

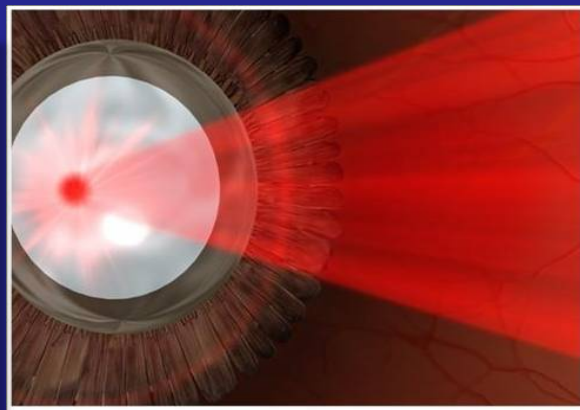
Die Photodynamische Therapie (PDT)

Eine wertvolle Waffe
im Wandel der Zeit

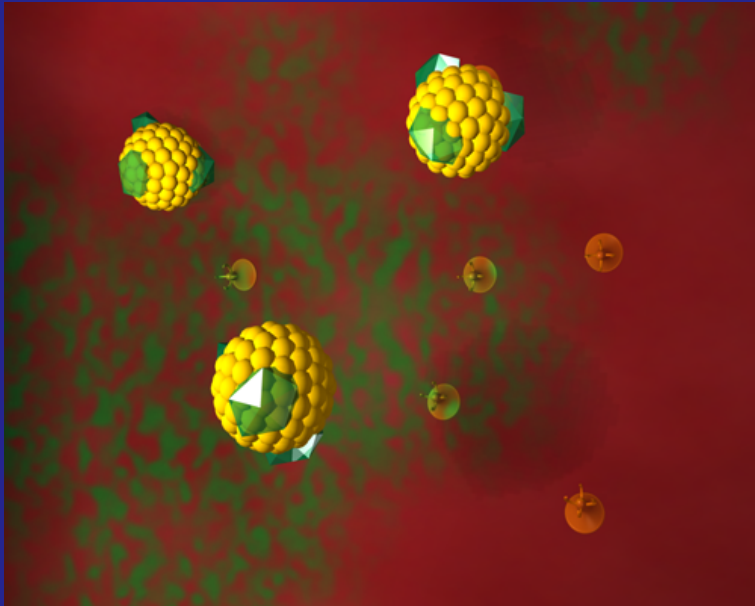
Prinzipien der PDT



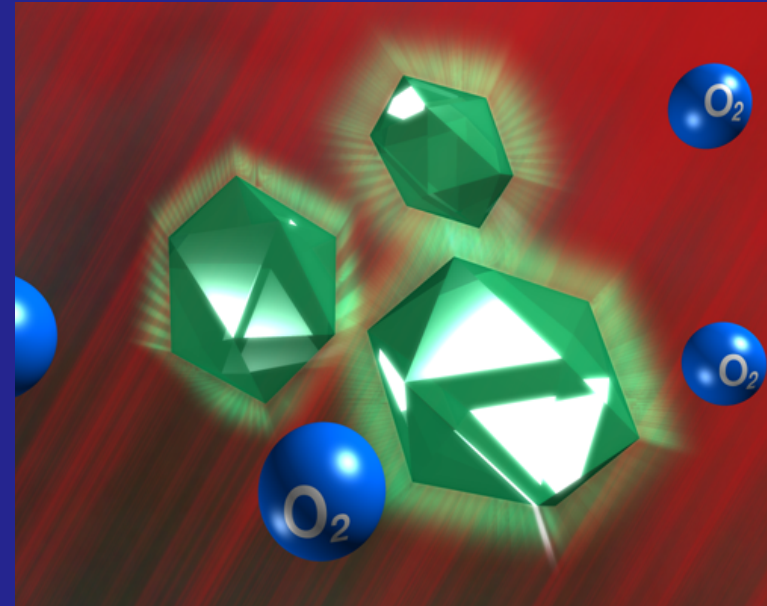
- **1. Schritt:**
Eine spezielle lichtempfindliche Substanz (**Verteporfin = Visudyne®**) wird über 10 min. in die Armvene verabreicht
- **2. Schritt:**
Die betroffene Netzhautstelle wird für 83 Sekunden mit kaltem Laserlicht bestrahlt



Prinzipien der PDT

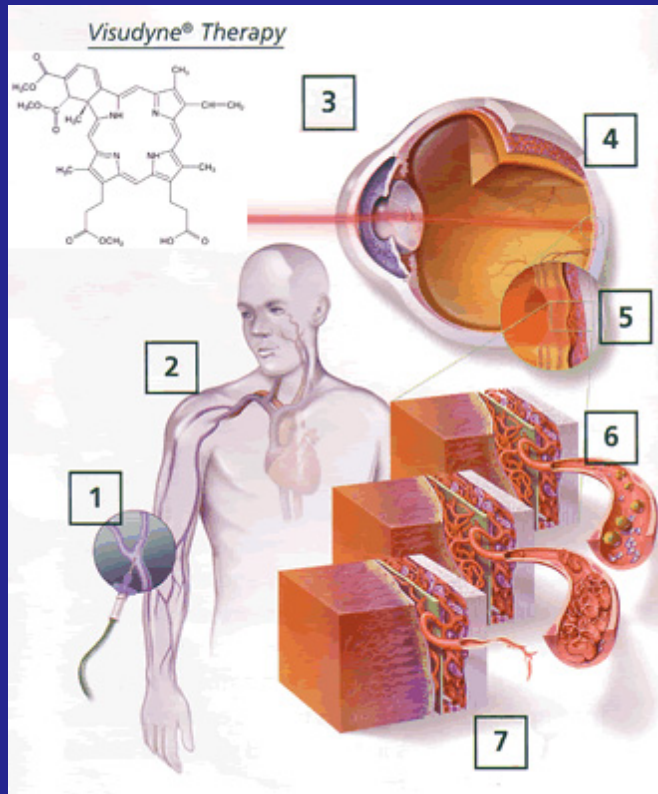


Verteporfin-Komplexe
mit LDL

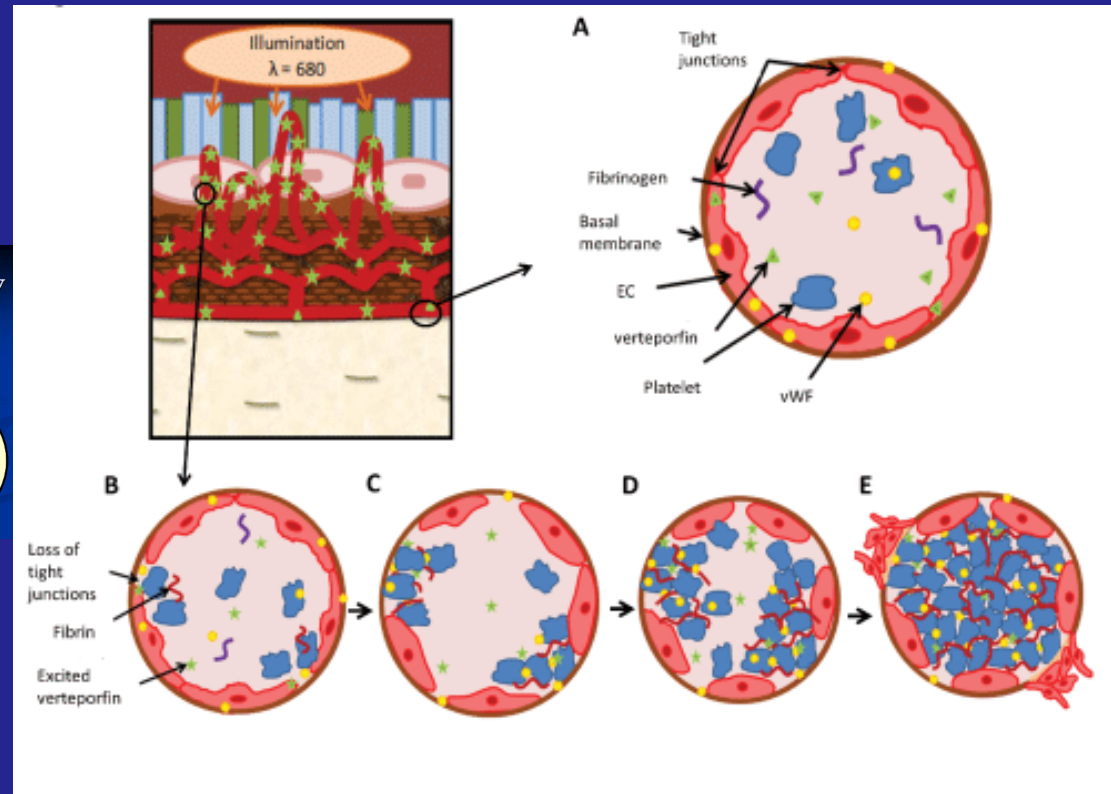
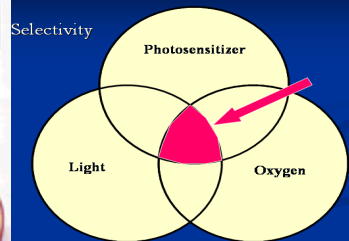


Verteporfin reagiert
mit Sauerstoff

Prinzipien der PDT



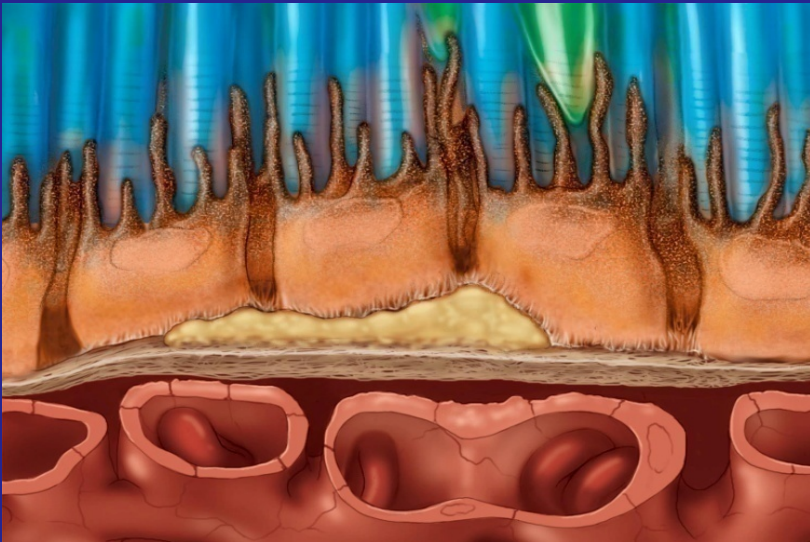
Photodynamic Therapy



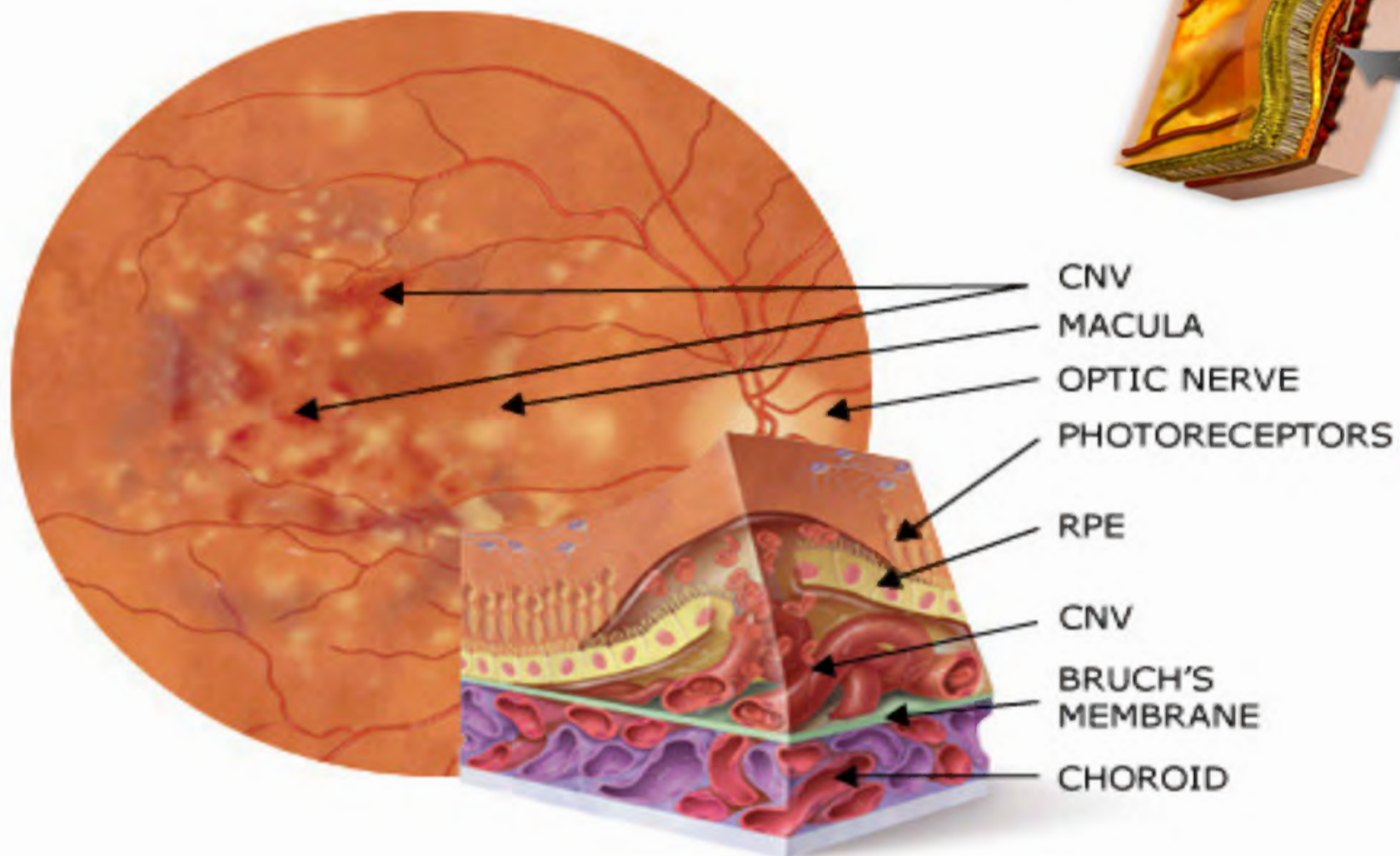
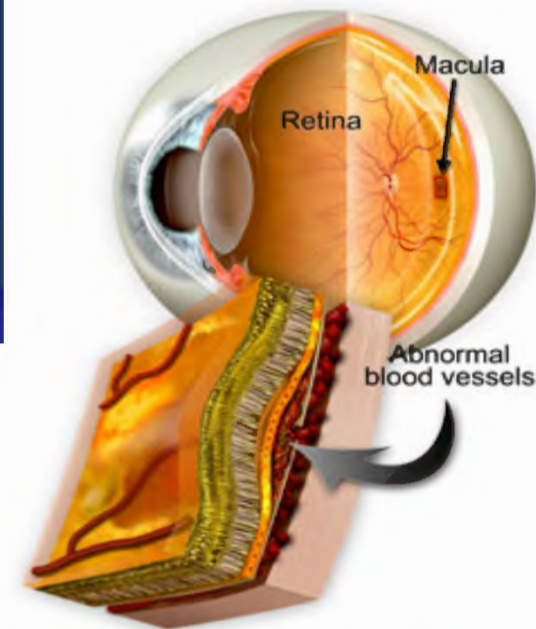
Die Substanz reichert sich vorwiegend in den pathologischen Gefäßen der Netzhaut an, die durch Aktivierung mit dem Diodenlaser durch photochemische Thrombosierung verödet werden.

Trockene AMD

- ◉ In ca. **85 %** der Fälle von AMD handelt es sich um eine trockene AMD. Sie verläuft **langsam**, über Jahrzehnte hinweg.
- ◉ Kennzeichen sind **Drusen**: weißlich-gelbe Ablagerungen in der Netzhaut

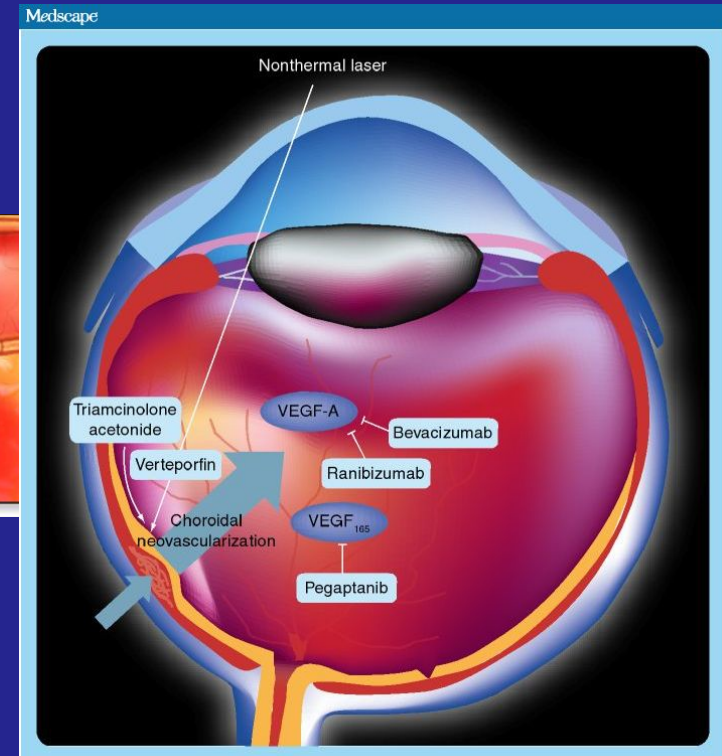
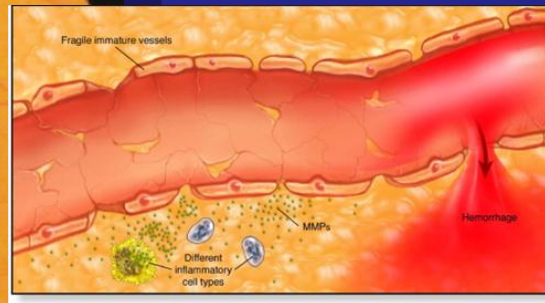
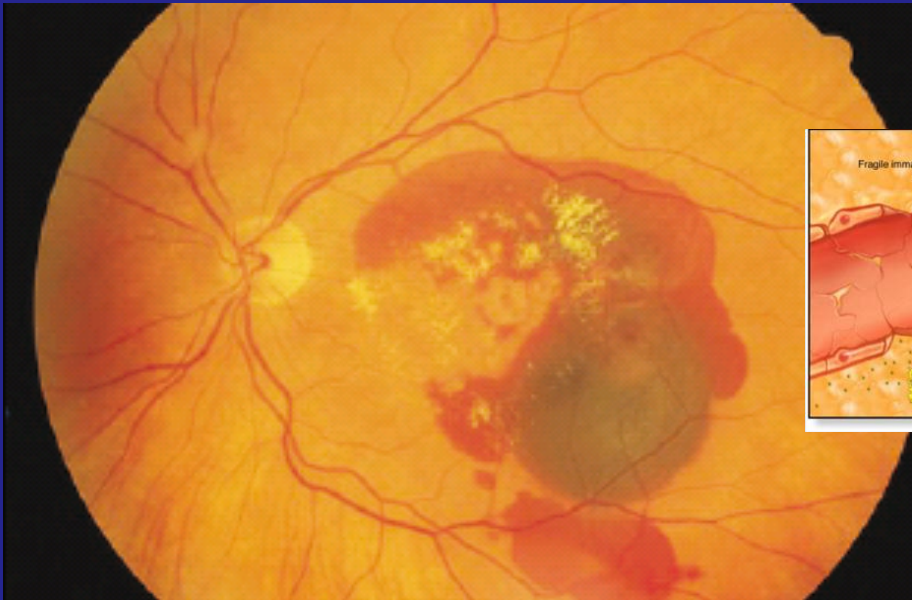


CNV = Choroidale Neovaskularisation

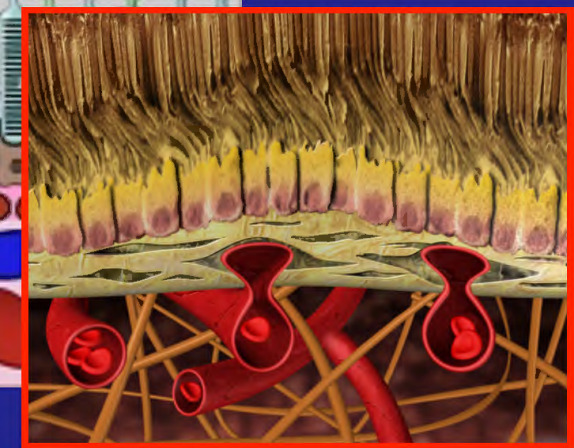
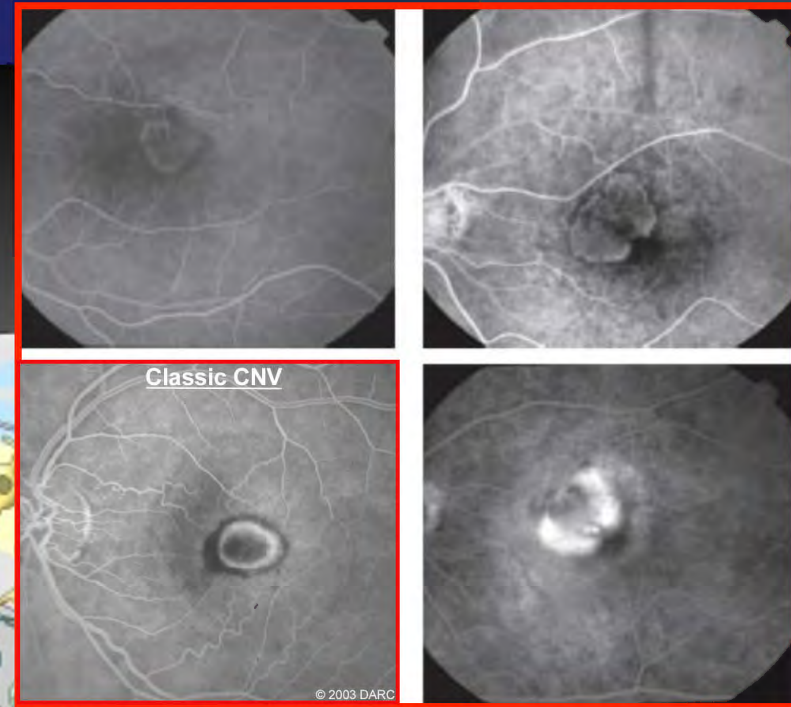
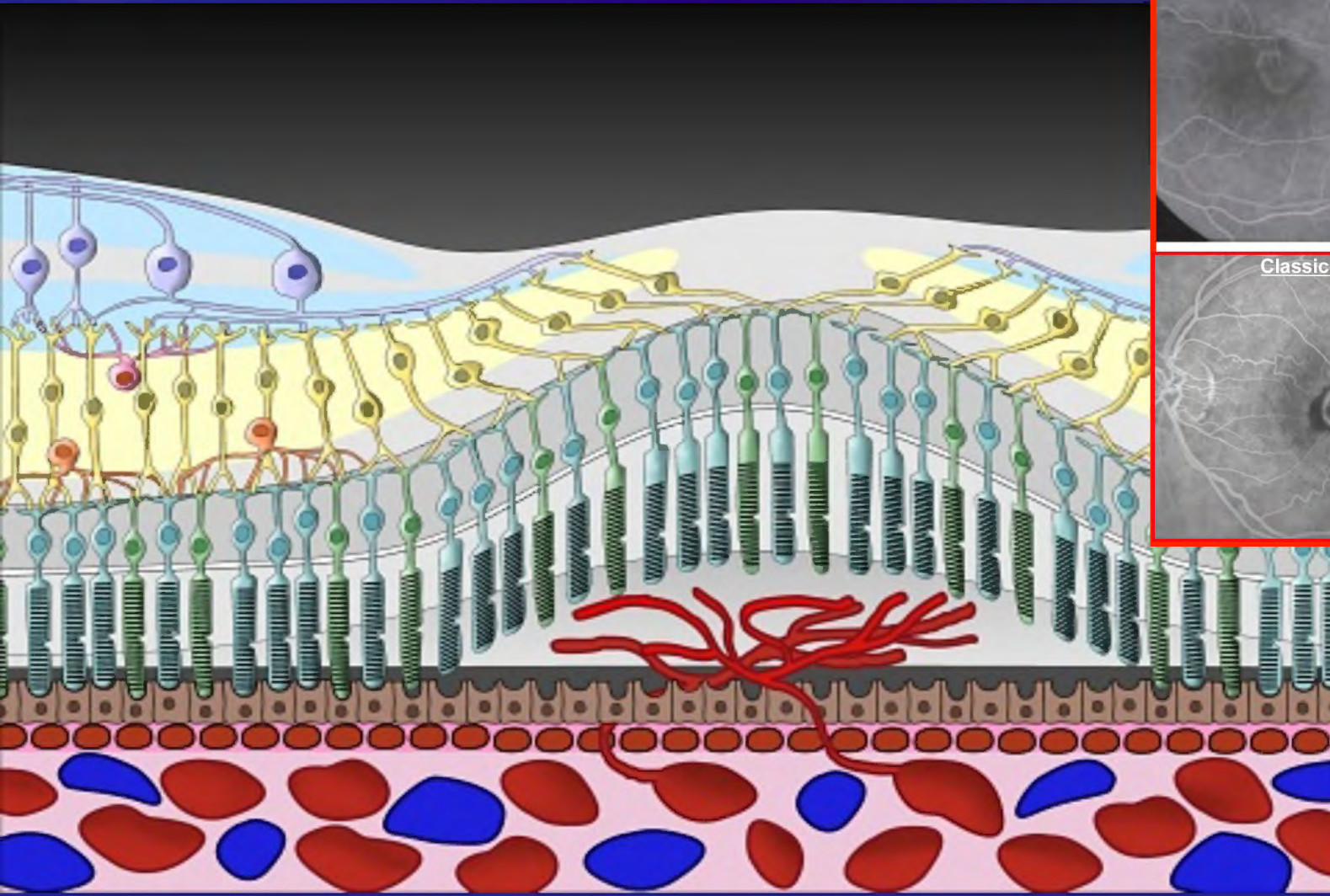


Feuchte AMD

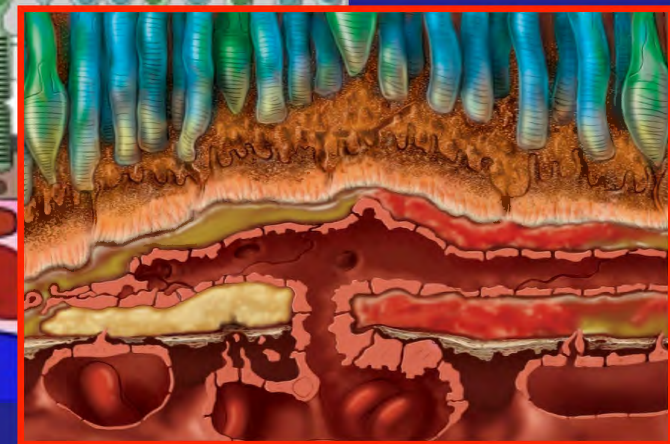
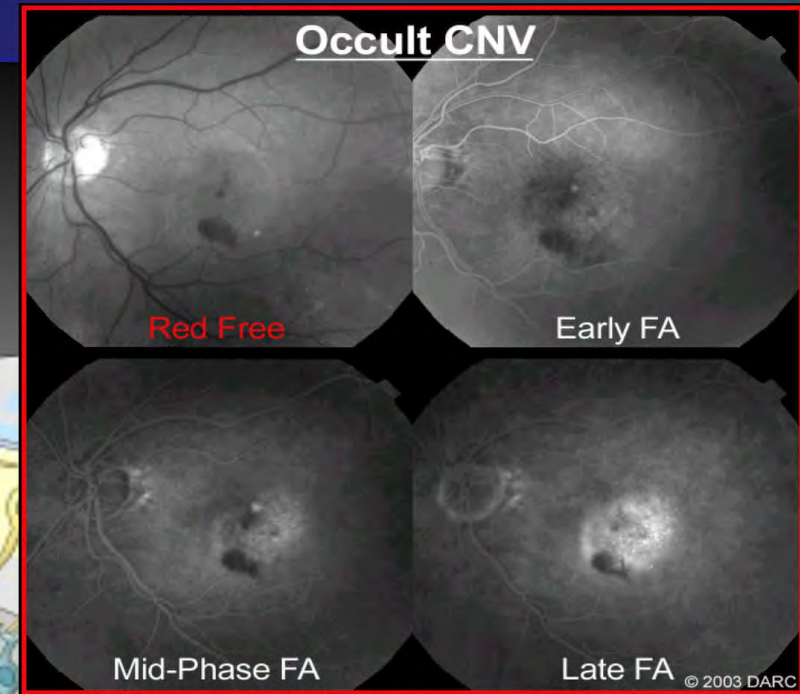
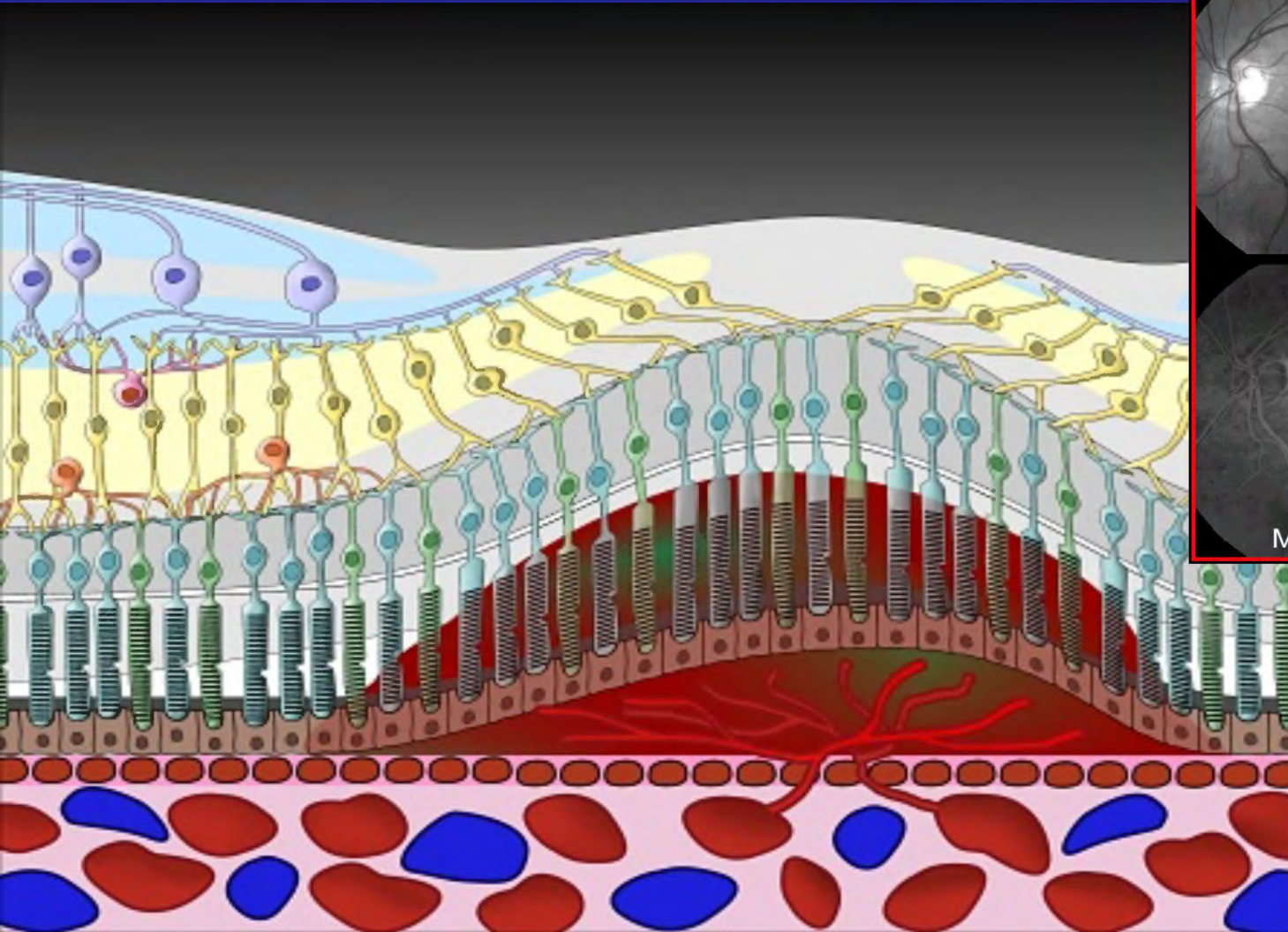
- Bei der **selteneren**, aber wesentlich **aggressiveren** feuchten Form der Makuladegeneration wachsen **krankhafte Blutgefäße** in die Netzhaut ein. Die Gefäßwände sind **undicht**, Flüssigkeit und Blutbestandteile treten aus.
- Ein Überangebot des **Wachstumsfaktors VEGF** erhöht das Risiko.
- VEGF stimuliert das Wachstum neuer Blutgefäße.



Klassische CNV



Okkulte CNV



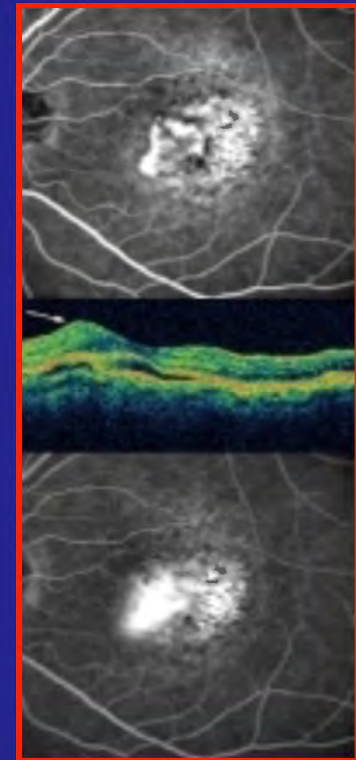
Kombinierte CNV

Minimally Classic CNV

Occult

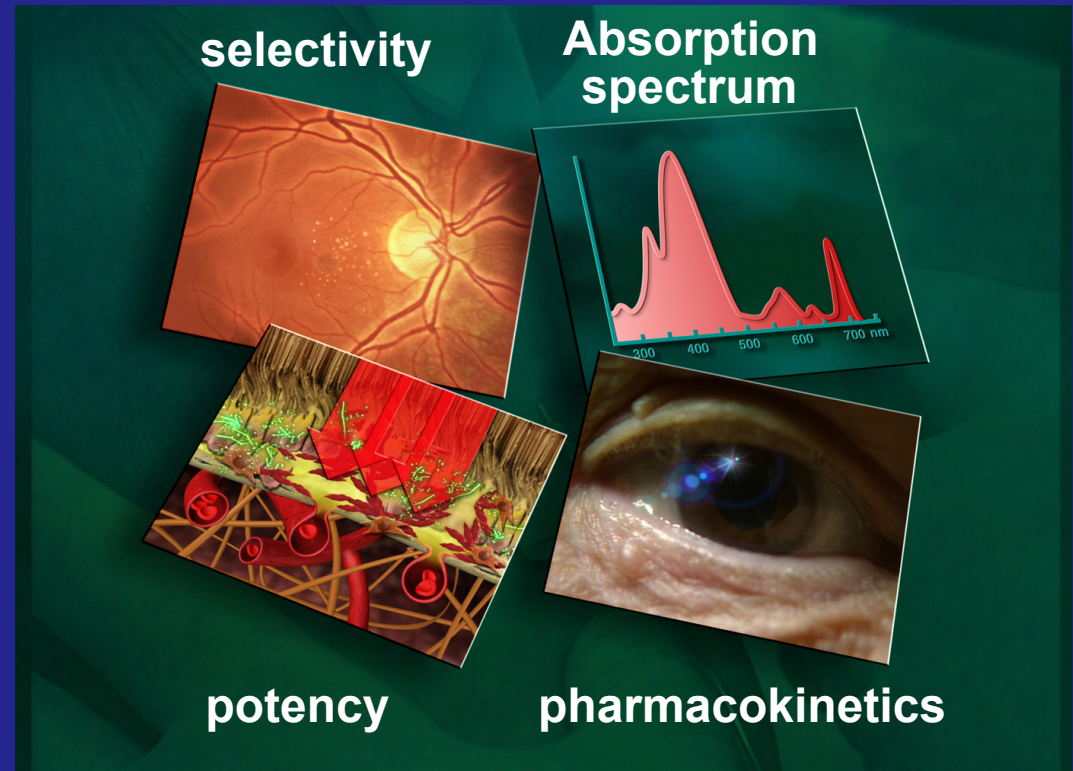
Classic

Hemorrhage



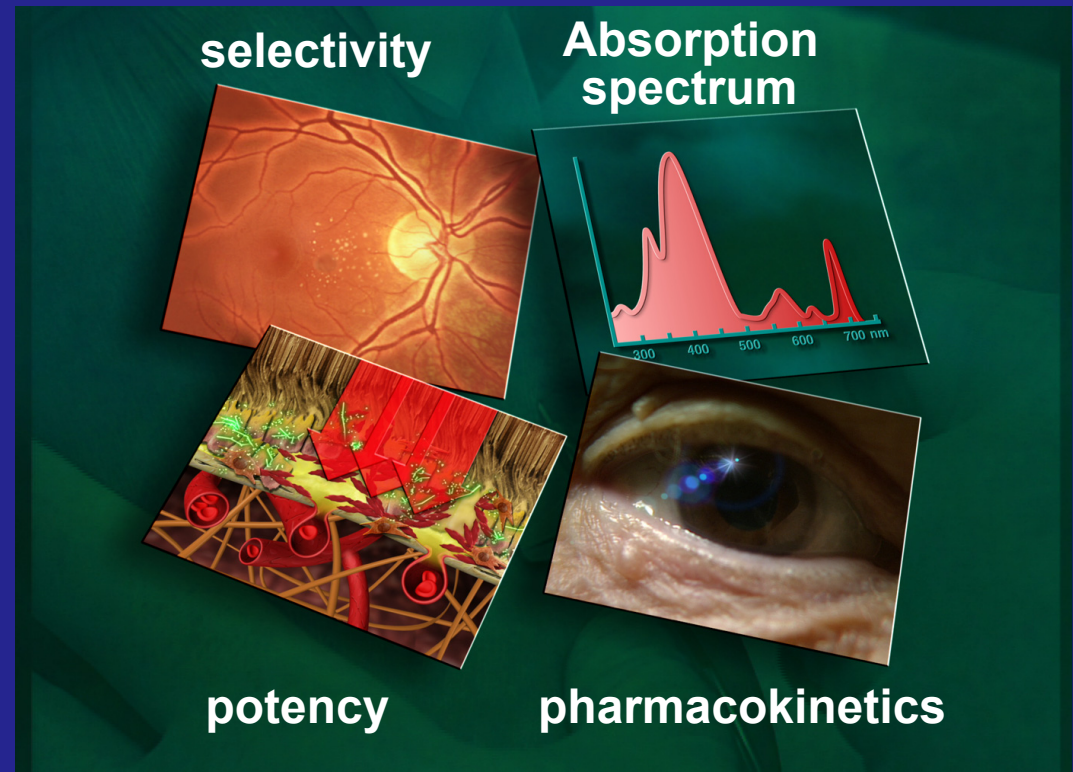
PDT mit Verteporfin

- Hoch selektiv für neovaskuläres Gewebe
- Rasche Ausscheidung
- Stark lichtempfindlich
- Günstiges Absorptions-Spektrum



PDT mit Verteporfin

- Hoch selektiv für neovaskuläres Gewebe
- Rasche Ausscheidung
- Stark lichtempfindlich
- Günstiges Absorptions-Spektrum



Nebenwirkungen: Extravasate



10 Tage danach



90 Tage danach



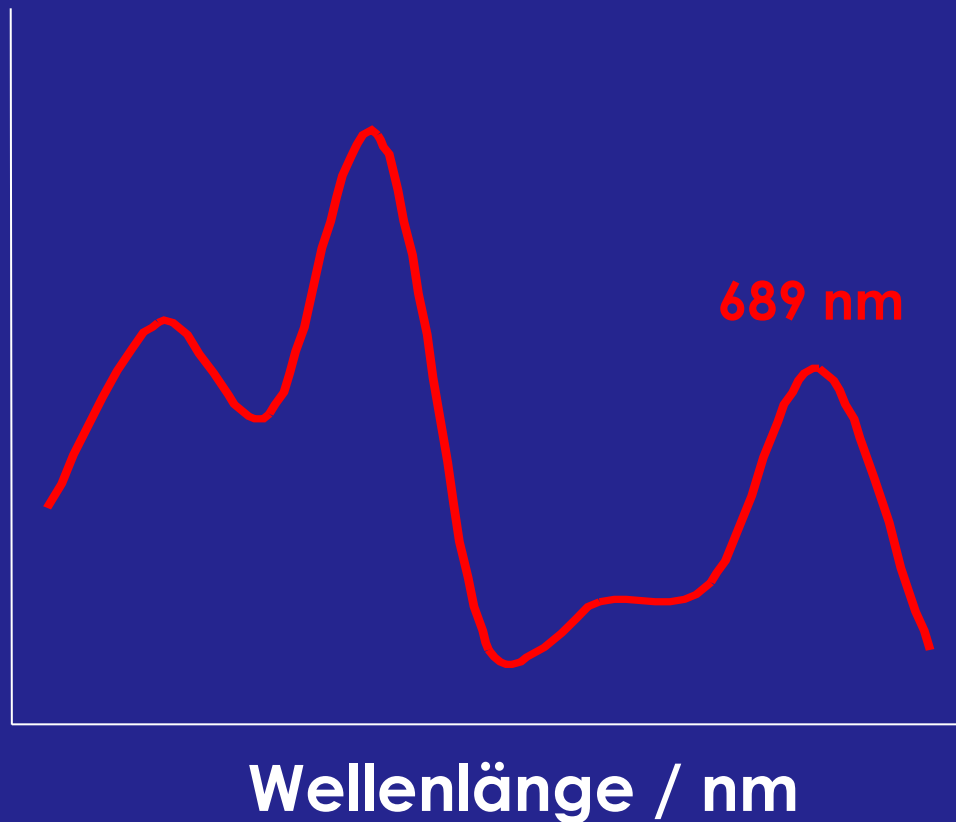
40 Tage danach



180 Tage danach

Pharmakologie und Toxikologie

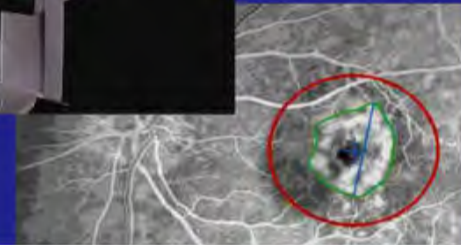
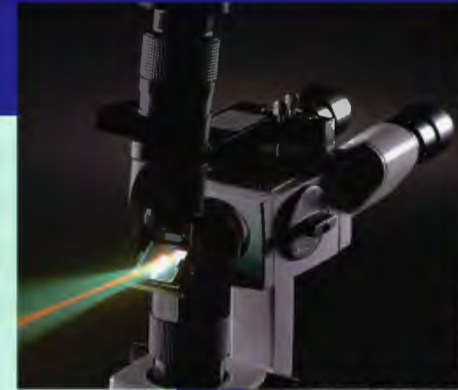
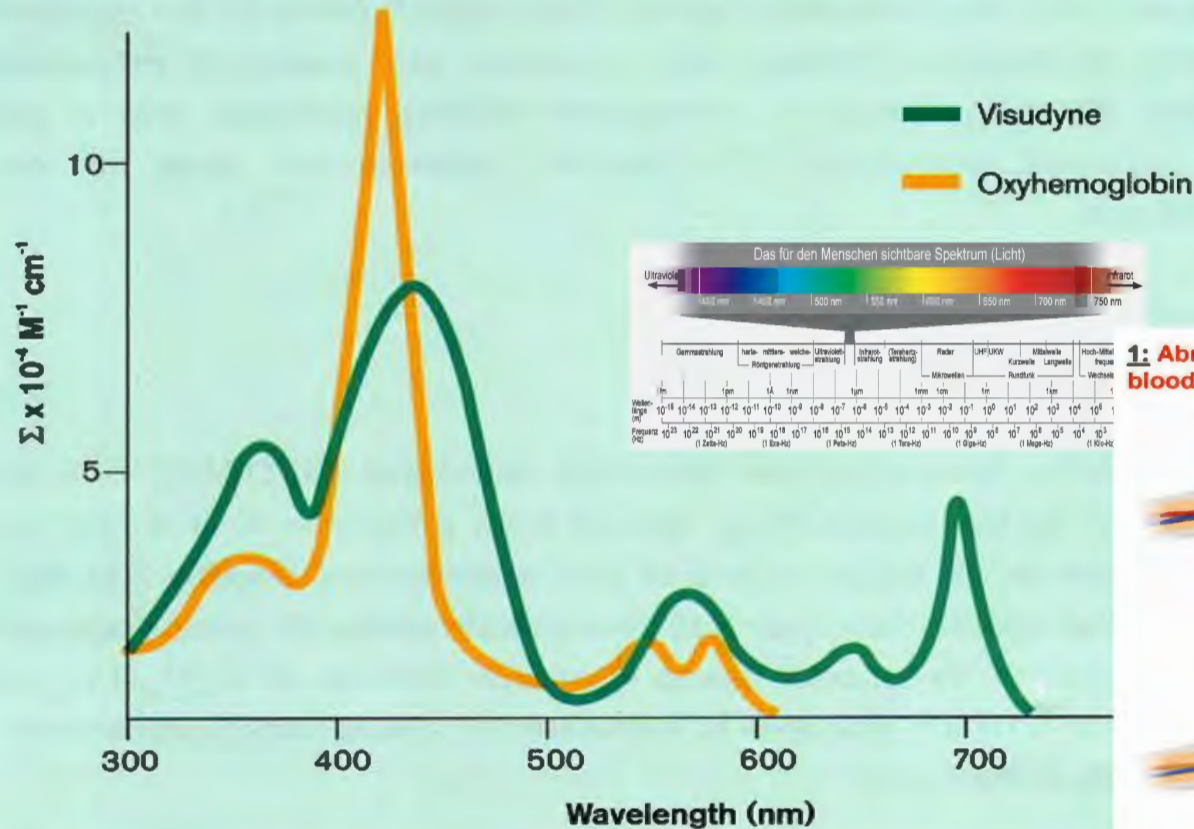
Relative Absorption



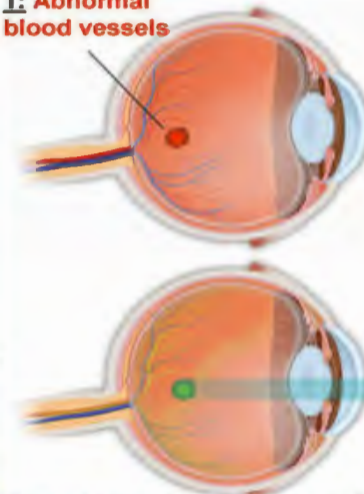
- Mehrere Absorptionspeaks
- Rotes Licht bei 689 nm durchdringt Gewebe gut
- Keine Toxizität bei klinischer Dosierung
- Vorsicht bei Extravasaten und Lichtexposition

Absorptionseigenschaften

Absorption spectra of Visudyne and oxyhemoglobin



1: Abnormal blood vessels

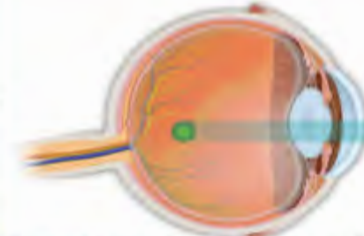


2: Circulation of photosensitive dye



3: Cold laser activates dye only in abnormal blood vessels

4: Selective destruction of abnormal blood vessels



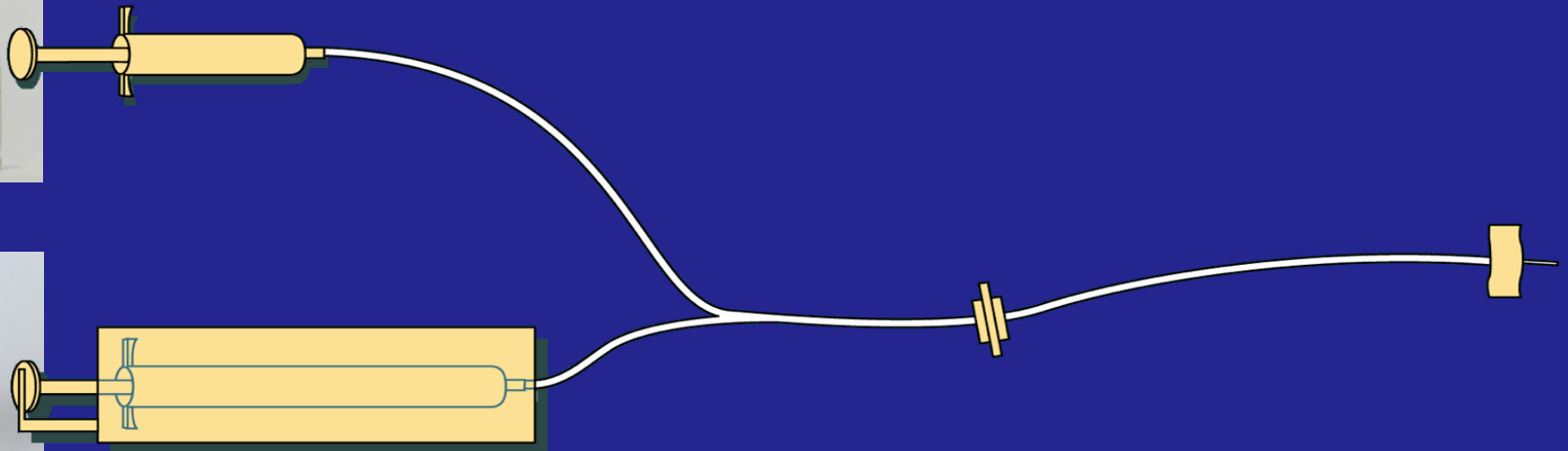
Standard-Dosierung

- **BSA definieren** (Formeln nach Körpergröße und Gewicht)

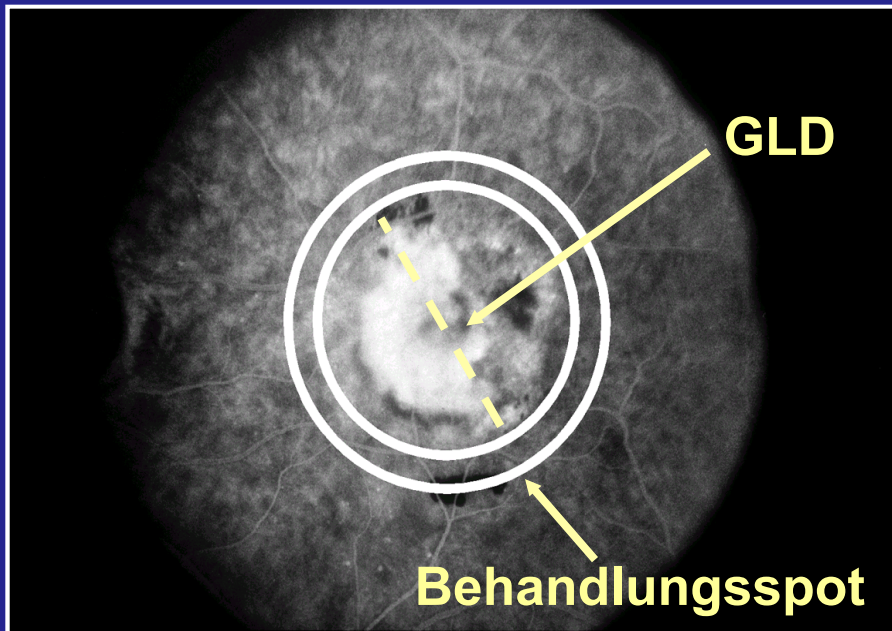
$$6 \text{ mg/m}^2 \times \text{BSA m}^2 = \text{DOSIS (mg)}$$

$$3 \times \text{BSA m}^2 = \text{DOSIS (ml)}$$

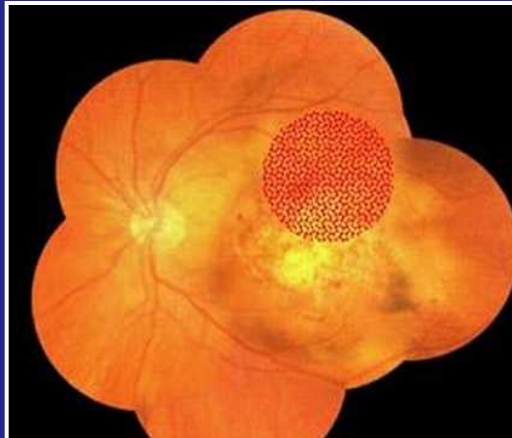
$$\text{z. B. } 1,8 \times 3 = 5,4 \text{ ml Verteporfin}$$



Laserparameter



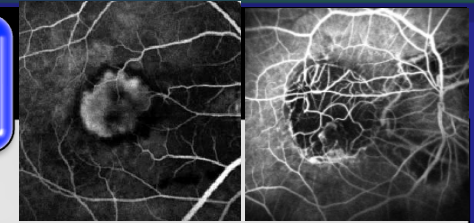
- Größtmöglicher Spot: 6400 μm
- Kleinstmöglicher Spot: 800 μm
- Sicherheitsrand: <1000 μm
- Lichtdosis: 50 J/cm^2
- Energie: 600 mW/cm^2
- Behandlungsbeginn: 15 min ab Start der 10-min Infusion
- Behandlungsdauer: 83 sec



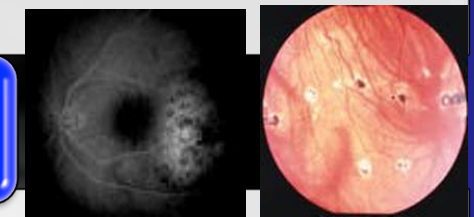
Indikationen der PDT heute

Kleine **klassische CNV** CNV als Folge hoher Myopie

- bei Nichtansprechen auf Anti-VEGF
- heute bessere Ergebnisse unter Anti-VEGF-Monotherapie



Aderhaut-**Hämangiome** **OHS** = Okuläres Histoplasmosesyndrom



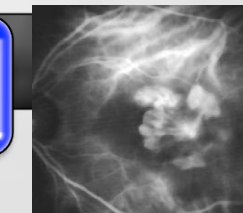
CSC = Chorioretinopathia centralis serosa

- modifiziert nach Chan
- halbe Dosis
- halbe Fluence

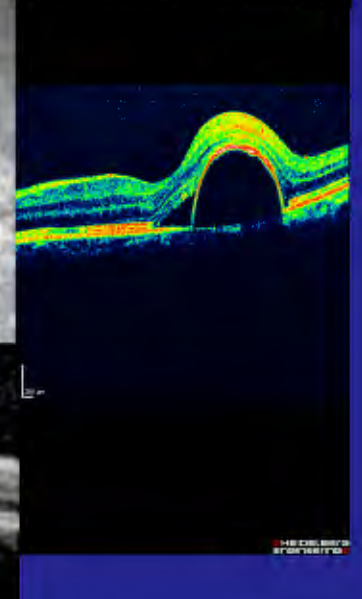
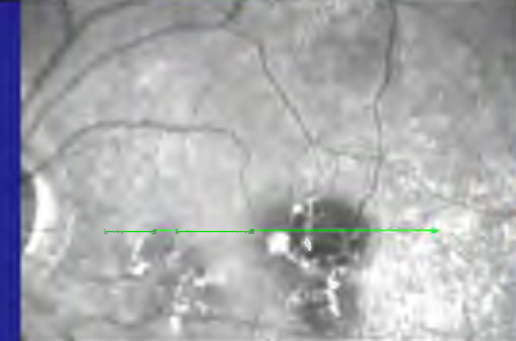
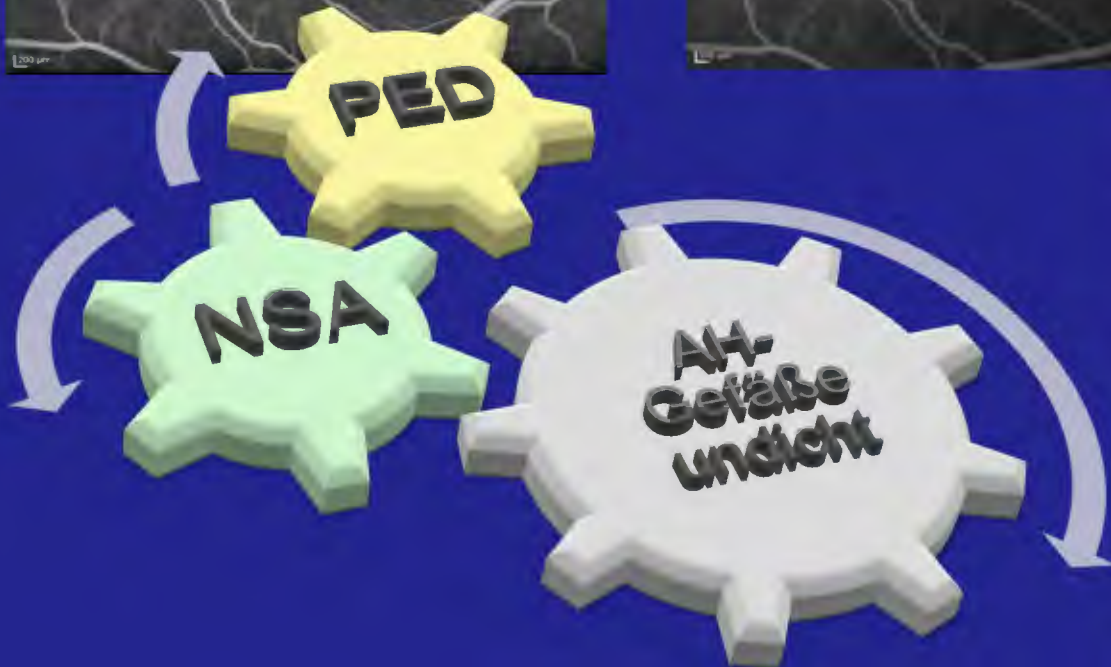
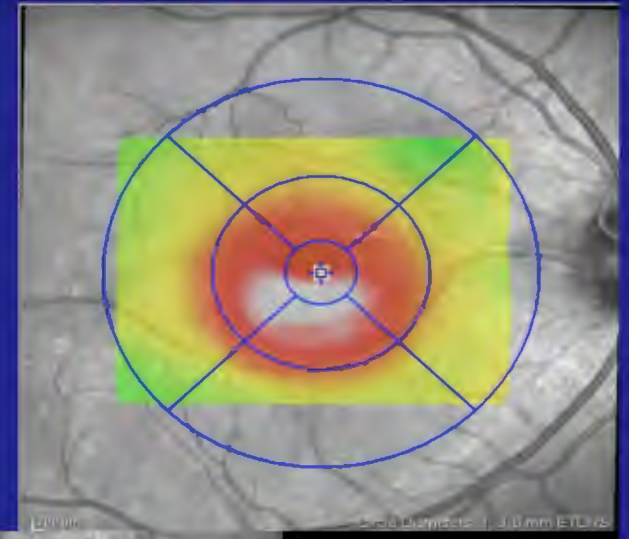


PCV = Polypoidale choroidale Vaskulopathie

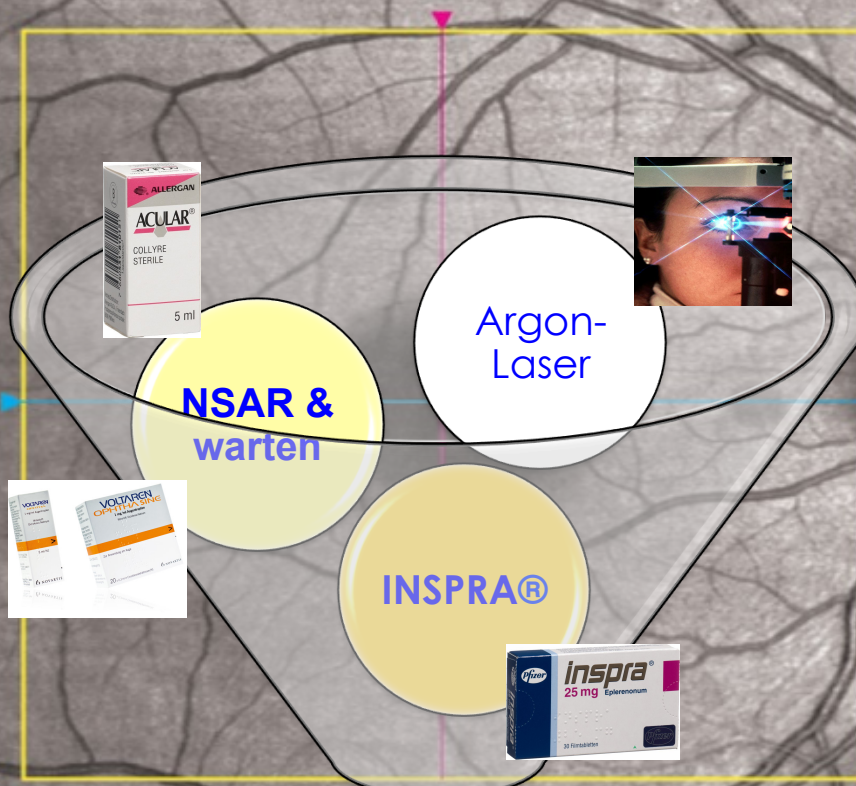
- in Kombination mit Anti-VEGF (Everest)
- Full dose + Reduced Fluence (40 J/cm²)



Chorioretinopathia centralis serosa = CSC

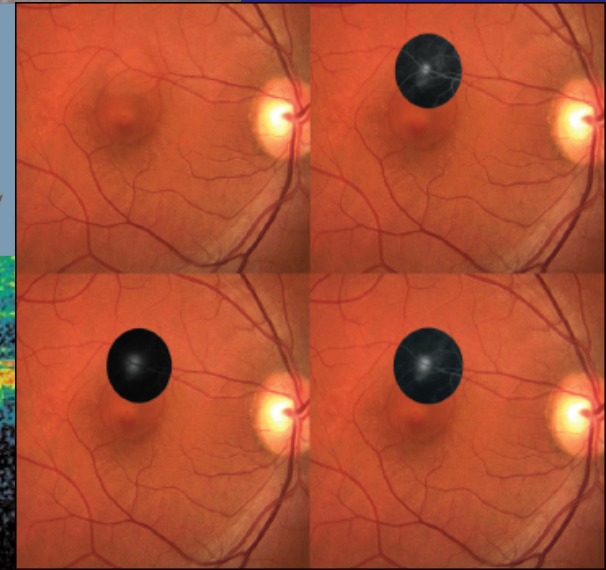
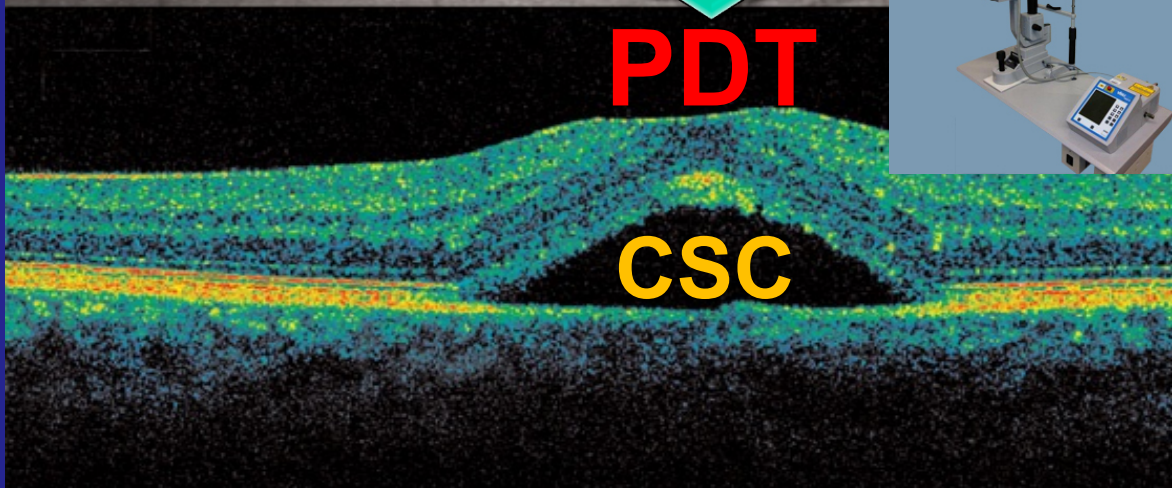


Therapieoptionen



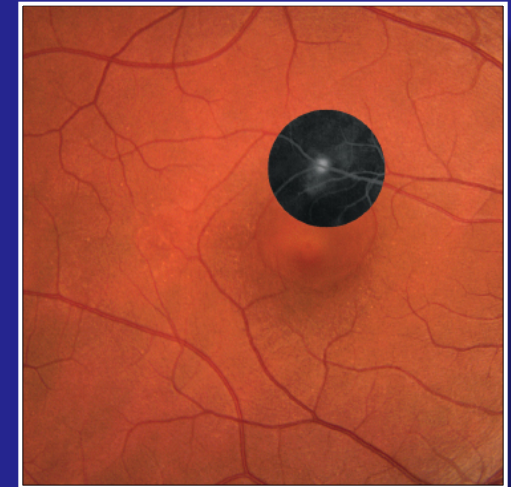
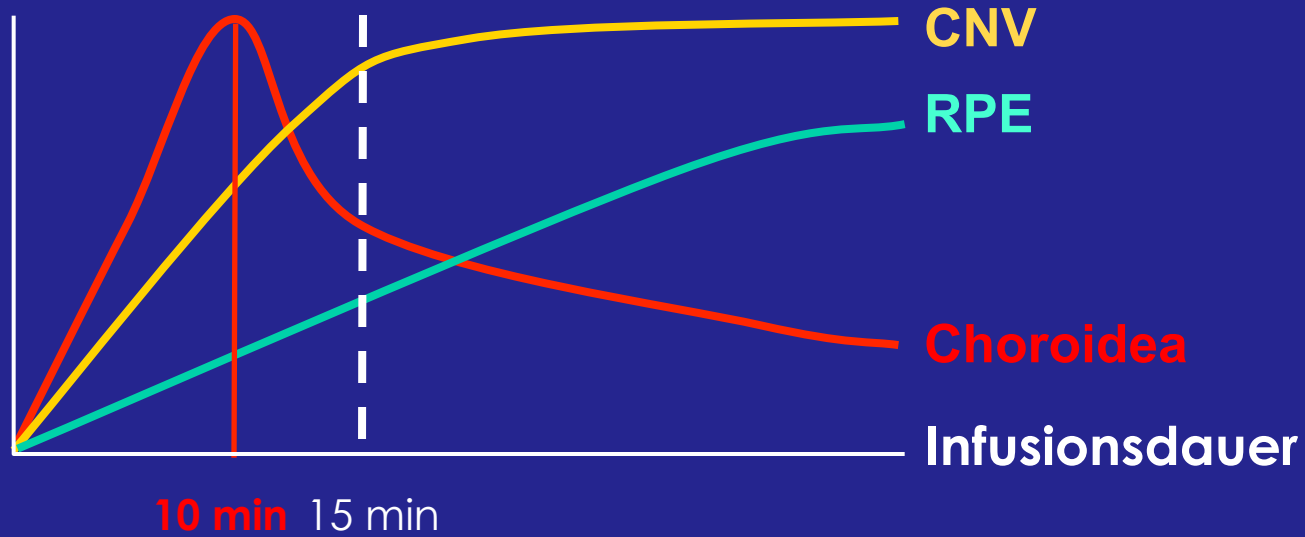
PDT

CSC



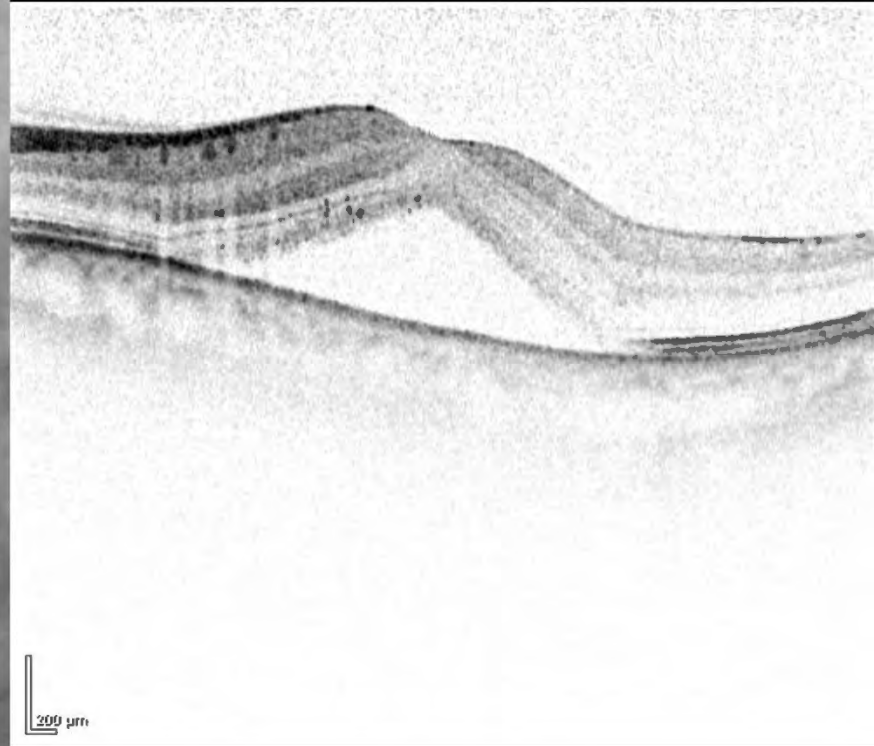
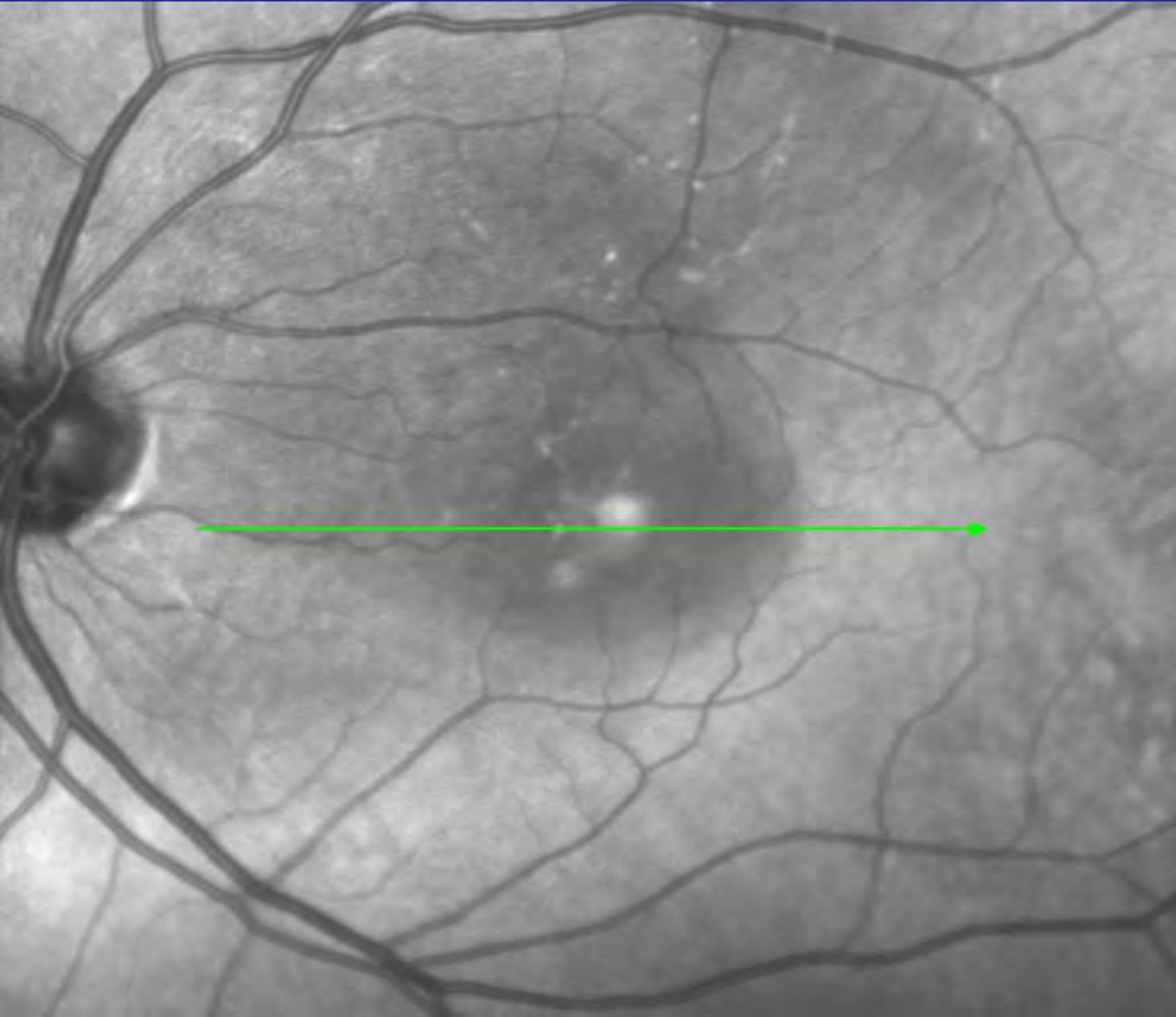
Pharmakokinetik von Verteporfin

Verteporfin-
Konzentration



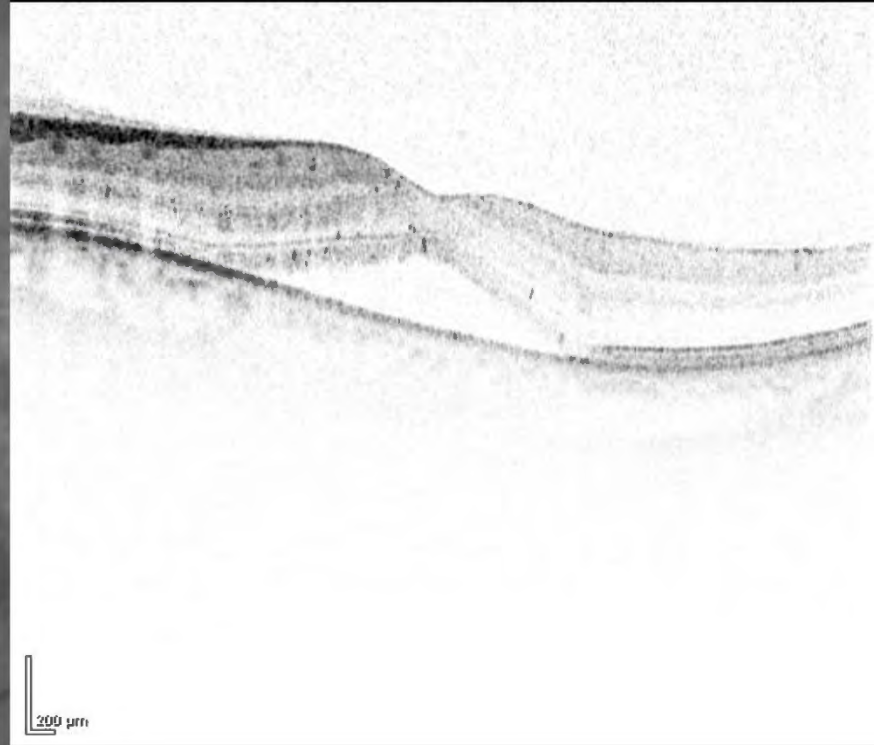
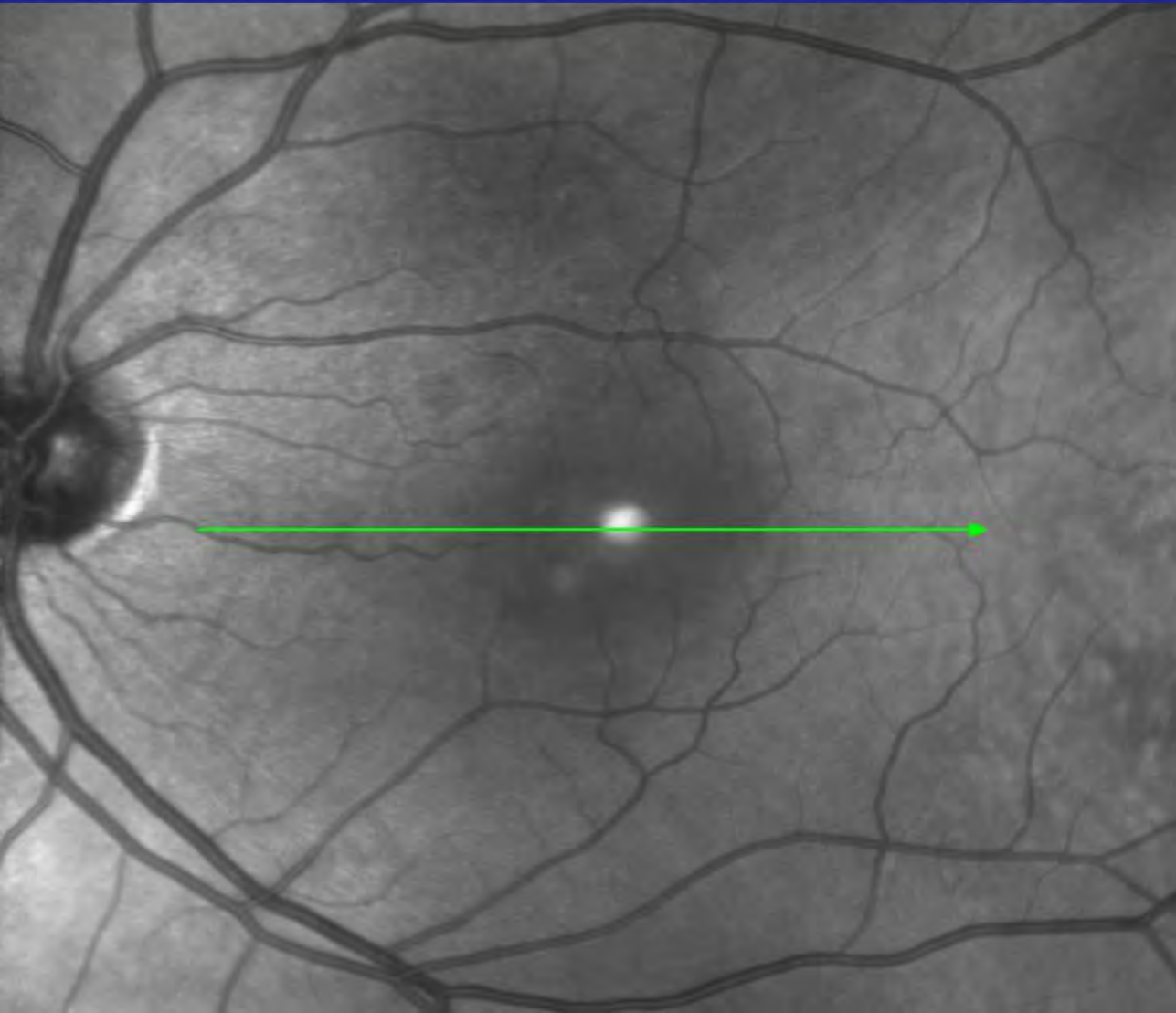
FALLBEISPIELE CSC

VORHER NACHHER



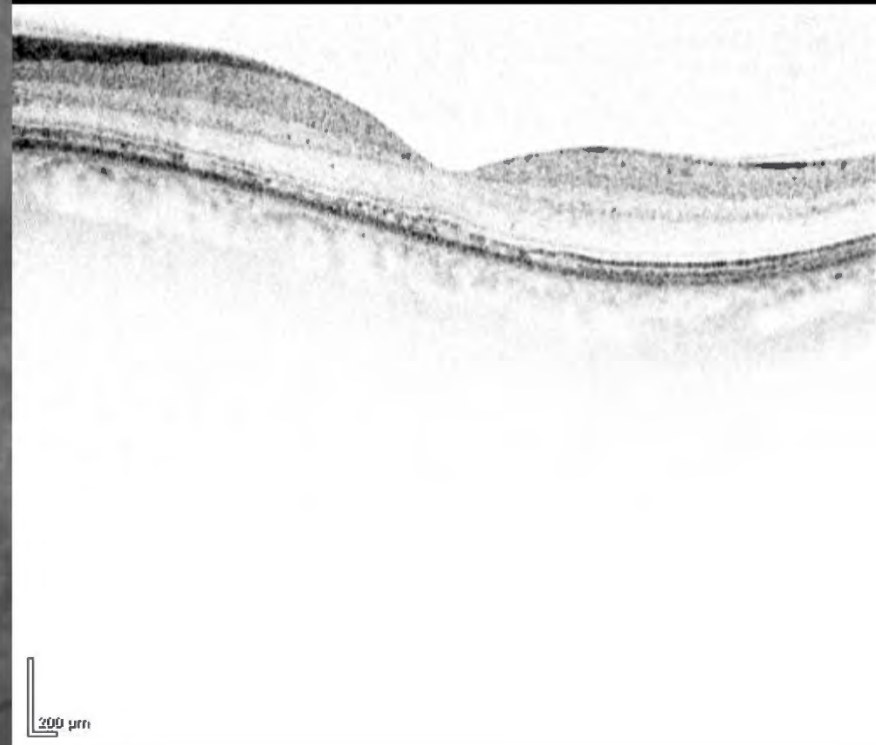
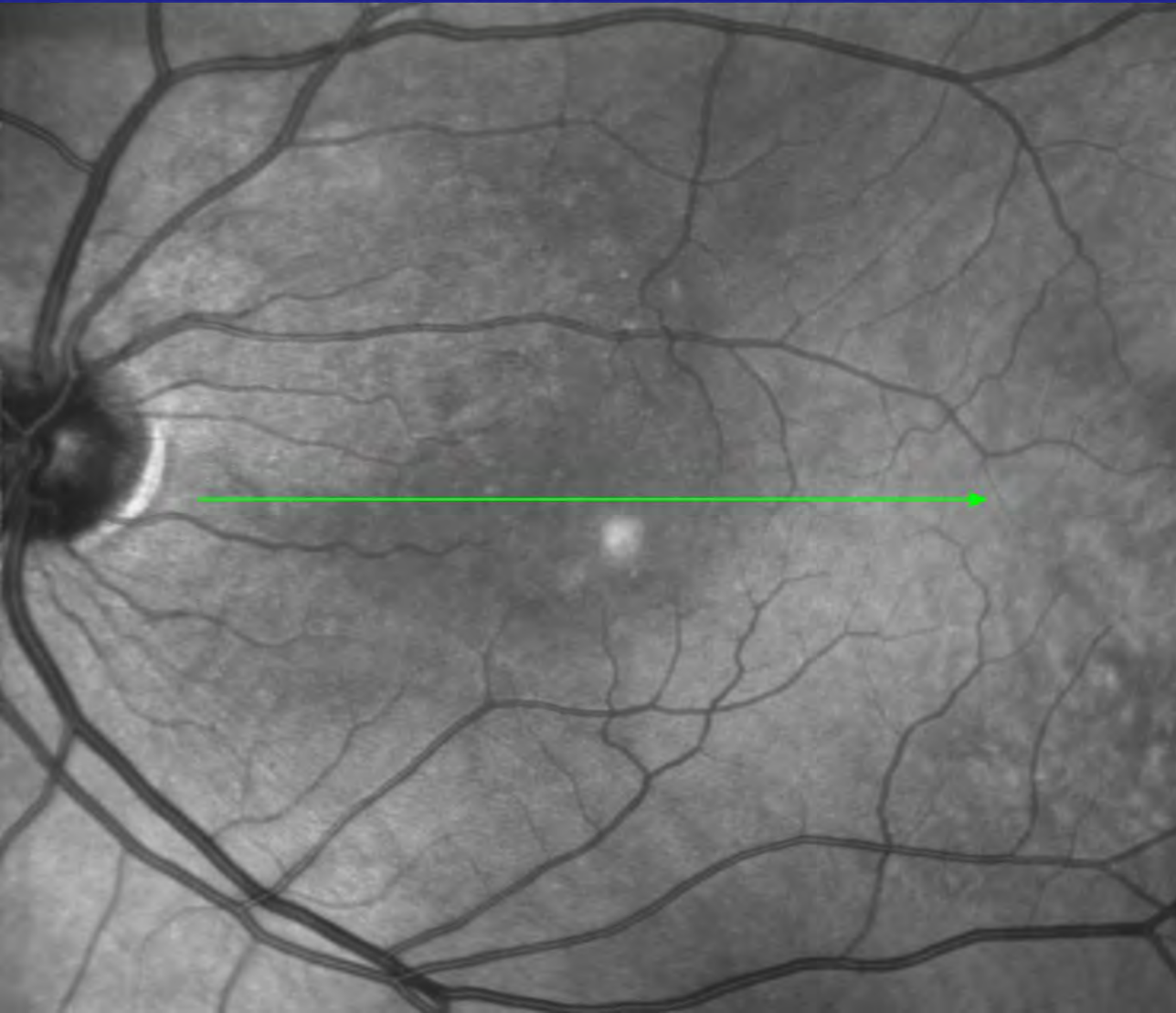
FALLBEISPIELE

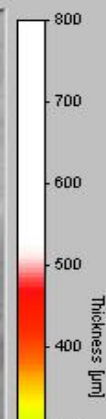
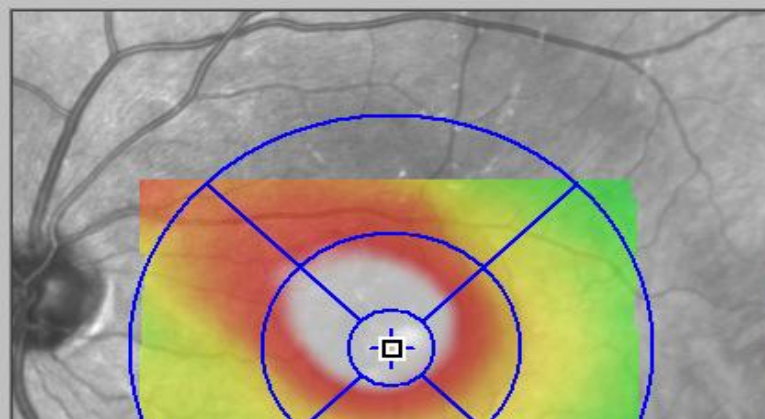
VORHER NACHHER



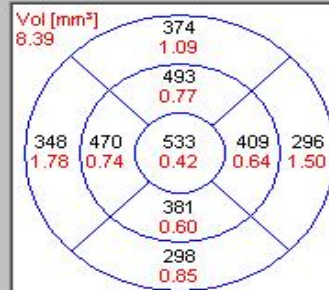
FALLBEISPIELE

VORHER NACHHER





Thickness [08.01.2009]



Marker

515 µm

Center

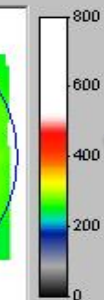
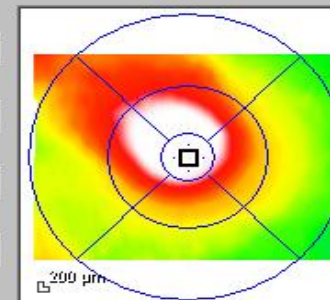
515 µm

Central Min

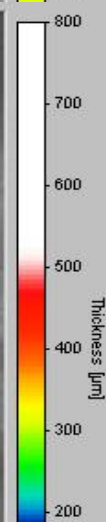
493 µm

Central Max

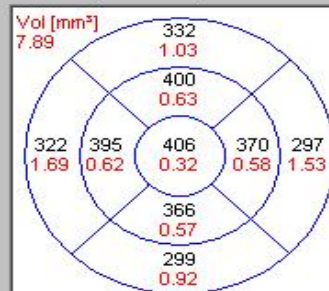
576 µm



VORHER



Thickness [20.01.2009]



Marker

373 µm

Center

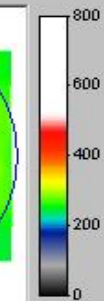
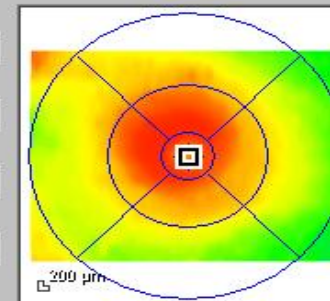
373 µm

Central Min

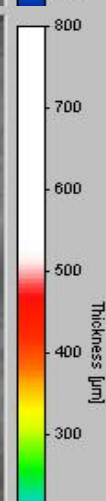
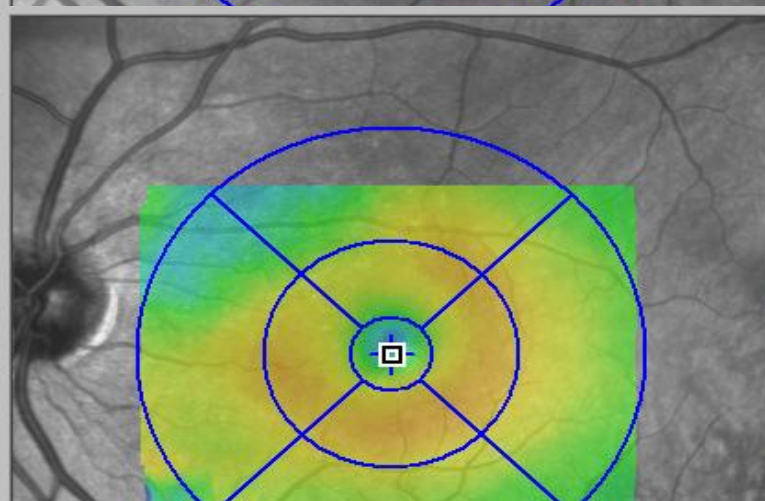
371 µm

Central Max

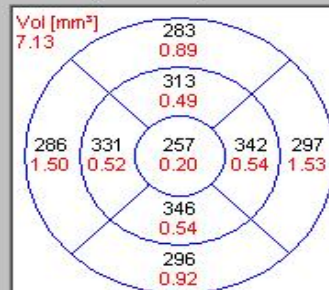
435 µm



1 Wo



Thickness [12.02.2009]



Marker

213 µm

Center

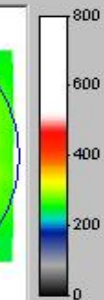
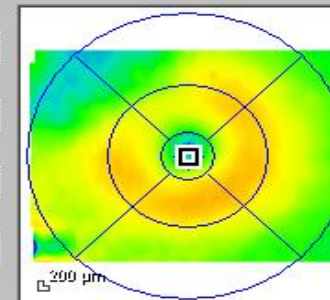
213 µm

Central Min

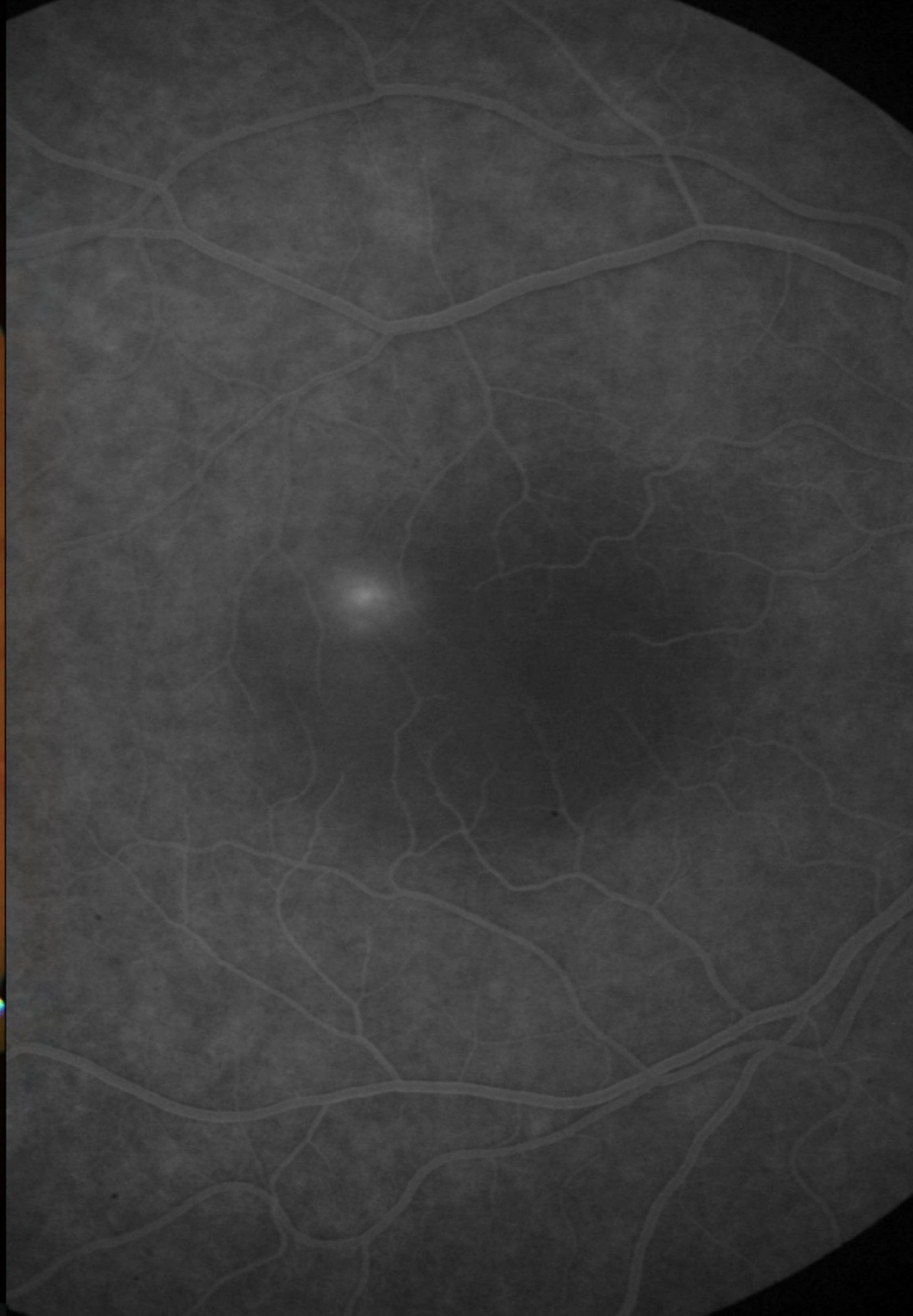
199 µm

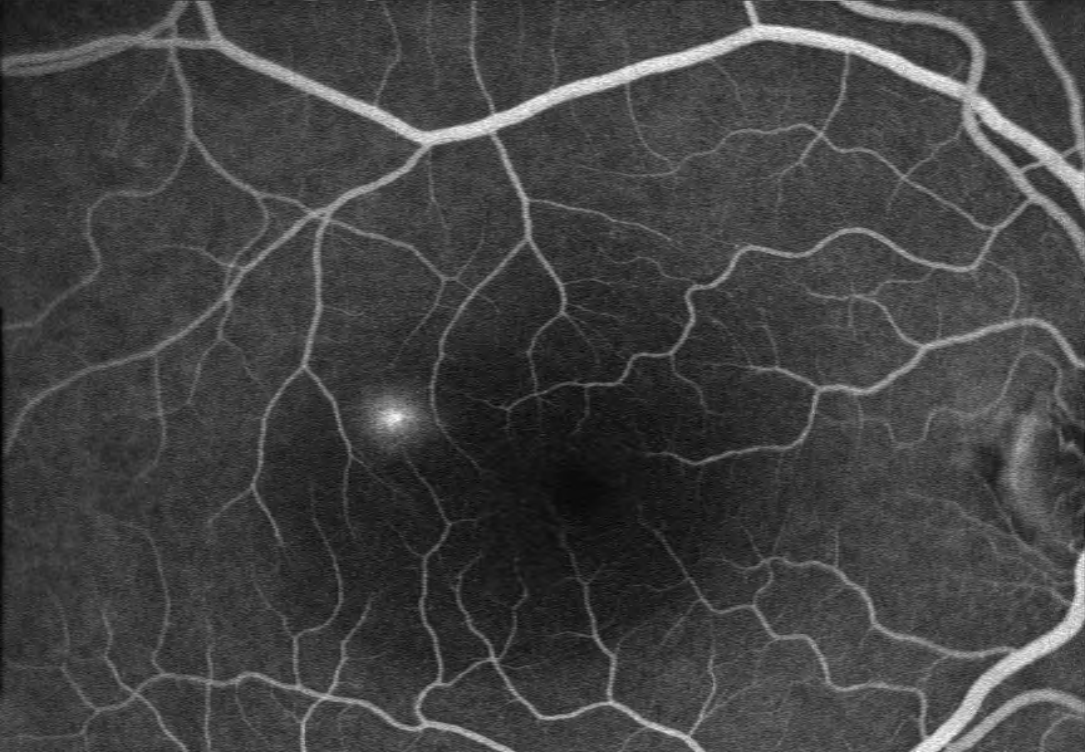
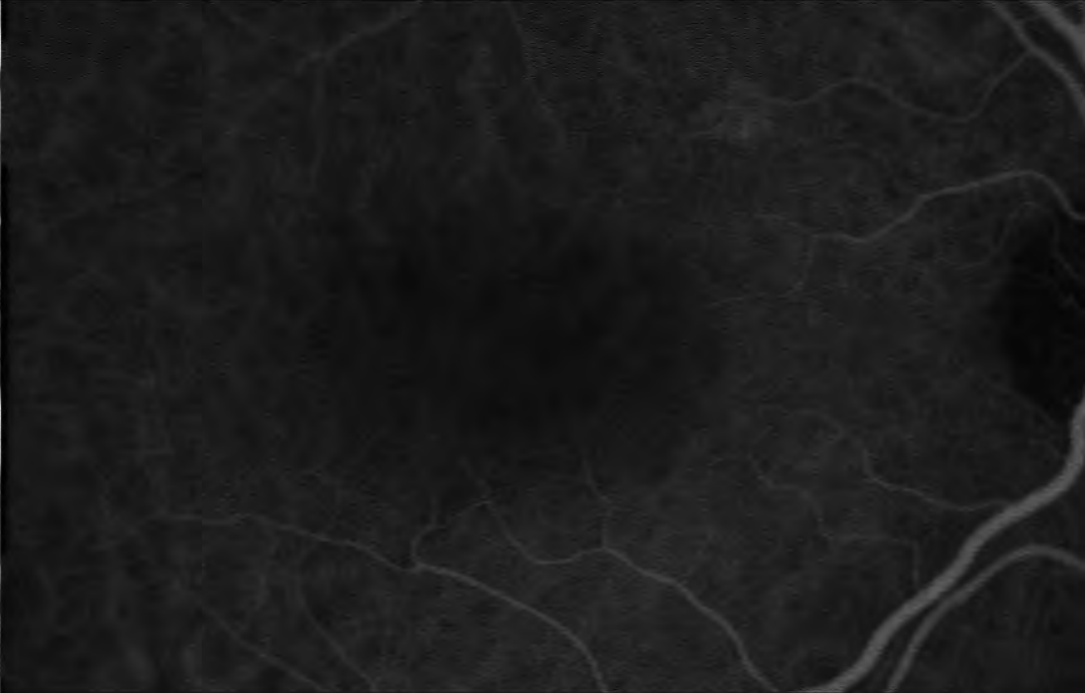
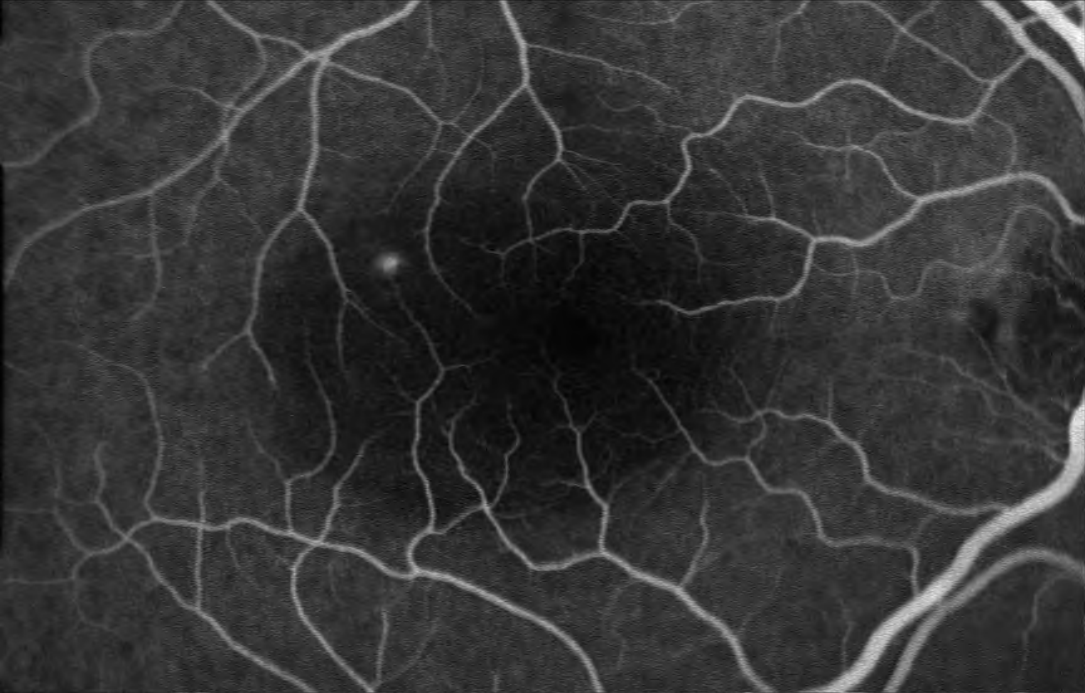
Central Max

331 µm



4 Wo

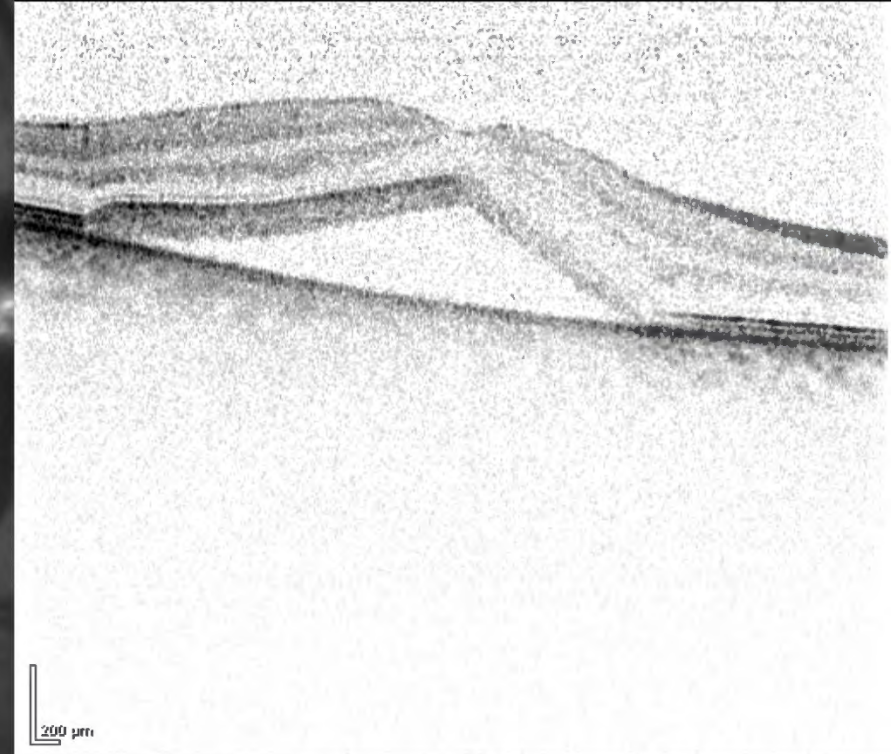
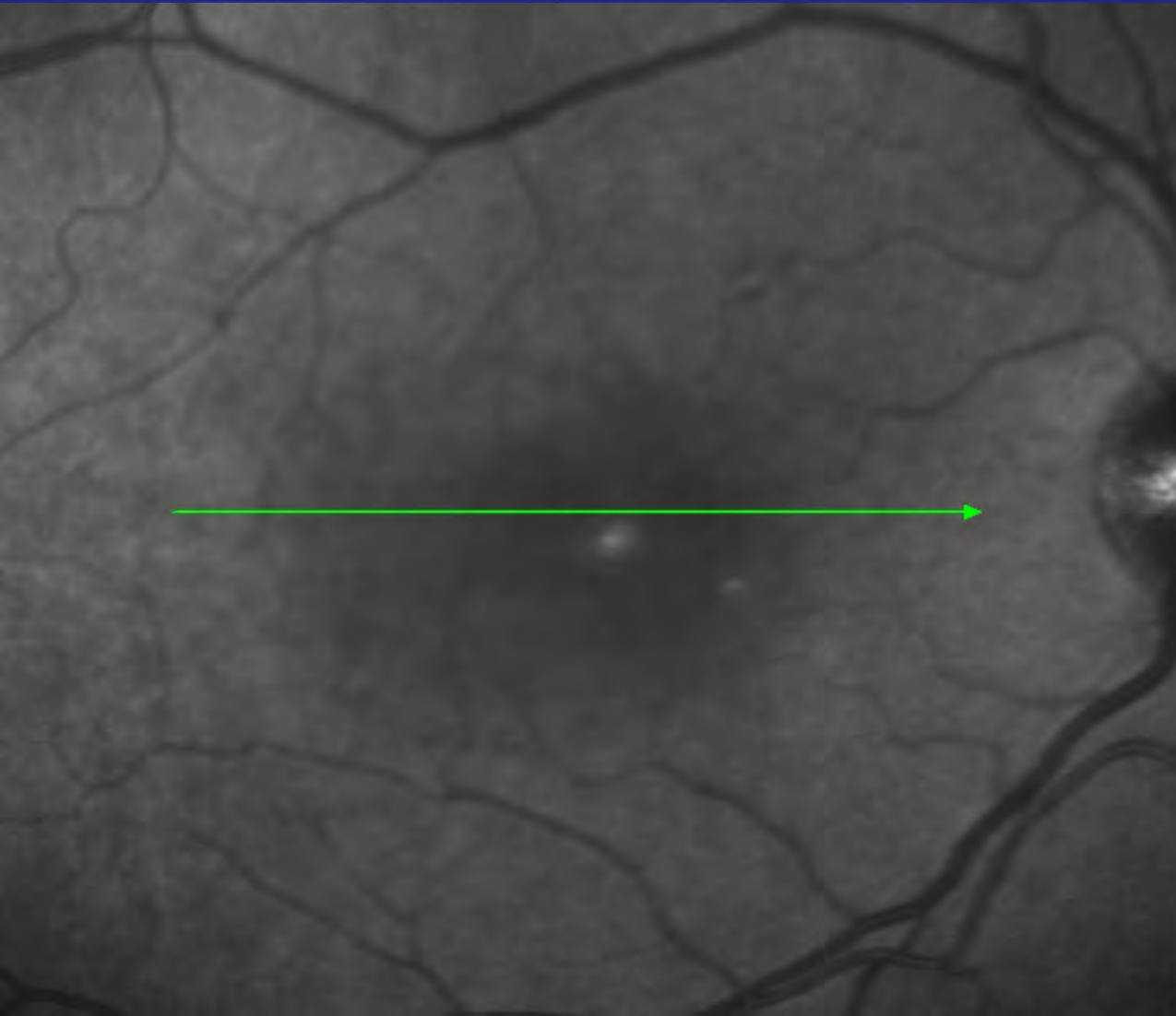


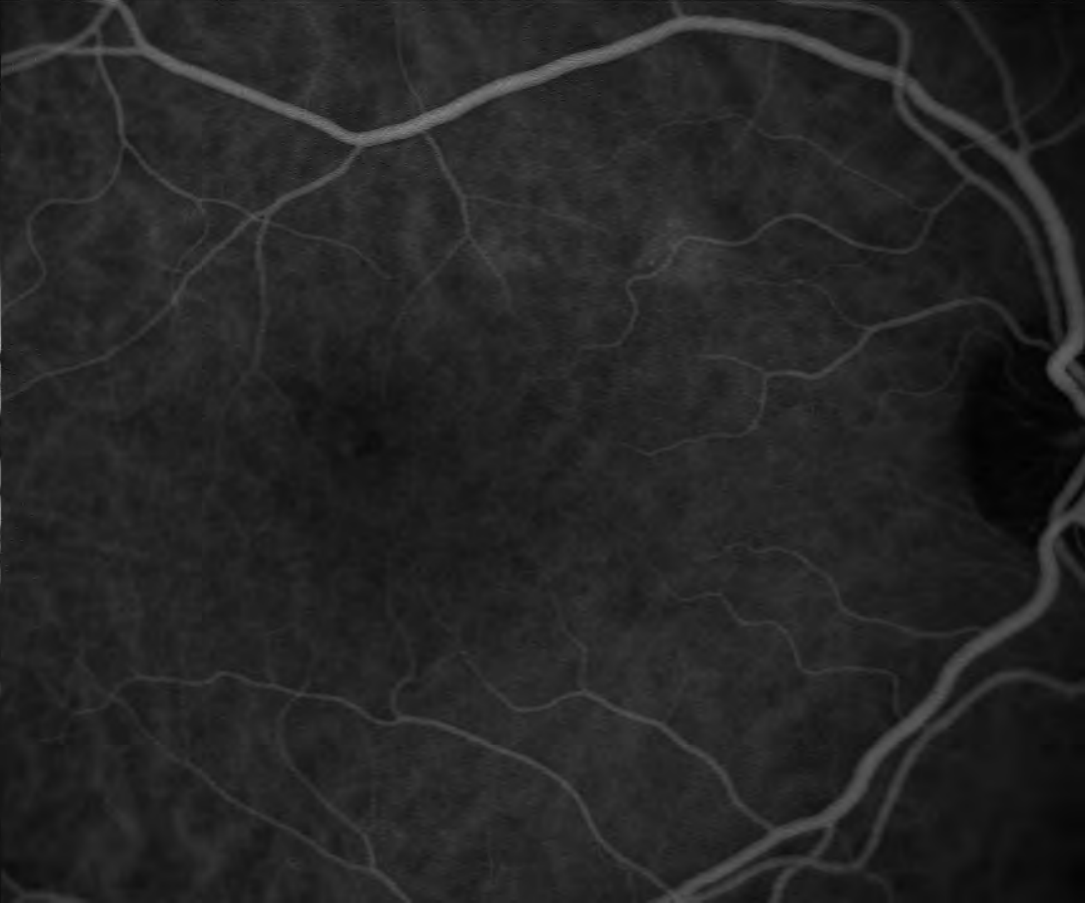
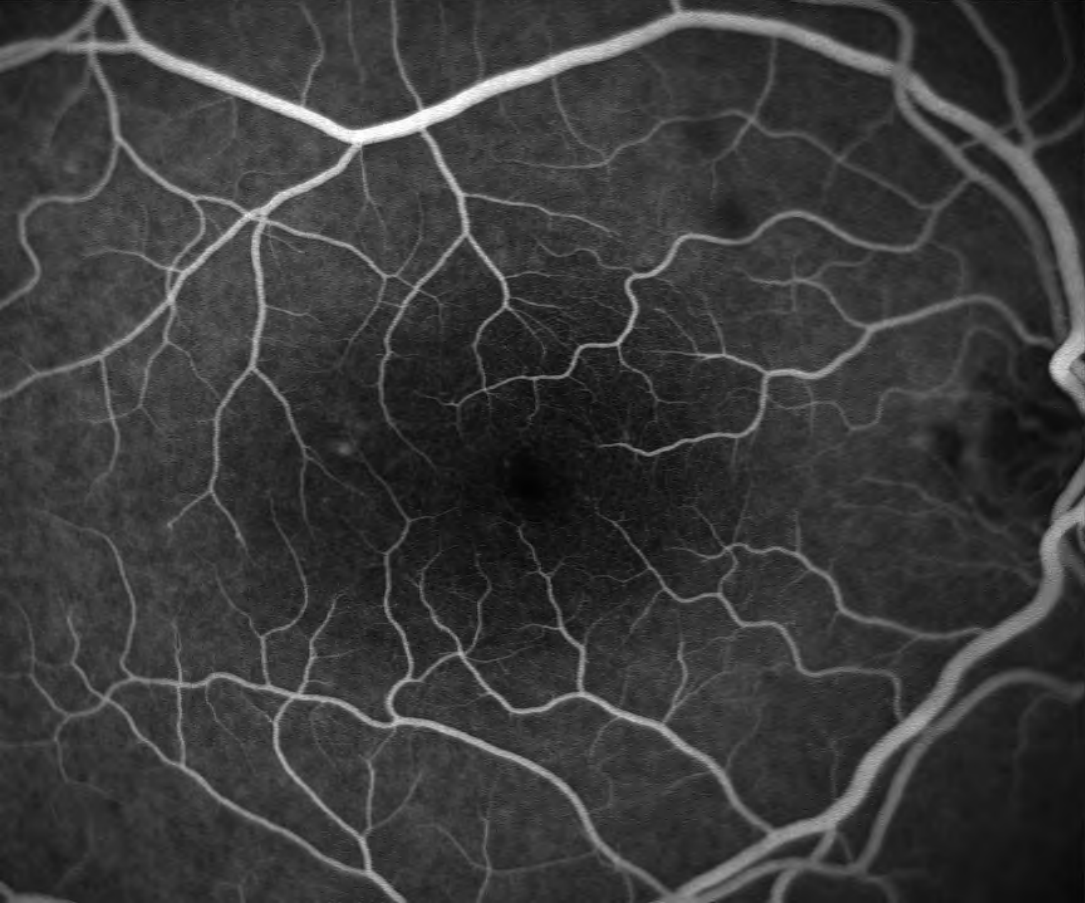
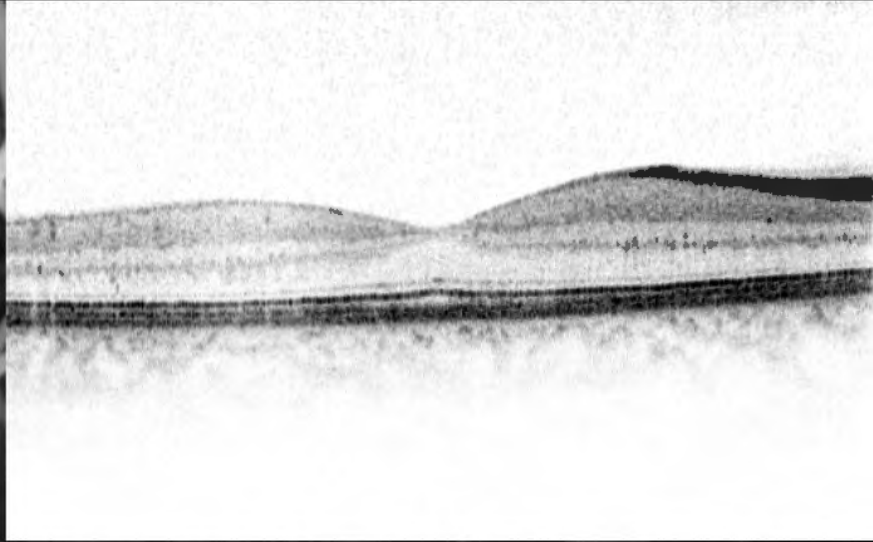
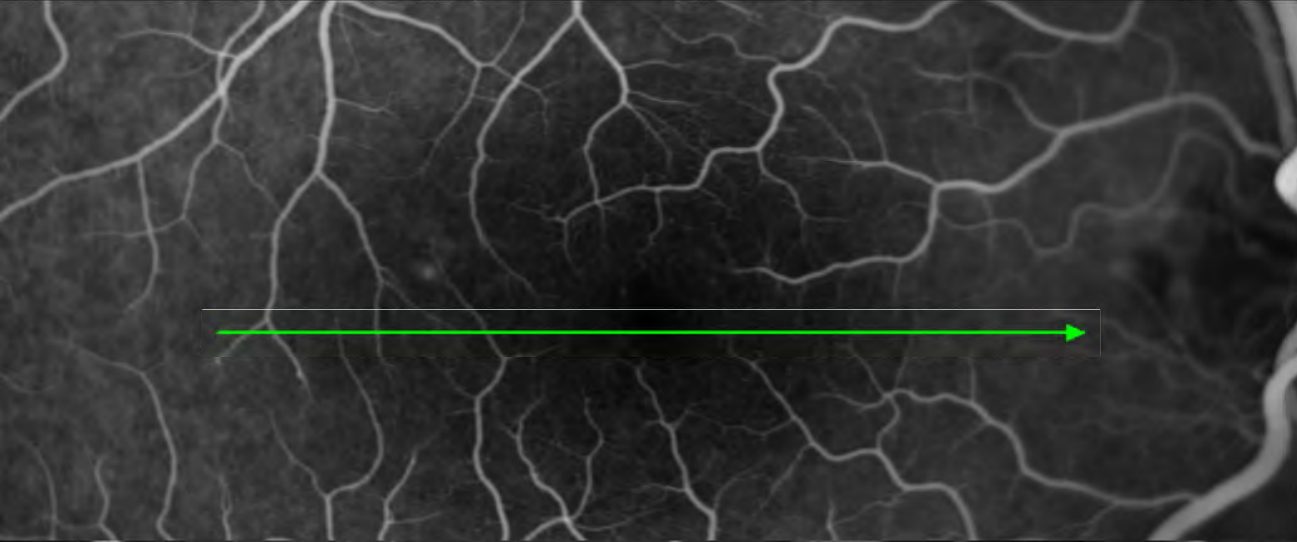




FALLBEISPIELE

VORHER NACHHER





ORF1

22:36

Modifizierte PDT nach Chan elektrisierend!!



Teuro

t 83,9 Prozent

BREAKING
NEWS

Wahlsieg für DJ Klobri



ERGEBNISSE

CSC mod. PDT: 8/08-11/14

- **Gesamtzahl** behandelter Augen: **238** (akut + chron.)
- **Visusgewinn** um 1-2 Zeilen: **57%**
um 3-4 Zeilen: **14%**
> 5 Zeilen: **29%** - Spot extrafoveal!
- **Visusverschlechterung**: **1** (temporär)
- **anatomische Besserung**: **>95%**

Modifizierte PDT nach Chan einfach zum knutschen!



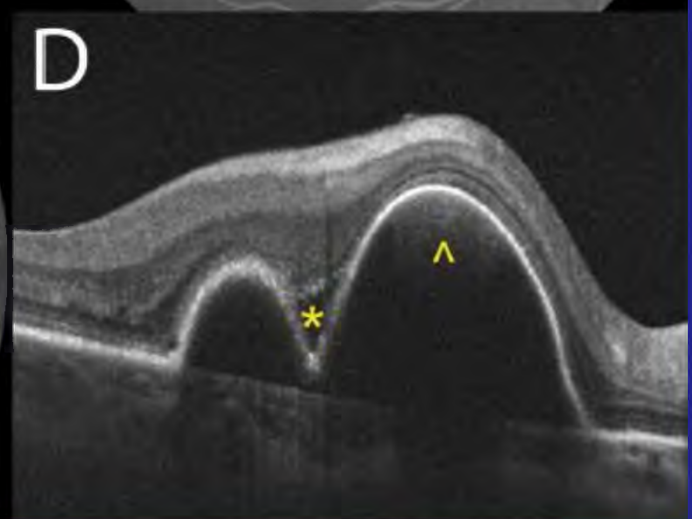
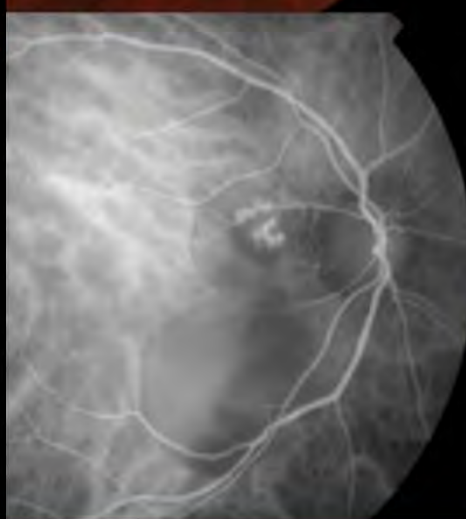
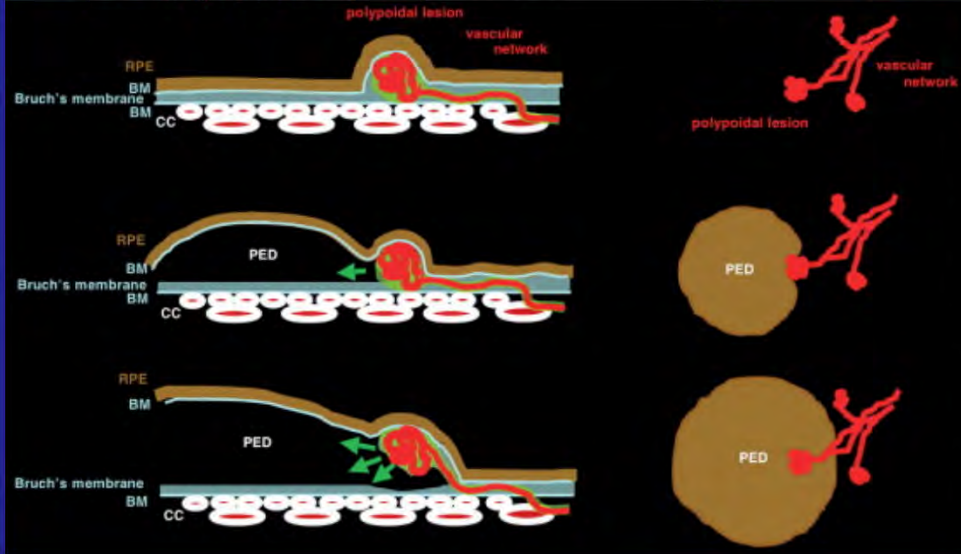
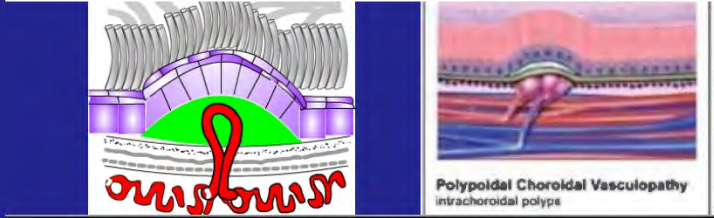
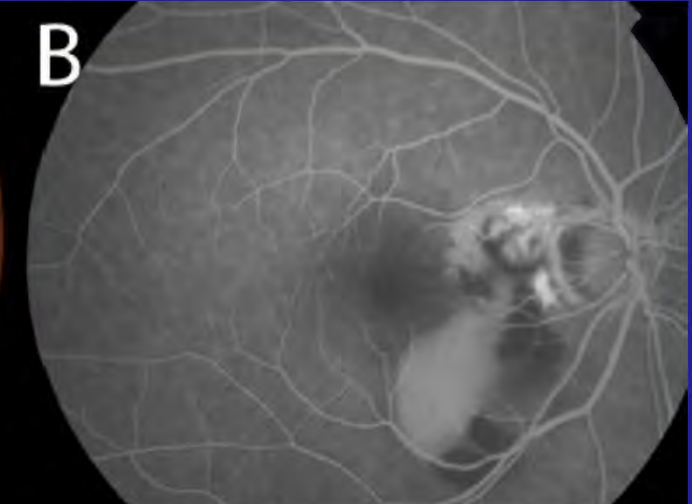
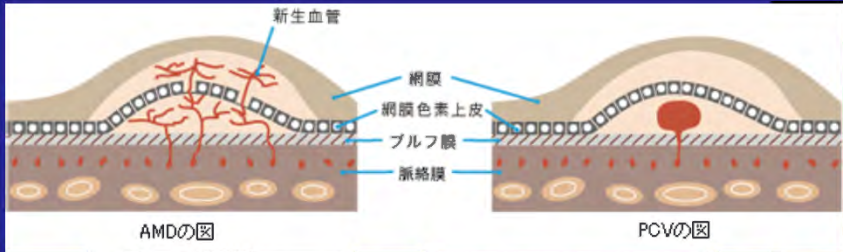
RTL1

22:43

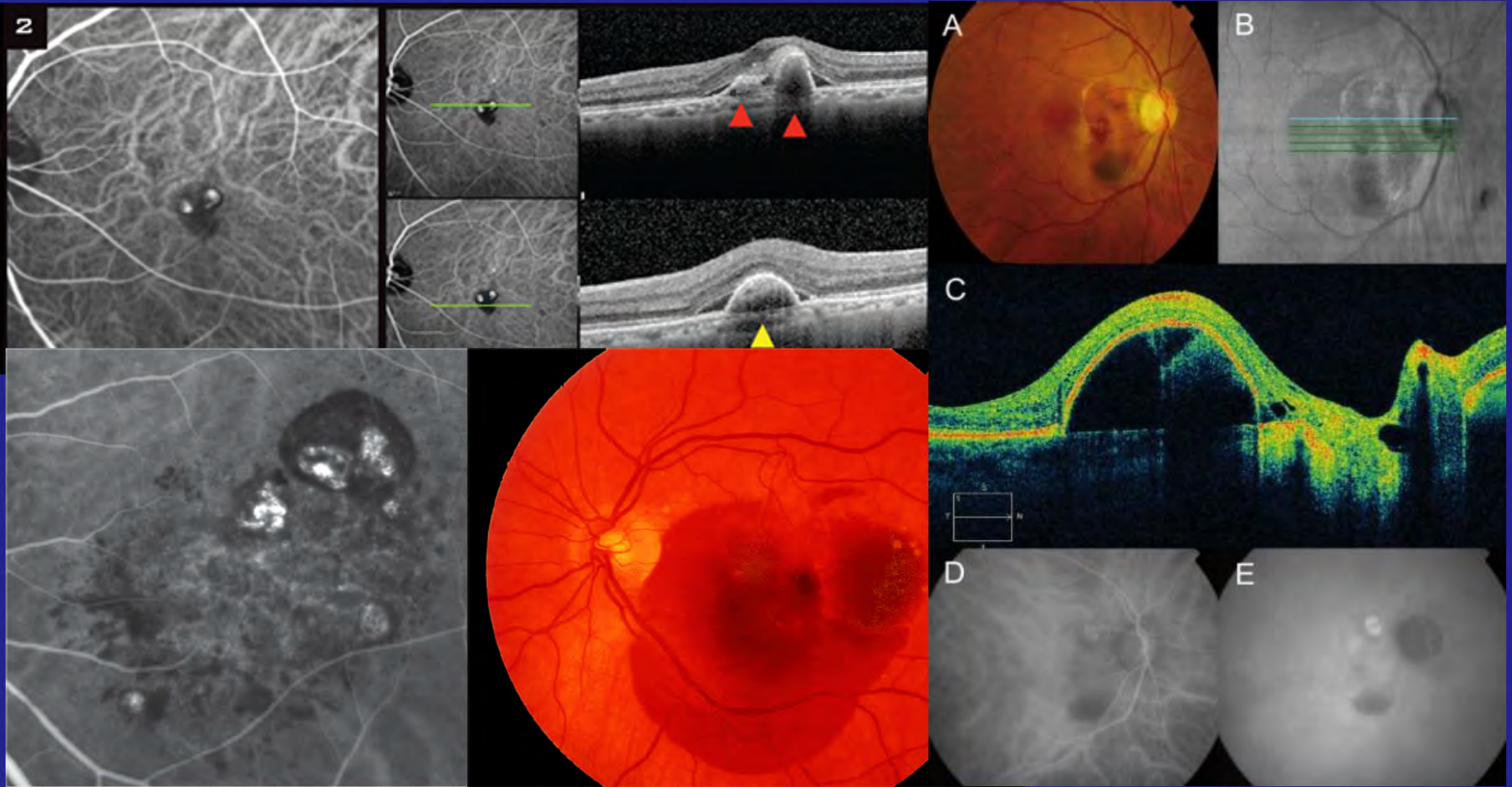


lonlinewahn.de fgaug Schäuble verhaftet! Der unter Terrorverdacht stehen

Polypoidale Choroidale Vaskulopathie = PCV



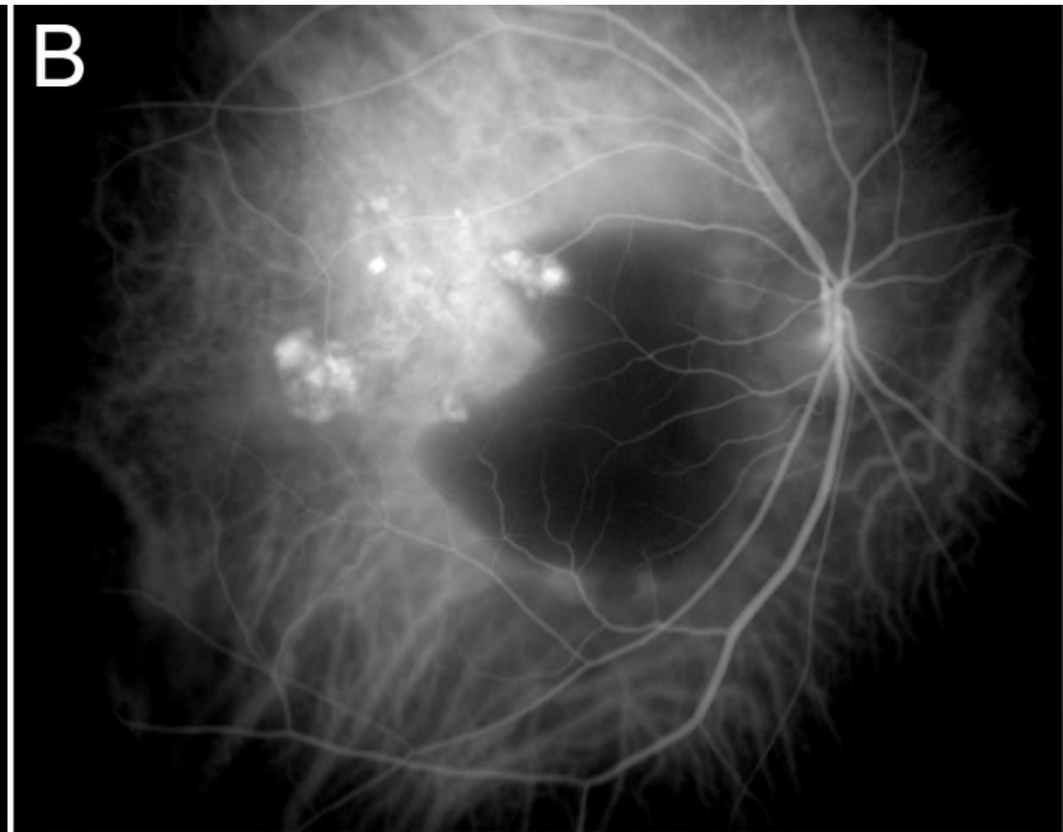
Polypoidale Choroidale Neovaskularisation = PCV





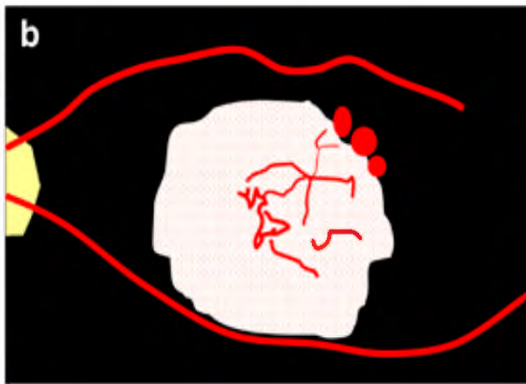
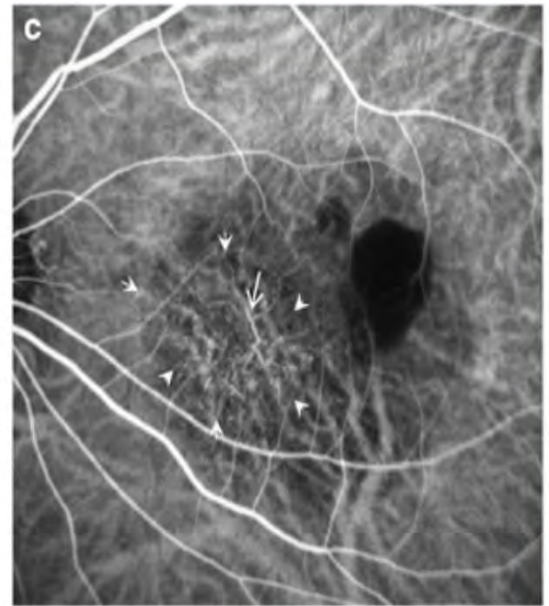
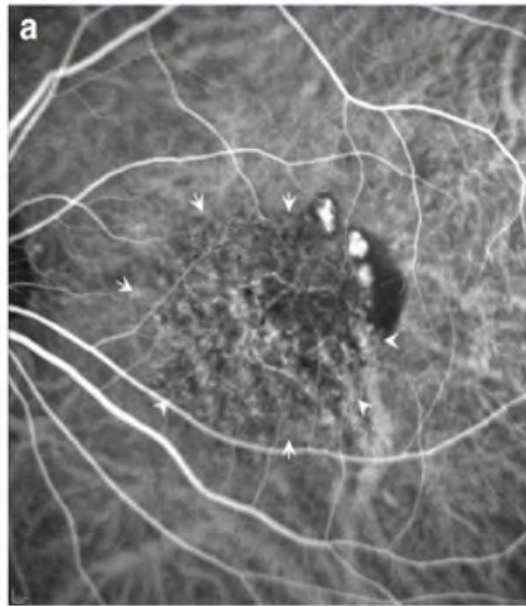
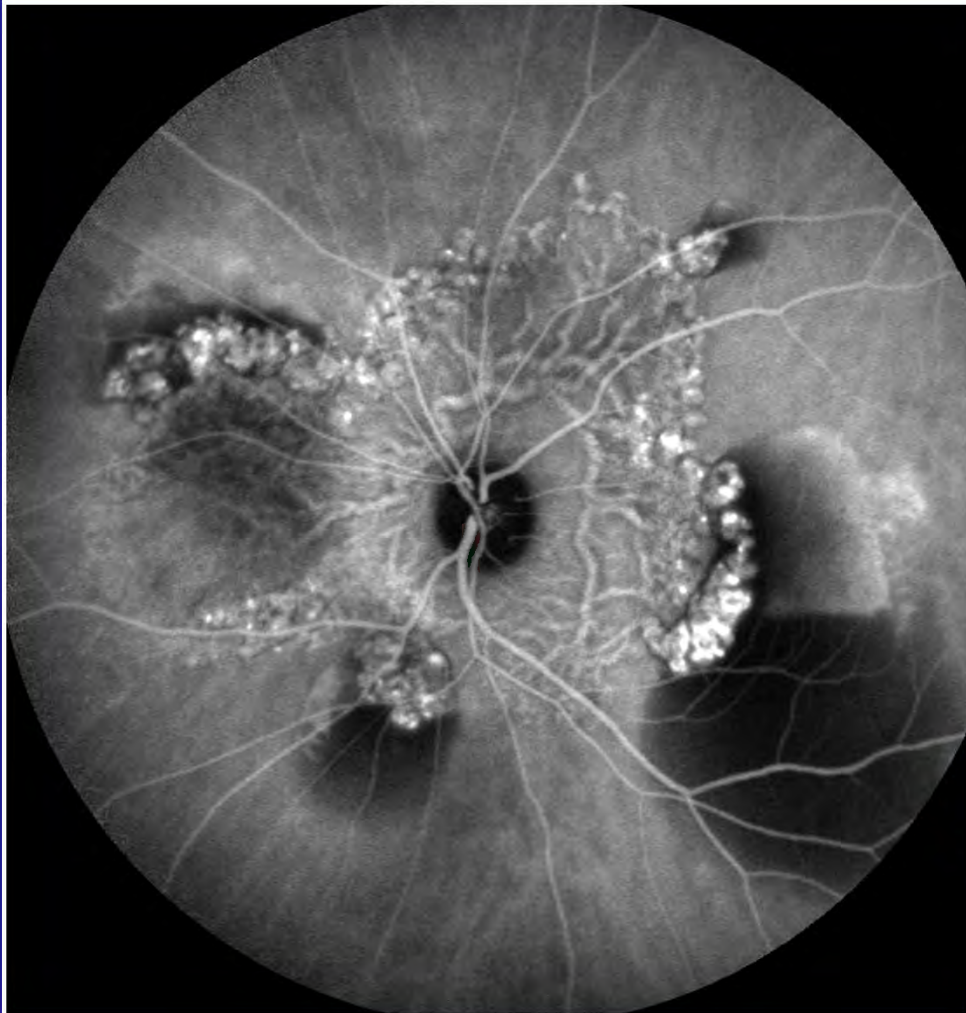
Klinik

PCV



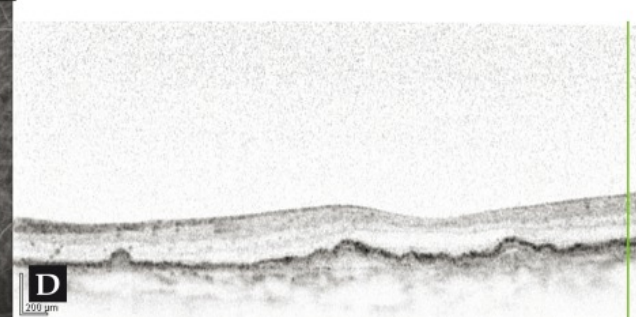
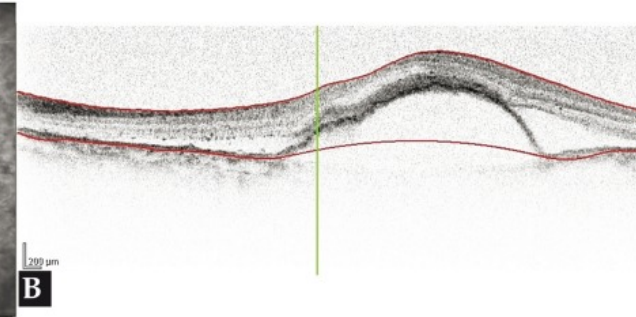
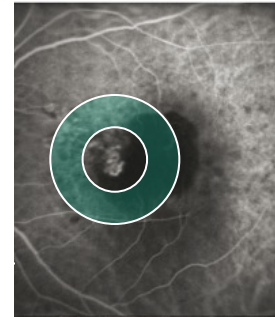
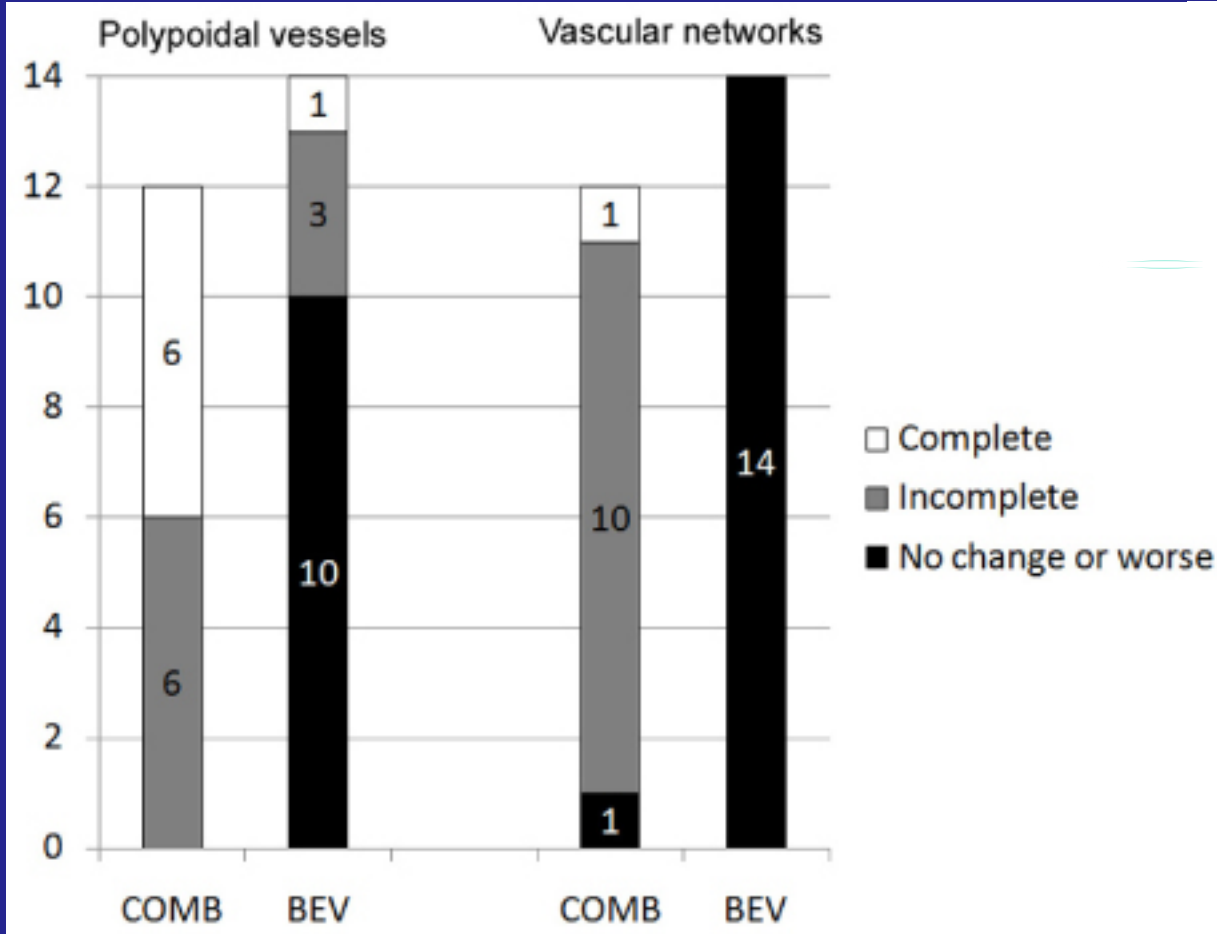
ICG-Angiographie

PCV



EVEREST-Studie

PCV



- Volle Verteporfindosis
- 10 min. Infusion
- Reduzierte Lichtenergie auf 70 sec. = 42 J/sec.
- IVOM innerhalb von 48h

PDT



PDT

