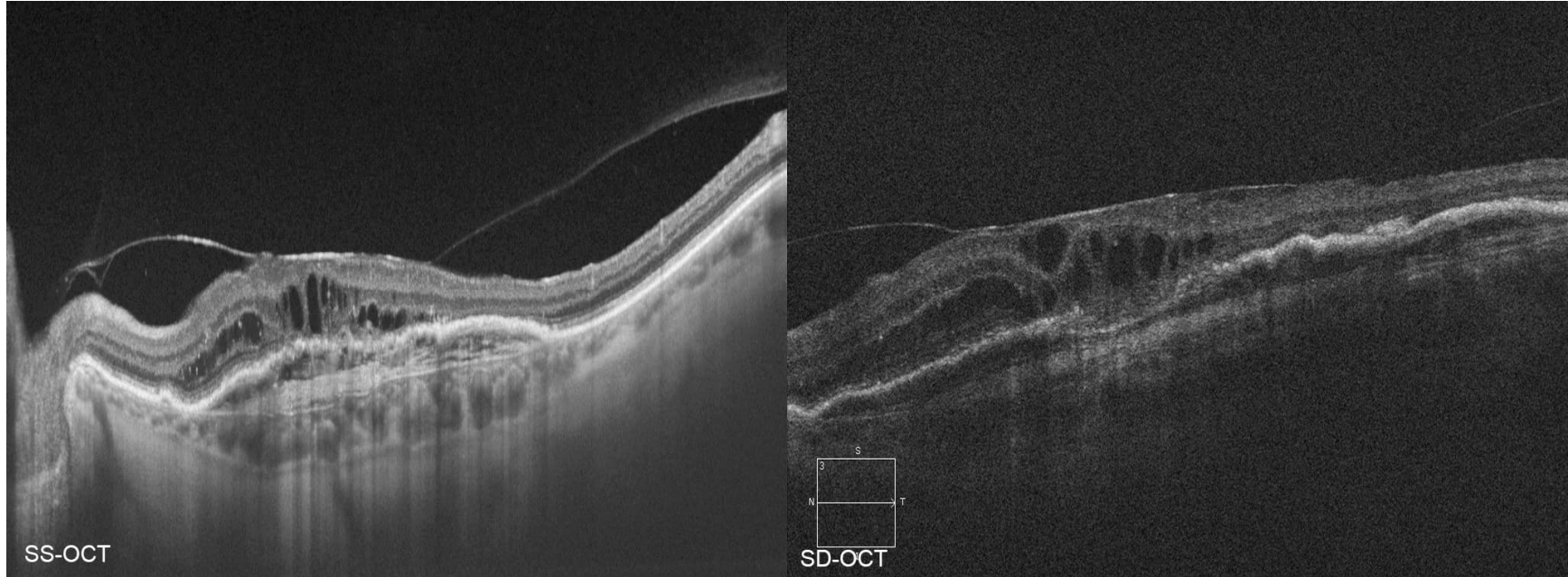
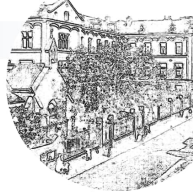
Netzhaut

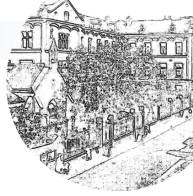
Aderhaut

Sklera

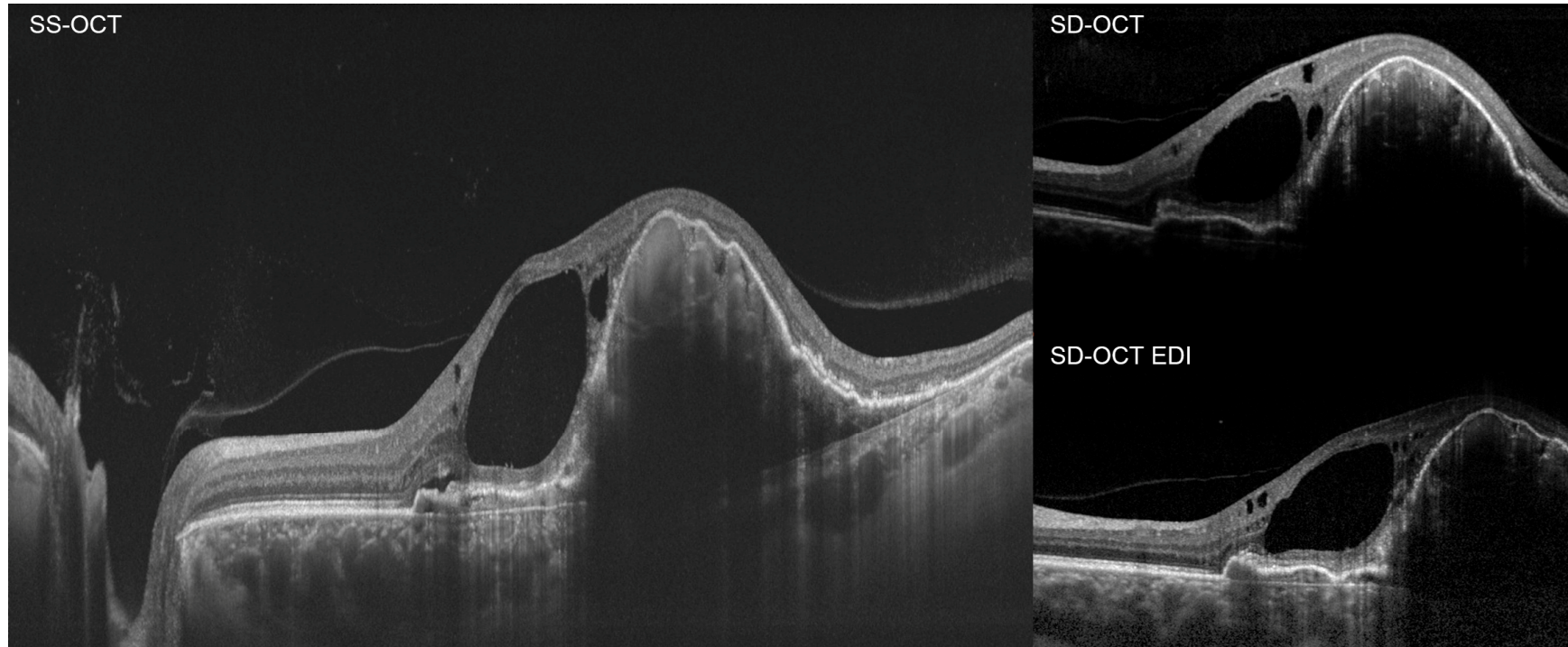


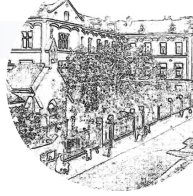
SS-OCT vs. Spectral Domain (SD)-OCT



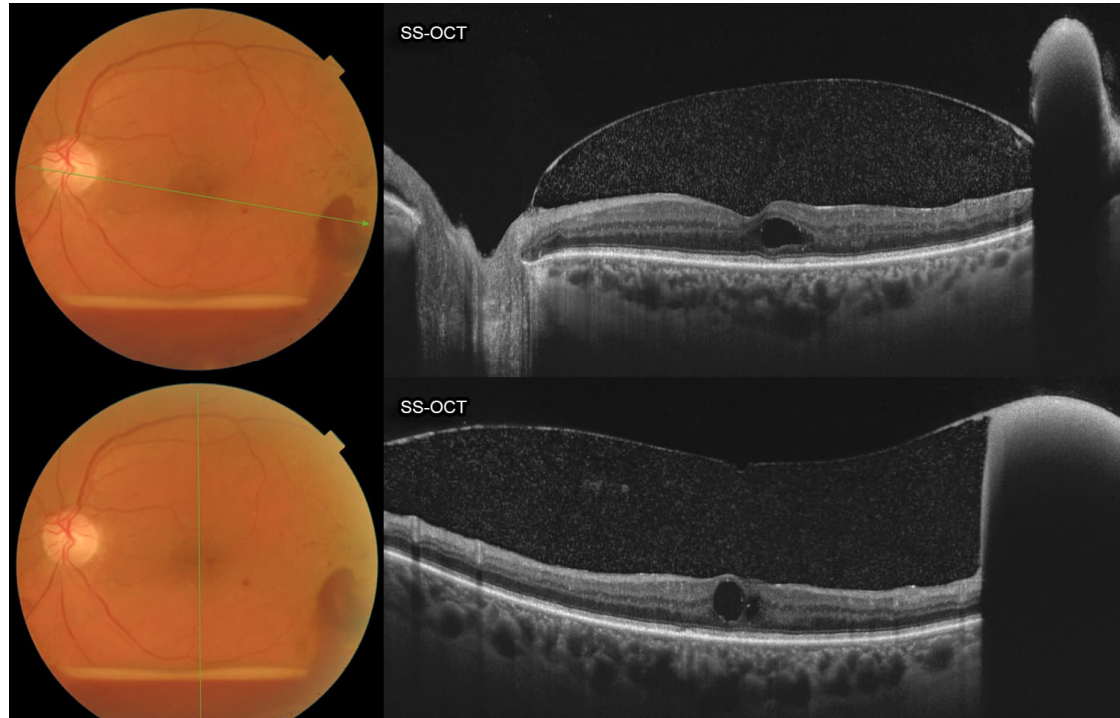


SS-OCT vs. SD-OCT EDI



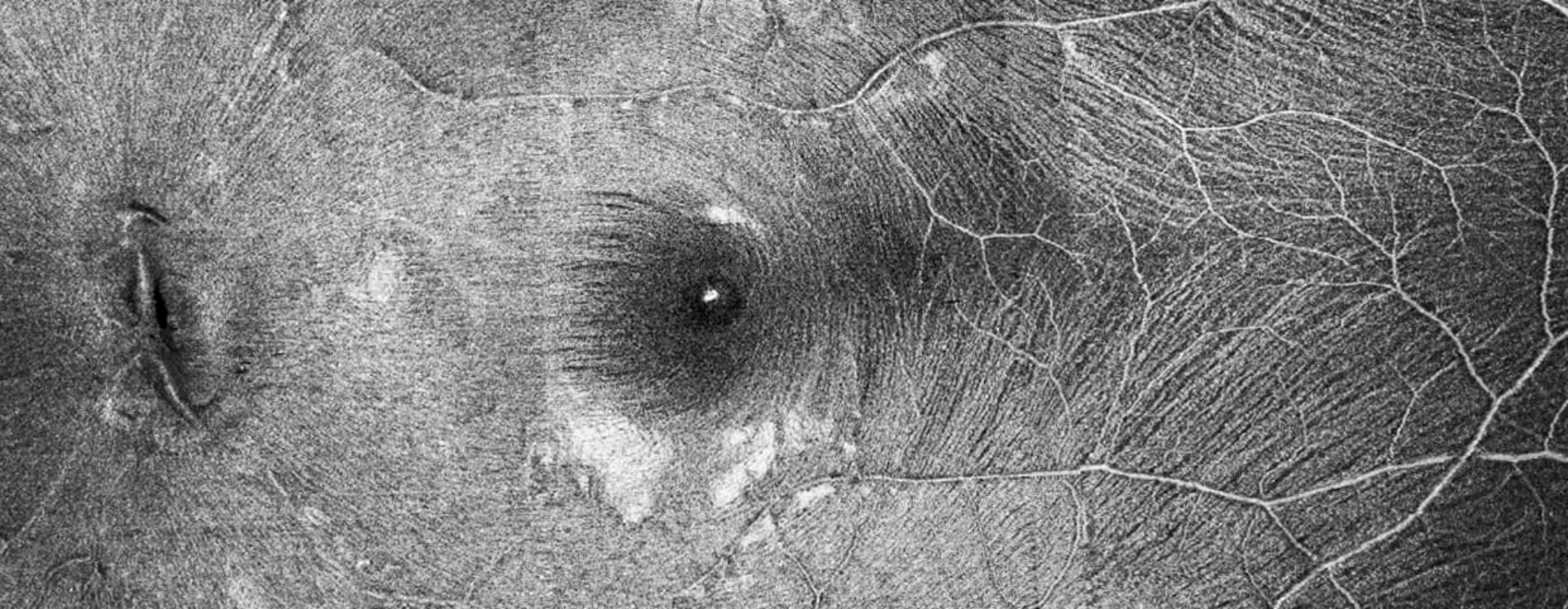
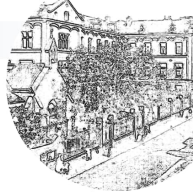


SS-OCT



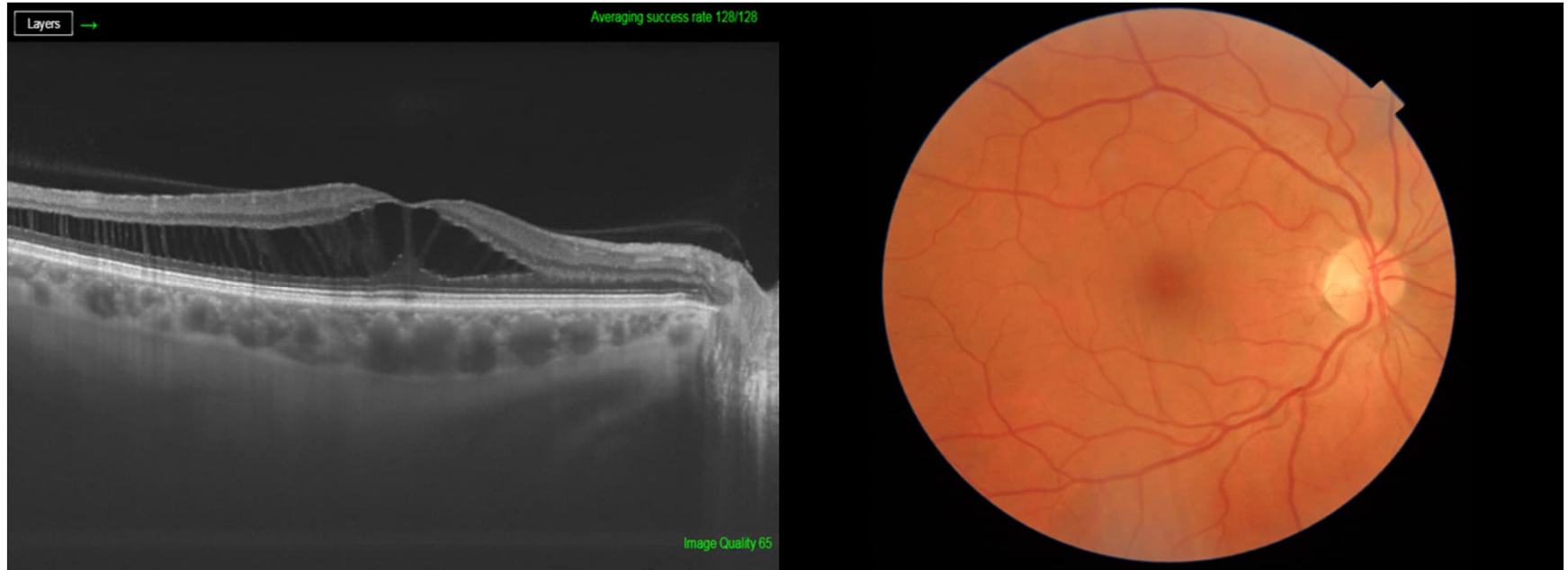
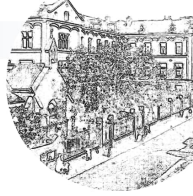


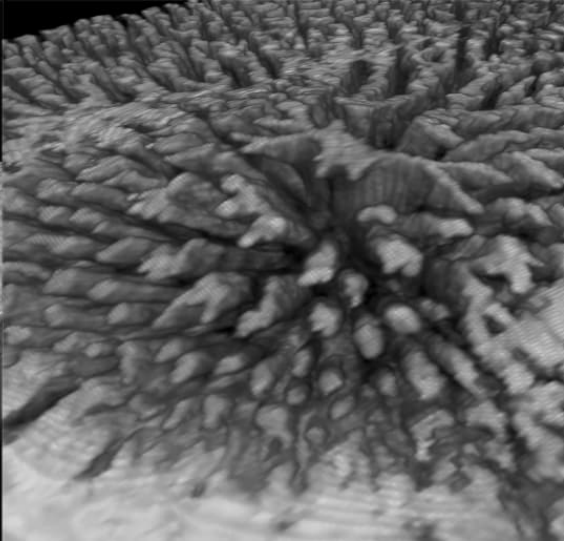
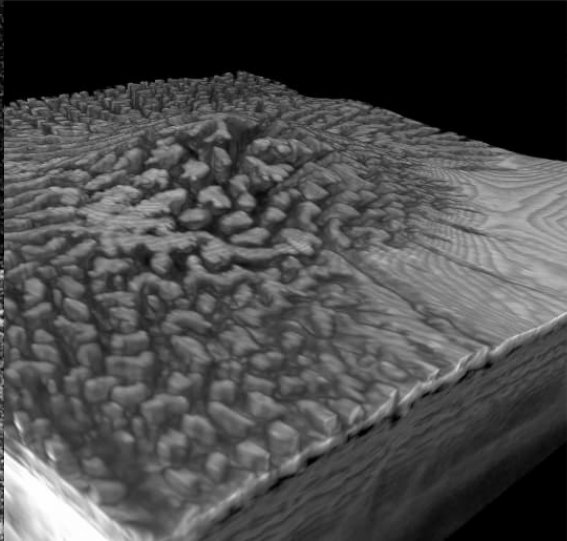
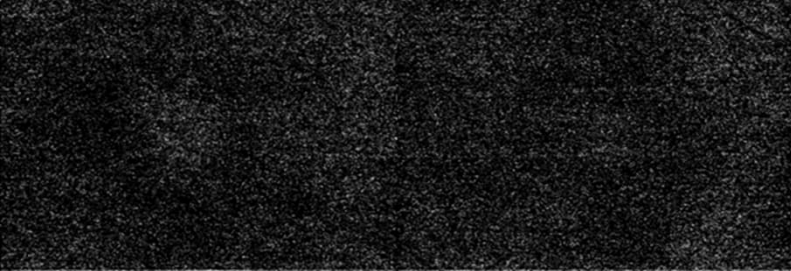
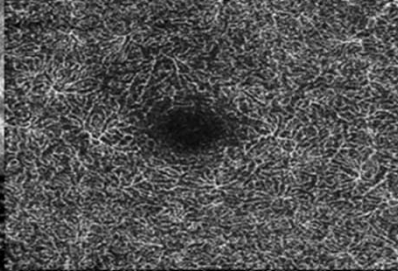
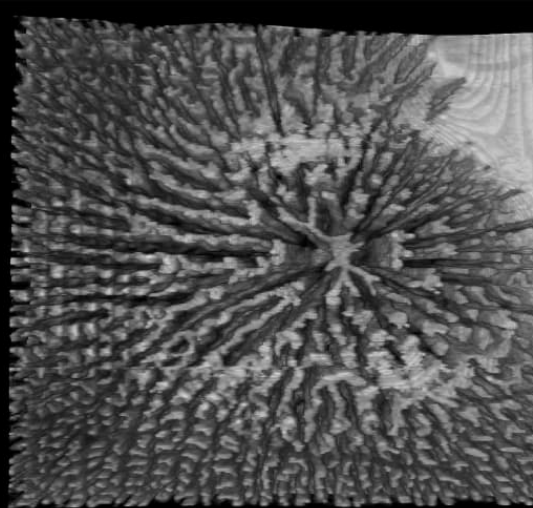
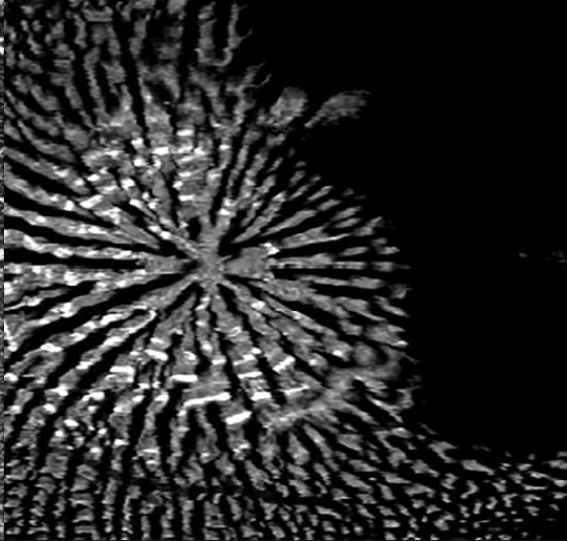
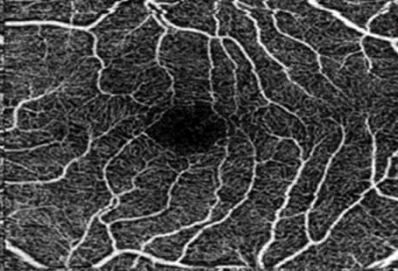
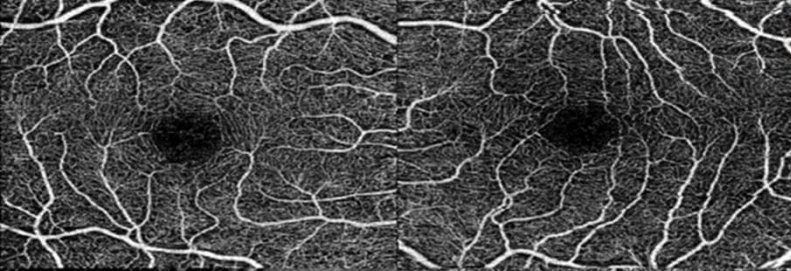
SS-OCT en-face Mosaik

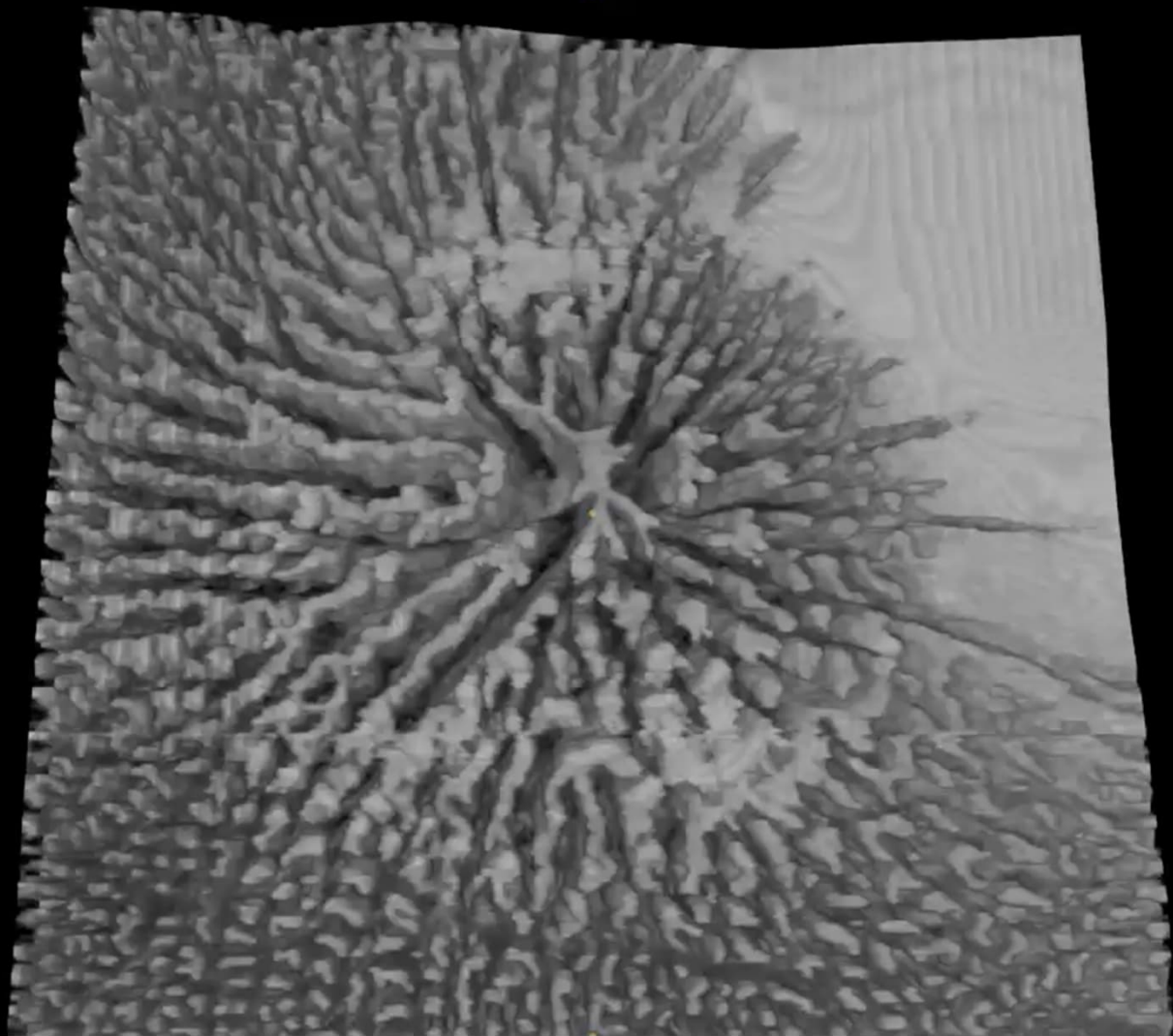




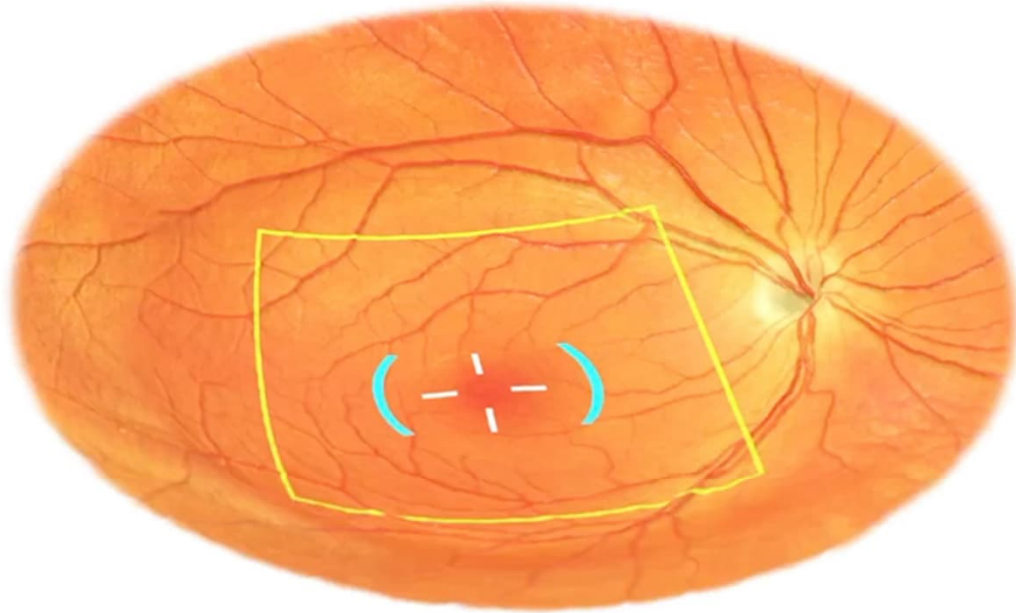
SNIFR – 3D Rekonstruktion

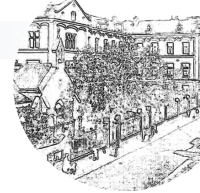






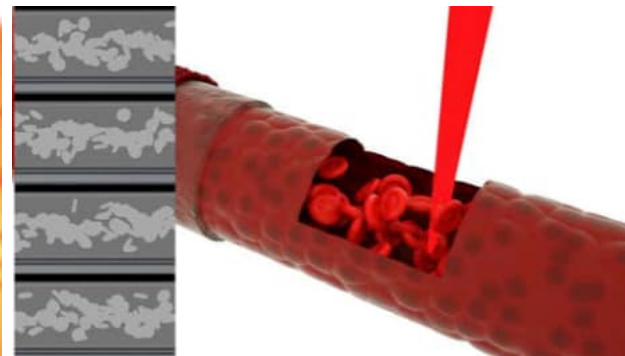
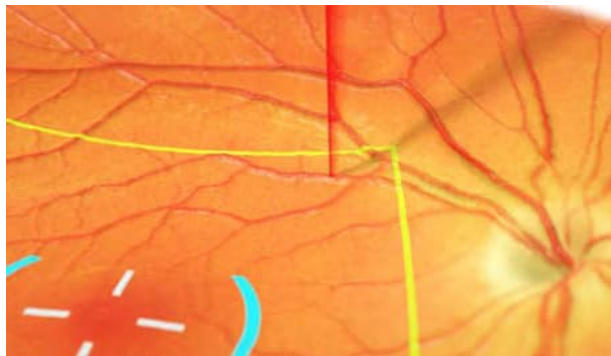
OCTA Technologie





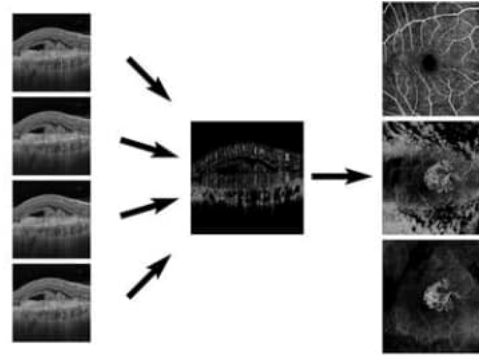
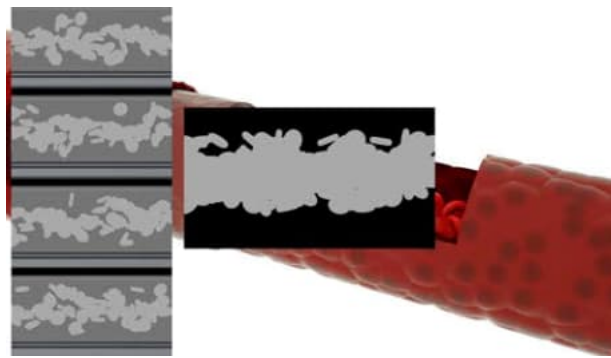
Vendor	Instrument	Algorithm name	Method
Topcon Corporation®	DRI OCT Triton™ Swept Source OCT	OCTARA™	Amplitude ratio analysis
Carl Zeiss Meditec®	Angioplex™ and Flex Elite™ 9000	OMAG™	Amplitude decorrelation
Heidelberg Engineering®	Spectralis CCT 2™	Full Spectrum Probabilistic Algorithm	Probabilistic amplitude decorrelation
Optovue®	Angiovue™	SSADA™	Amplitude decorrelation
Canon®	OCT-HS100™	–	Amplitude decorrelation
Nidek Corporation®	RS-3000 Advance AngioScan™	CCDAA™	Complex phase and amplitude decorrelation

Laser scannt 4x dieselbe Stelle



4 B-scans mit dynamischen und statischen Elementen

Dynamische und statische Elemente werden subtrahiert



Summation vaskulärer Strukturen in Portraitbild (en face)



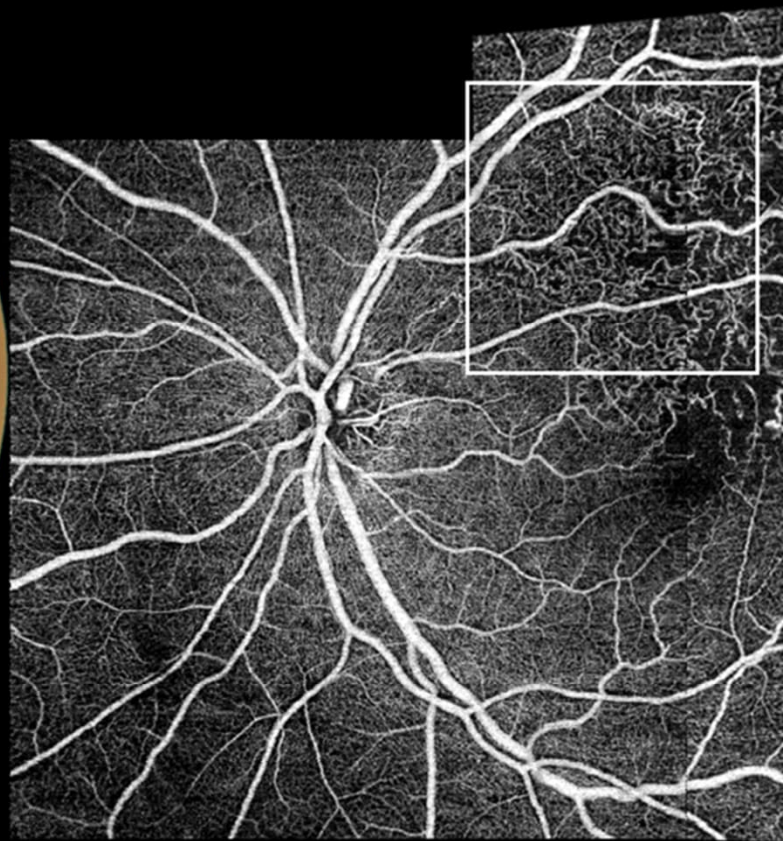
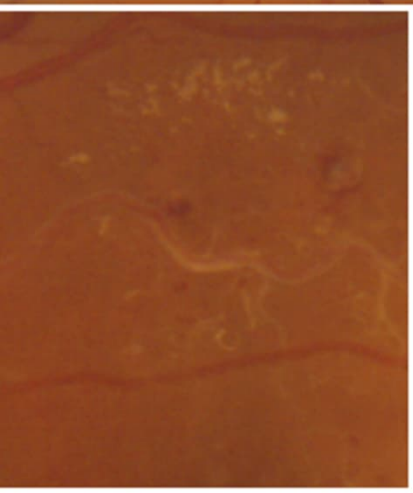
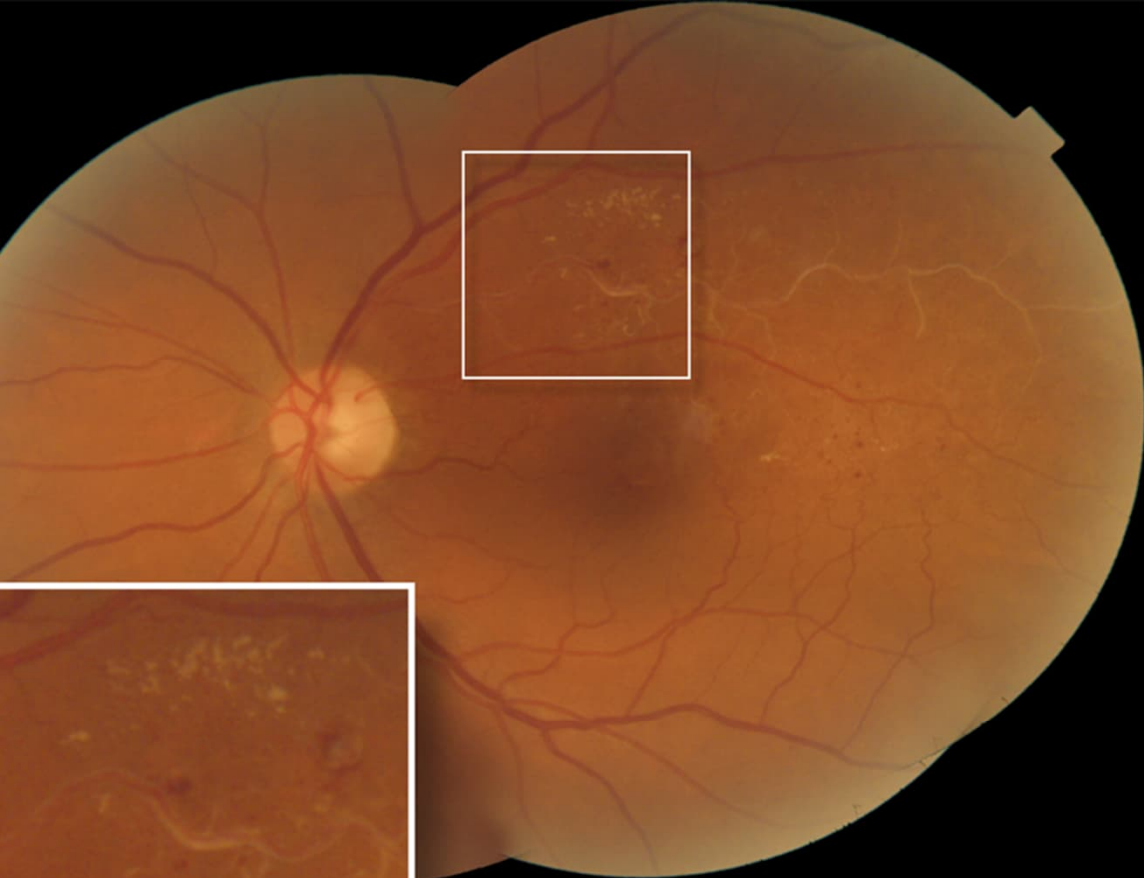


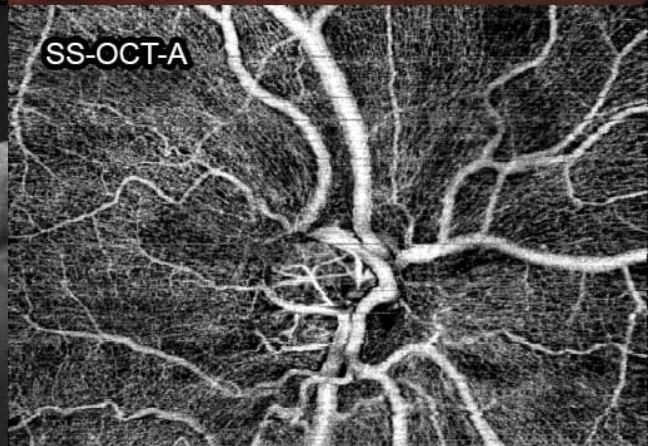
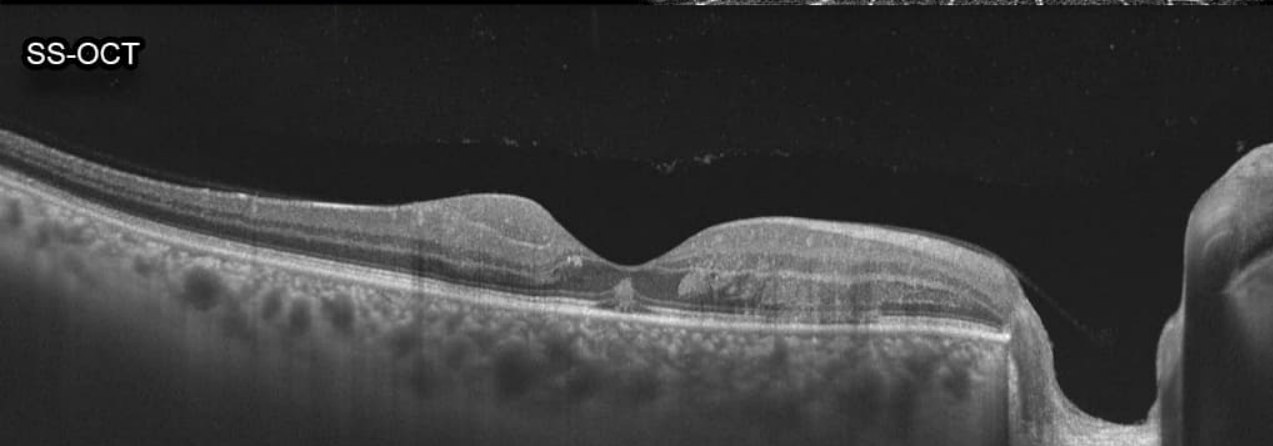
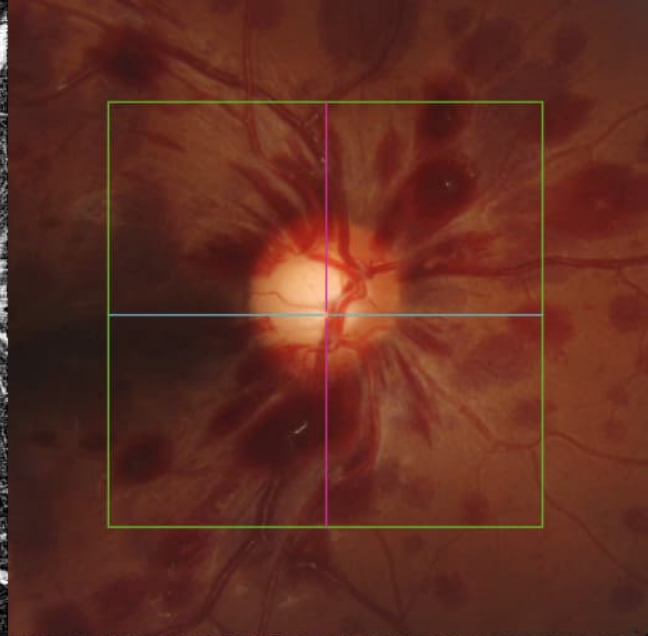
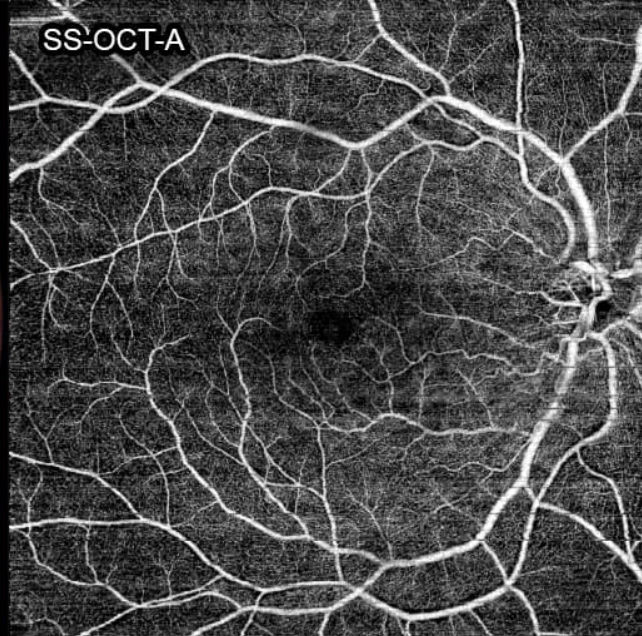
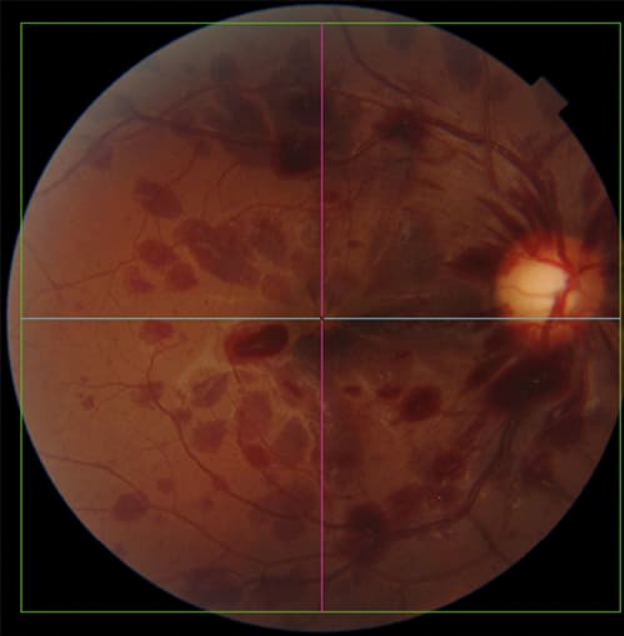


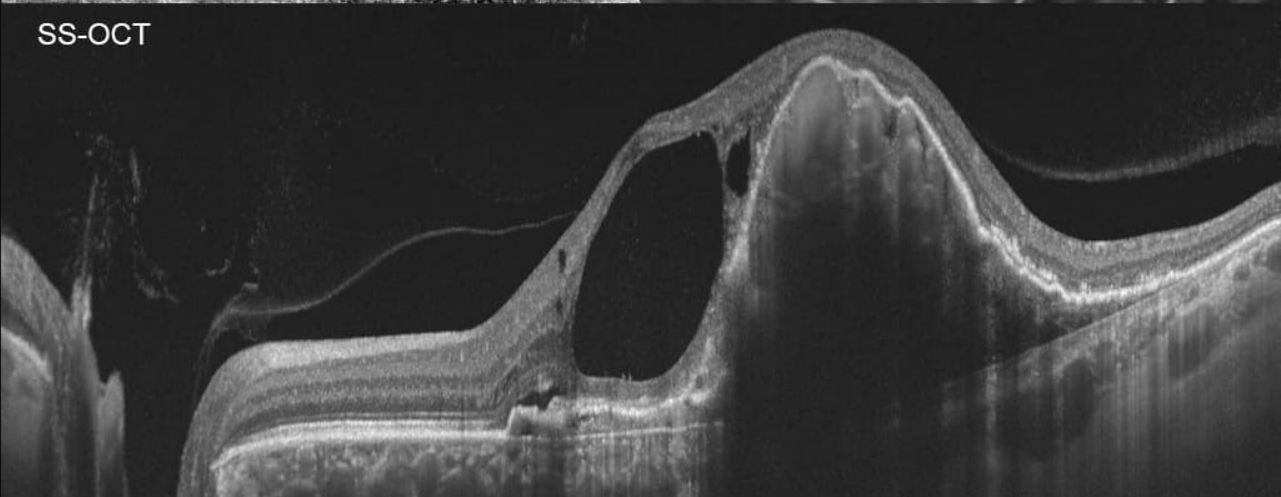
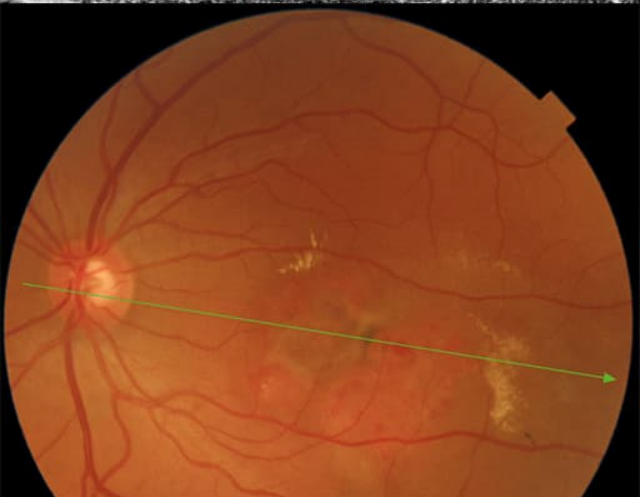
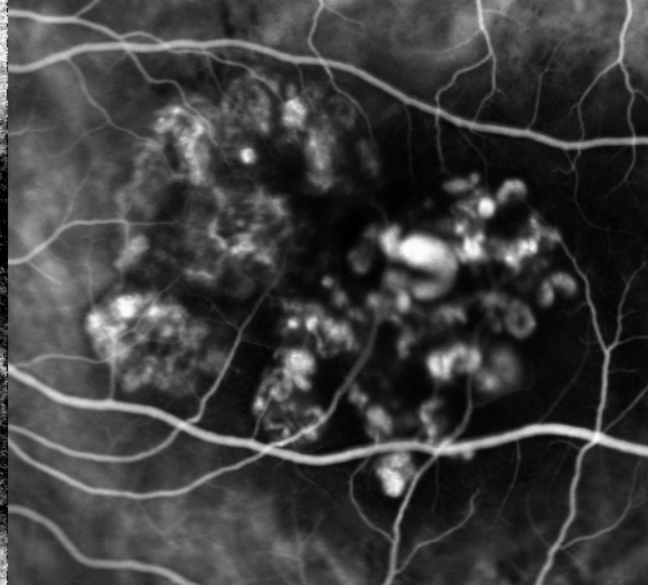


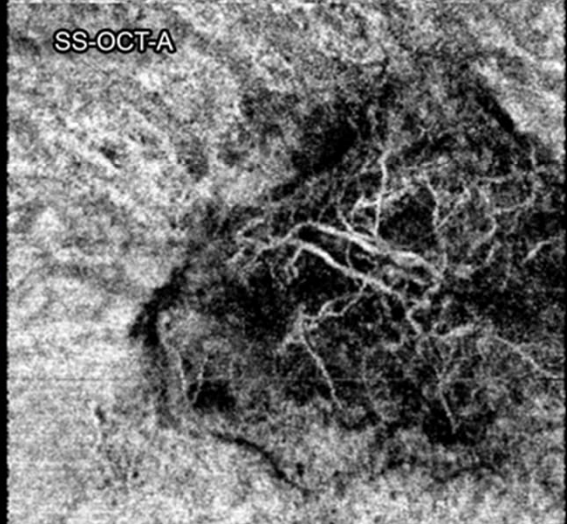
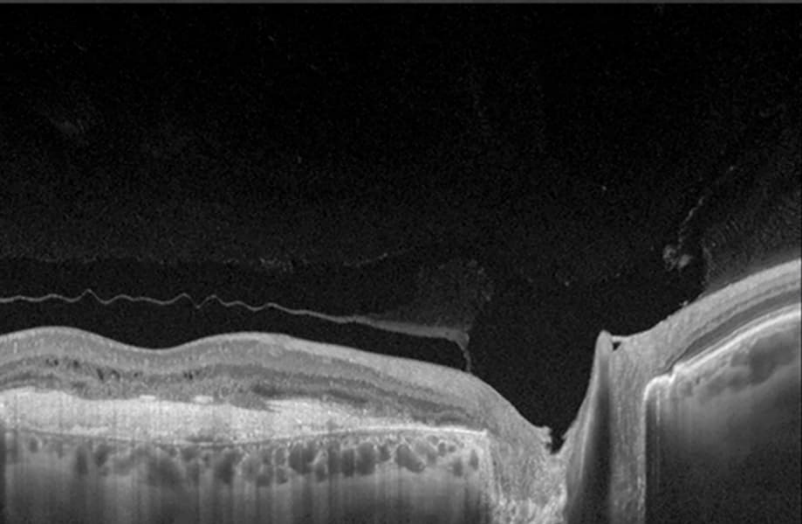
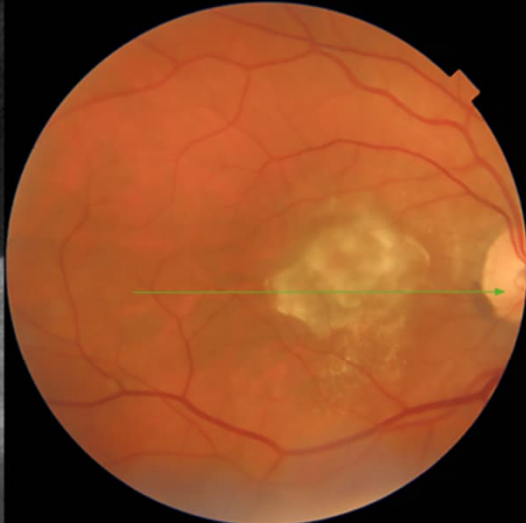
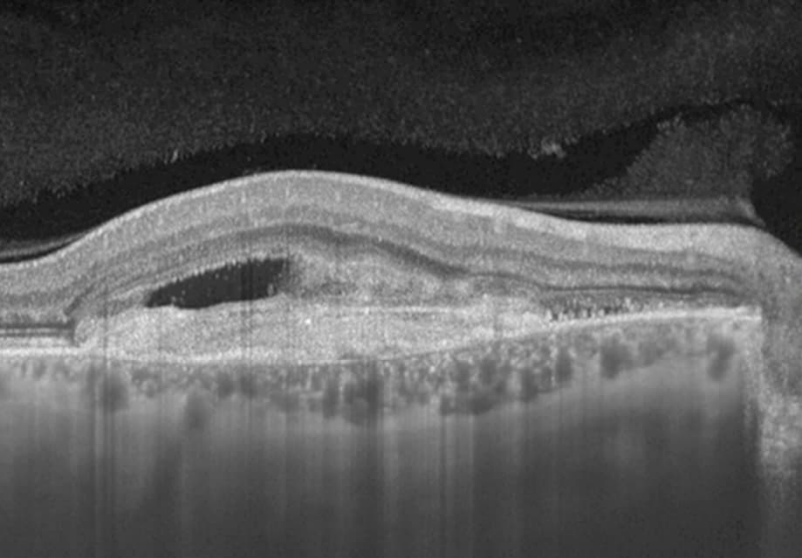






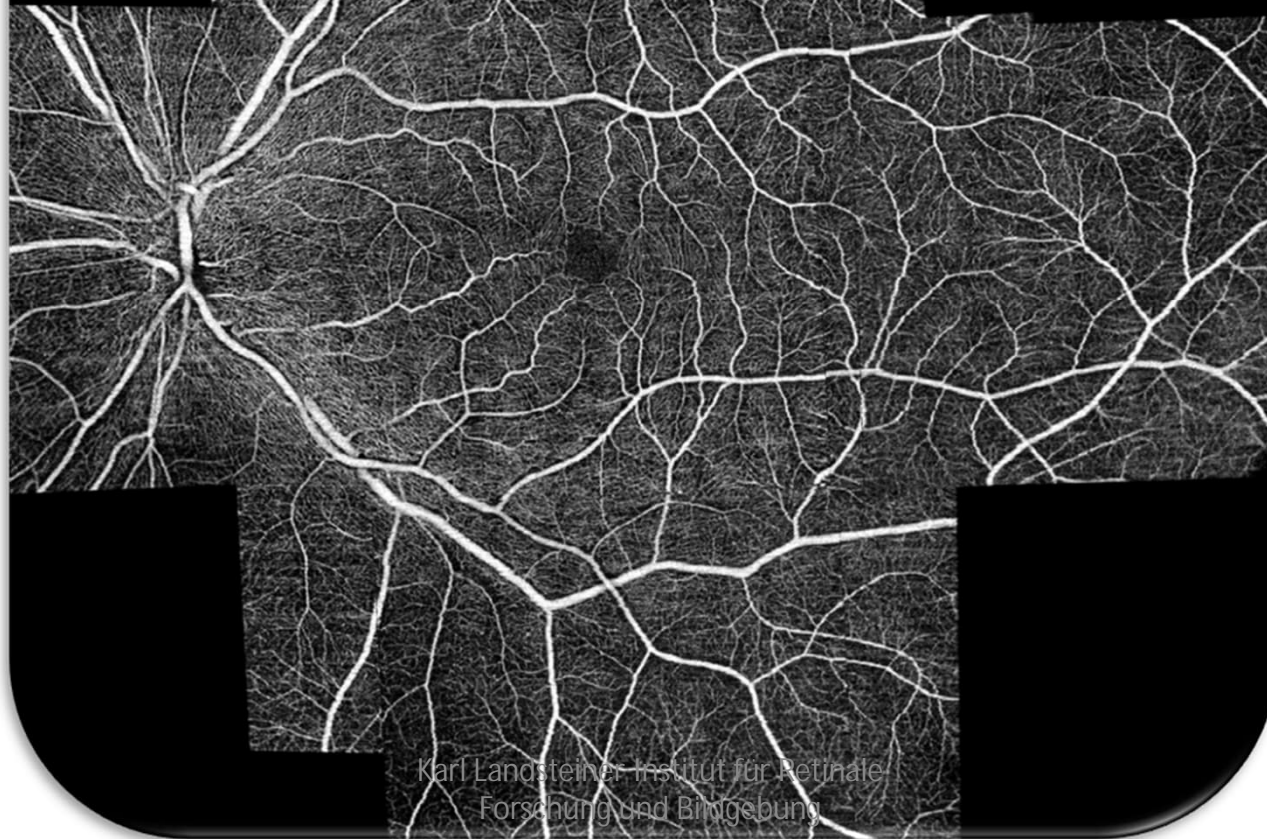




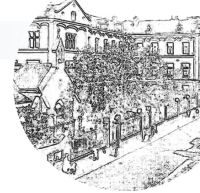




Komposition von 6x6mm HD SS-OCTA en face scans

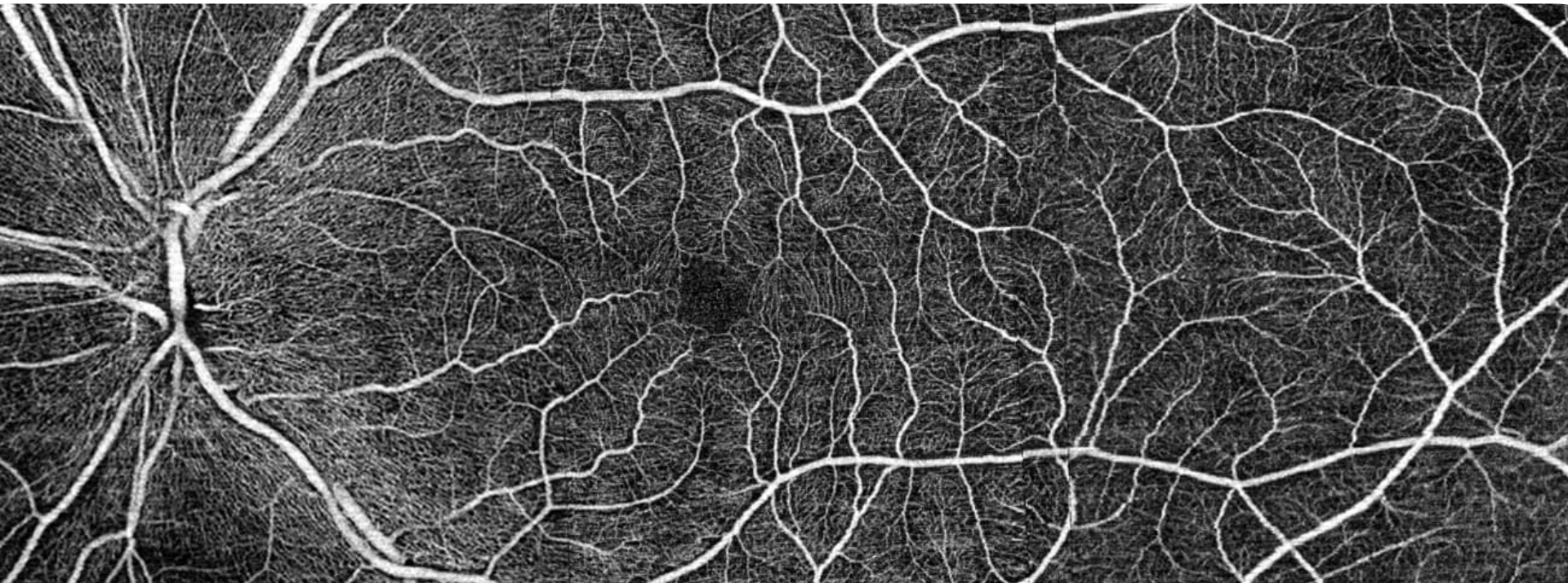
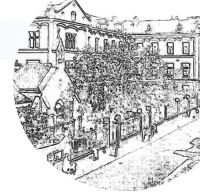


Karl Landsteiner Institut für Retinale
Forschung und Umgebung



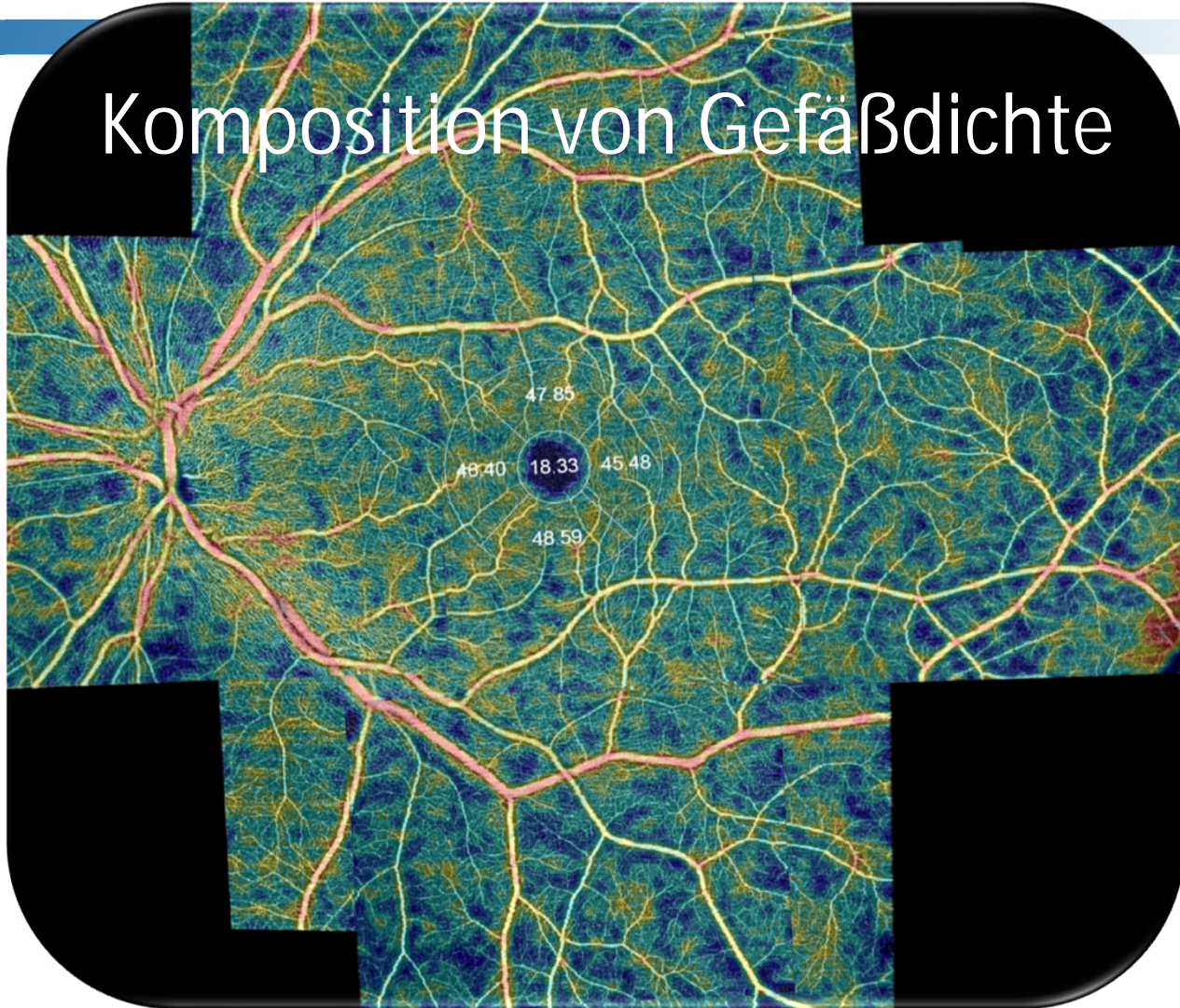
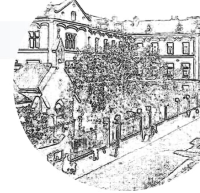


3x512 A-scans x 512 A-scans



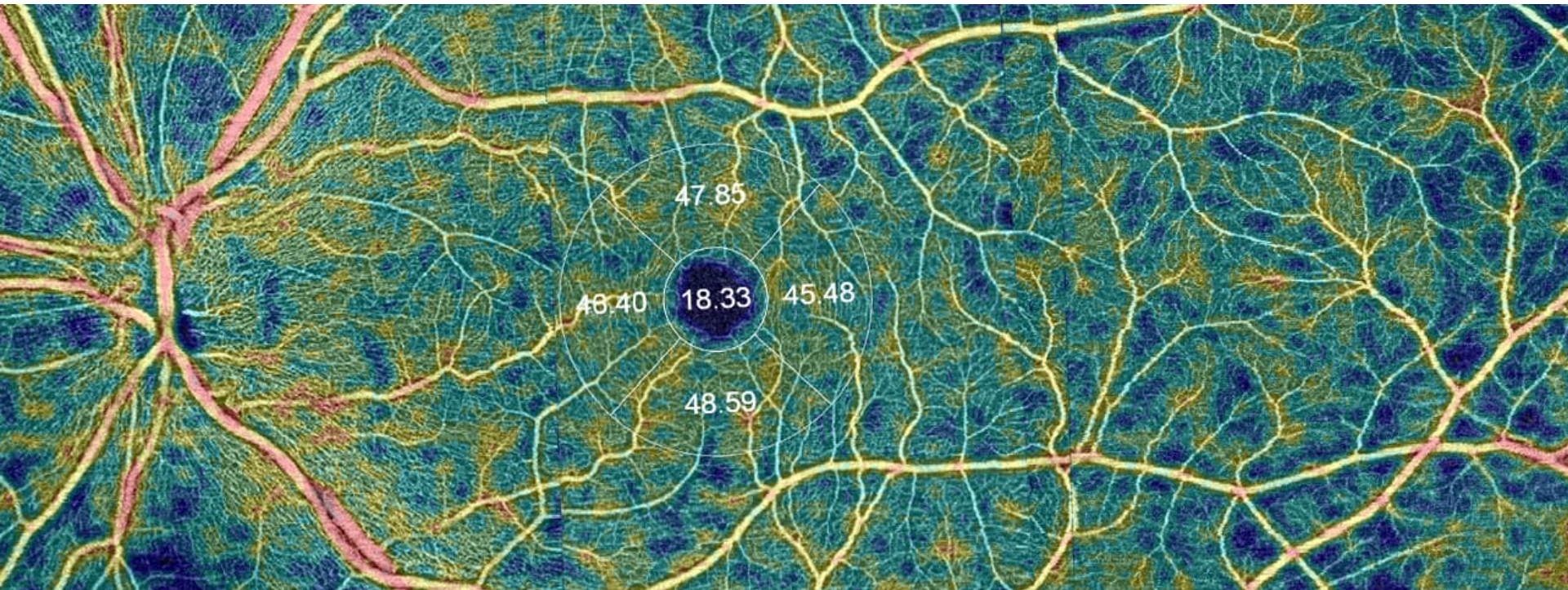
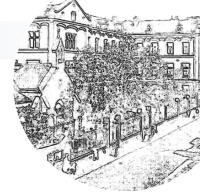


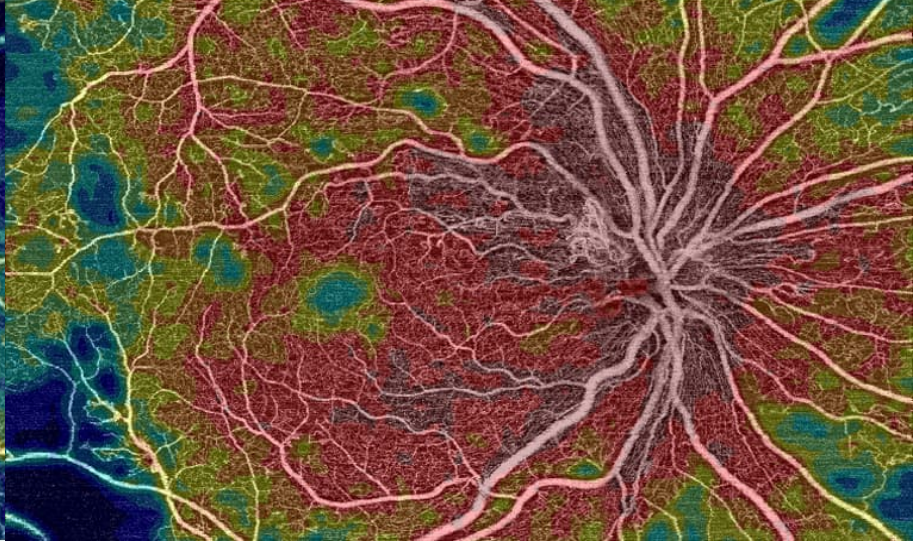
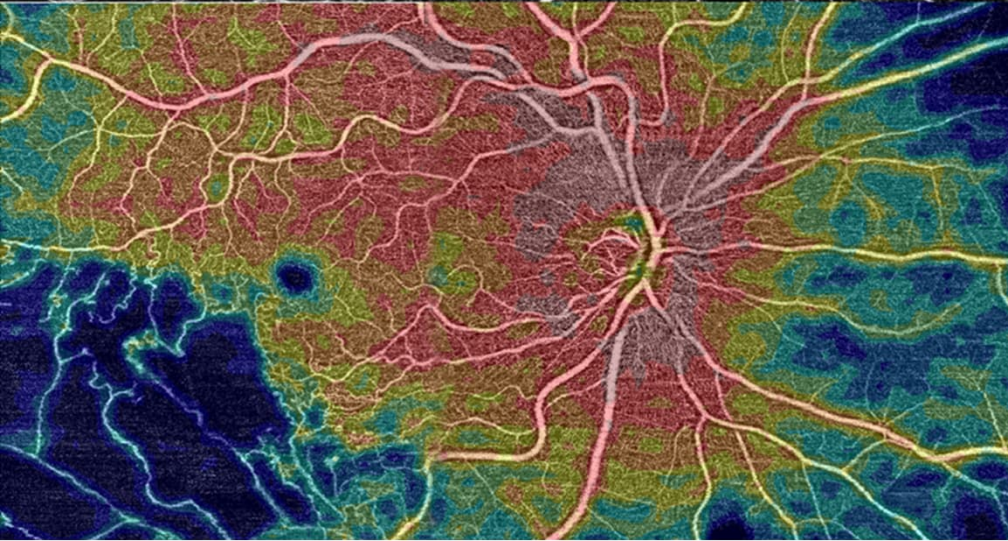
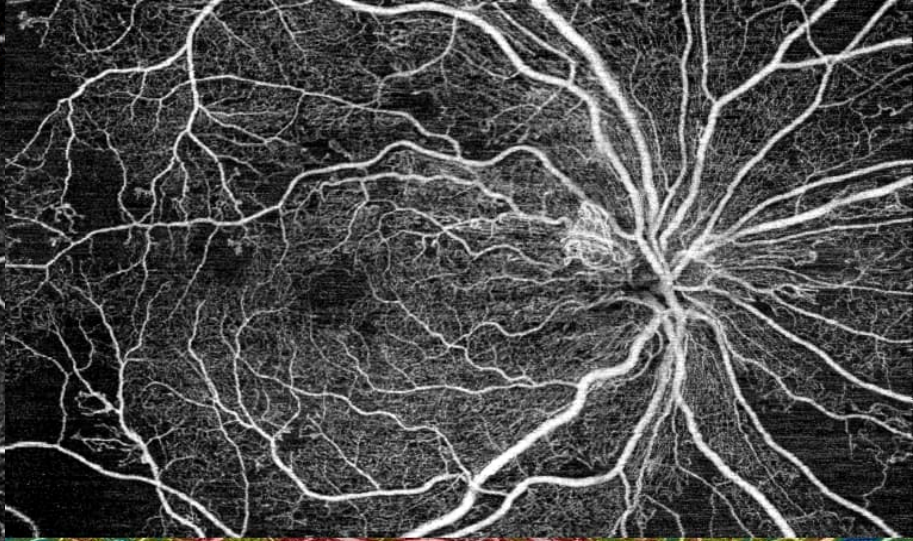
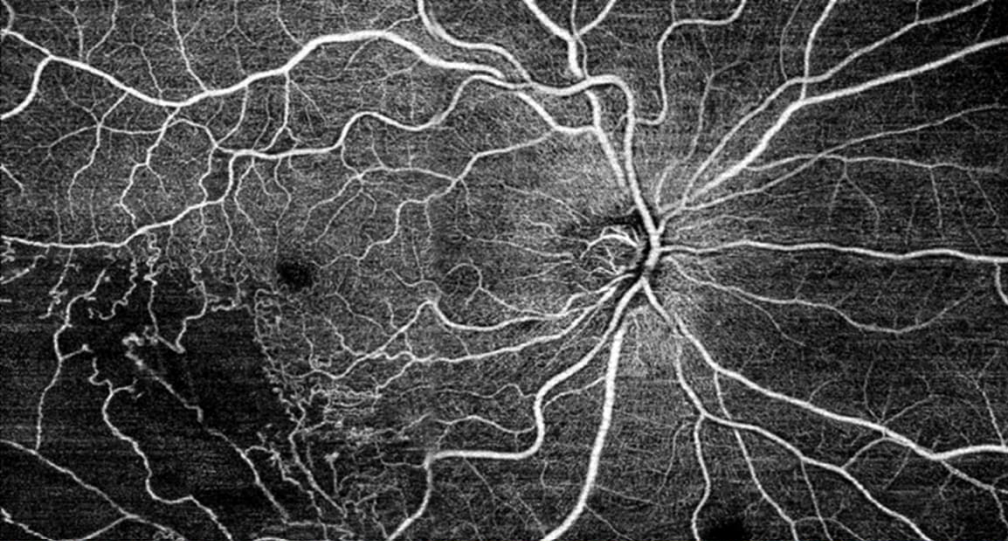
Komposition von Gefäßdichte





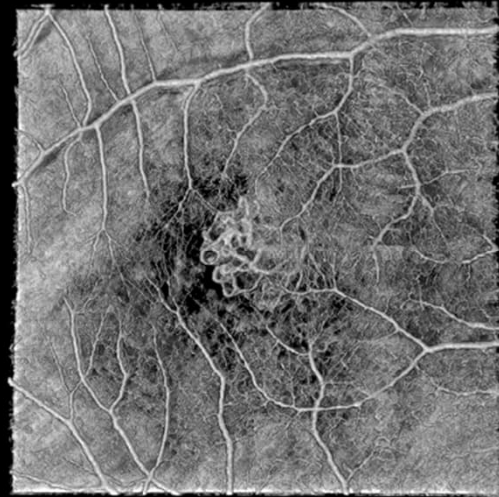
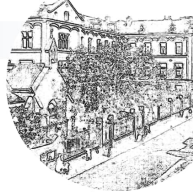
3x512 A-scans x 512 A-scans







Danke für Ihre Aufmerksamkeit



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