

The Nanopulse Revolution

SLT to 2RT

Ellex Satellite Meeting
19th September 2011
Vienna



ALT

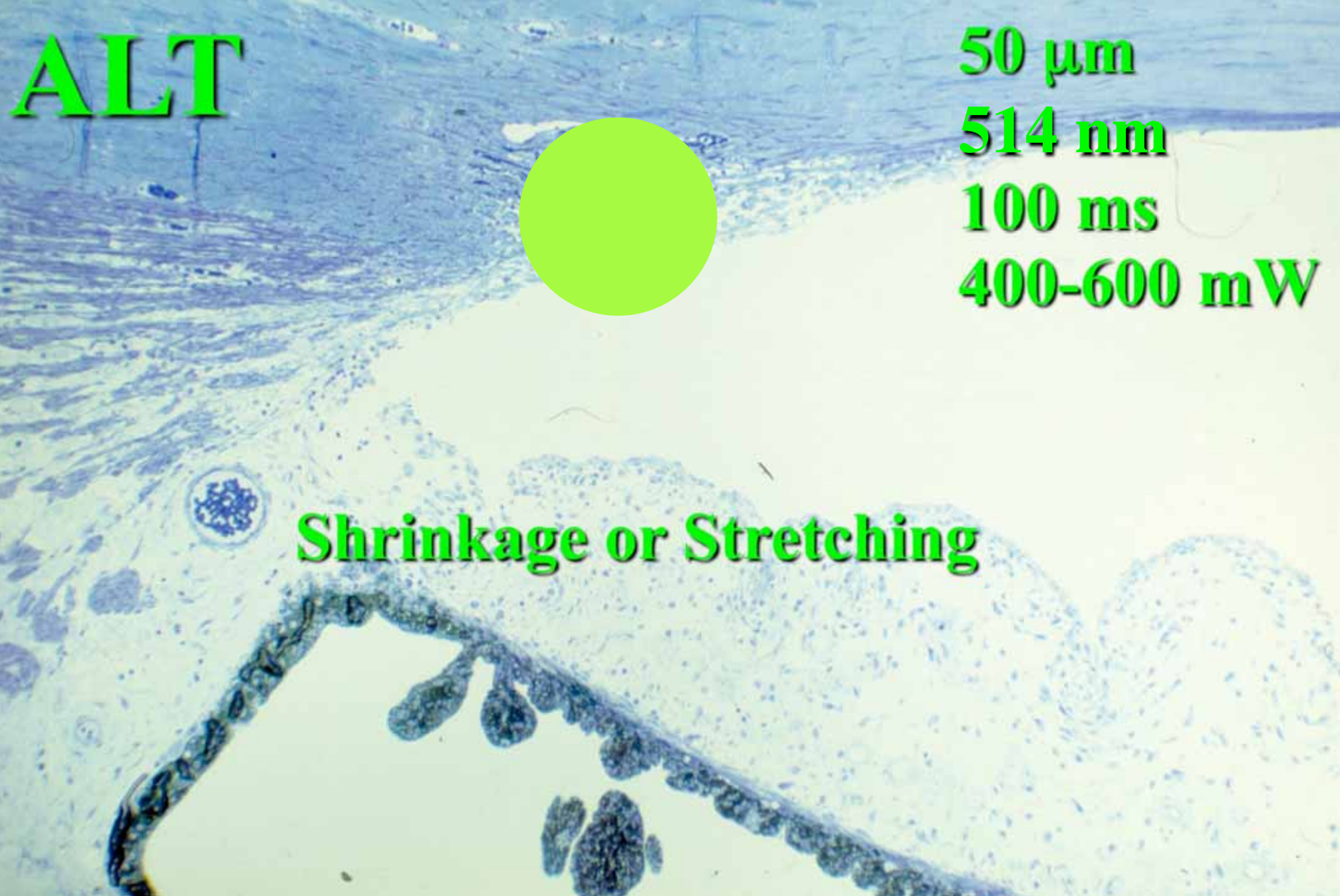
50 μm

514 nm

100 ms

400-600 mW

Shrinkage or Stretching



Shrinking or Stretching?



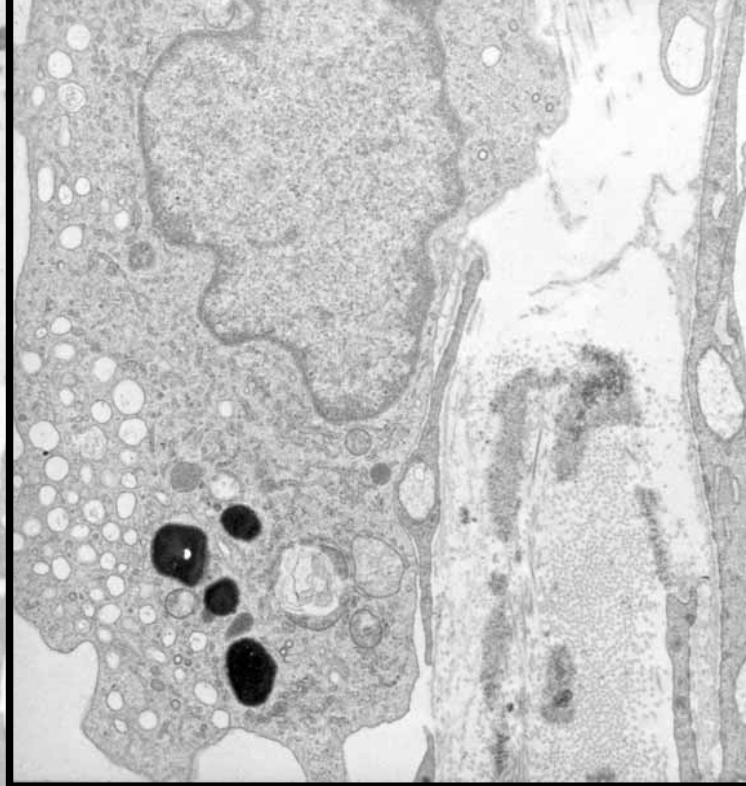
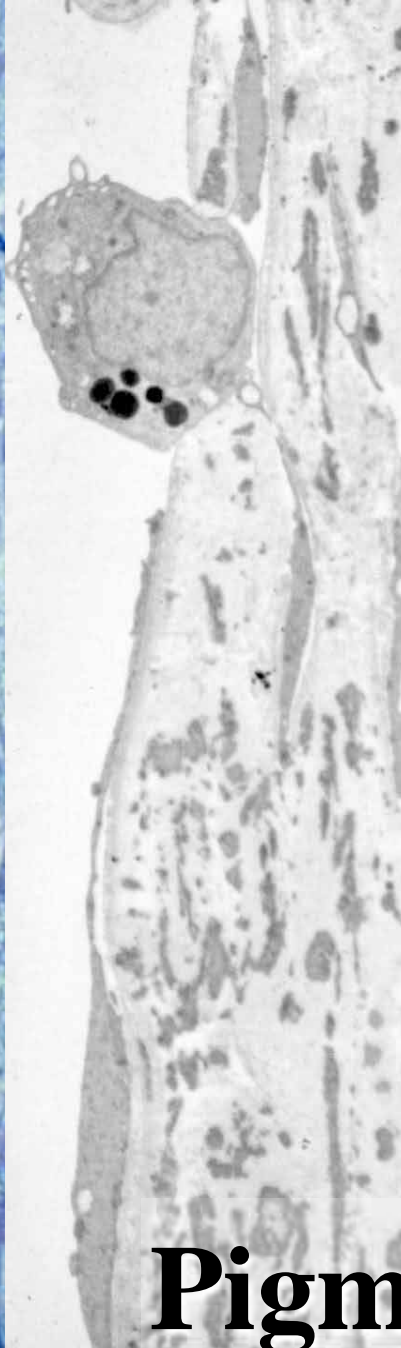
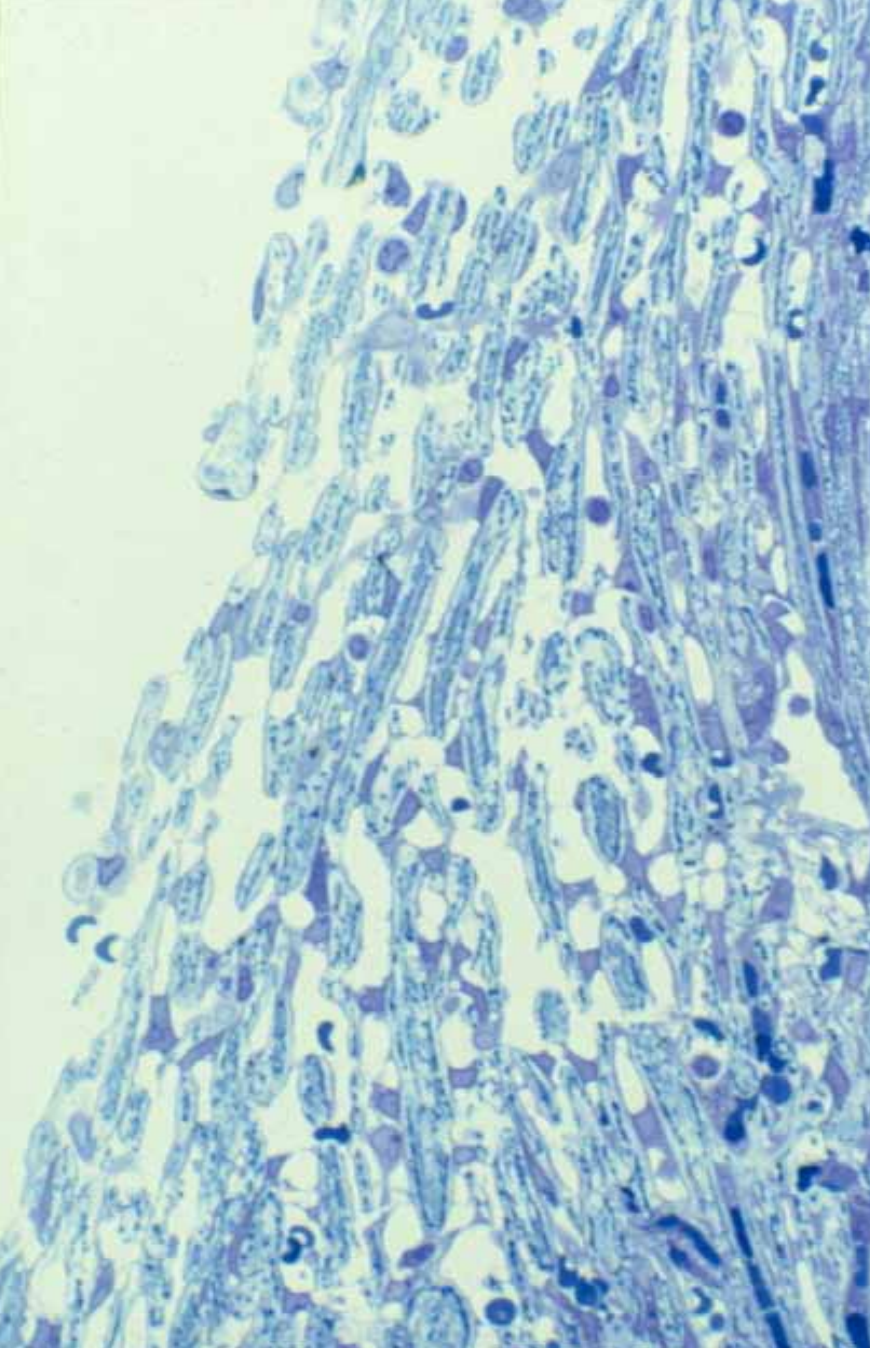
Stretching

Shrinkage



ALT
Photocoagulation

Cell Death & Scarring
OVERKILL!



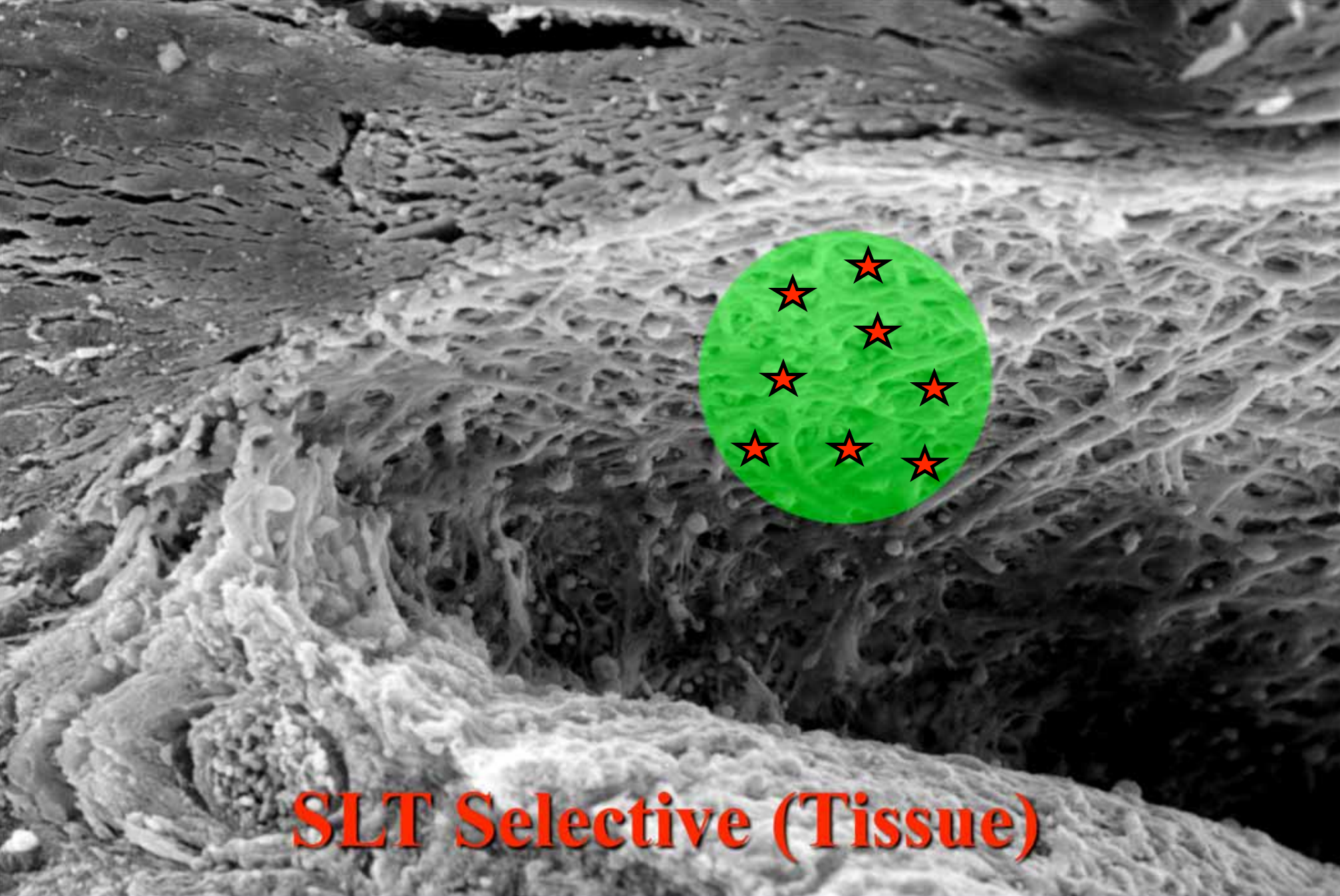
Pigmented Cells

SLT

400 μm

Wavelength 532 nm
Pulse Length 3 nsec
Energy 0.6 – 1.2 mJ





SLT Selective (Tissue)

SLT



Nanosecond Pulses

Selective Damage Pigmented Cells

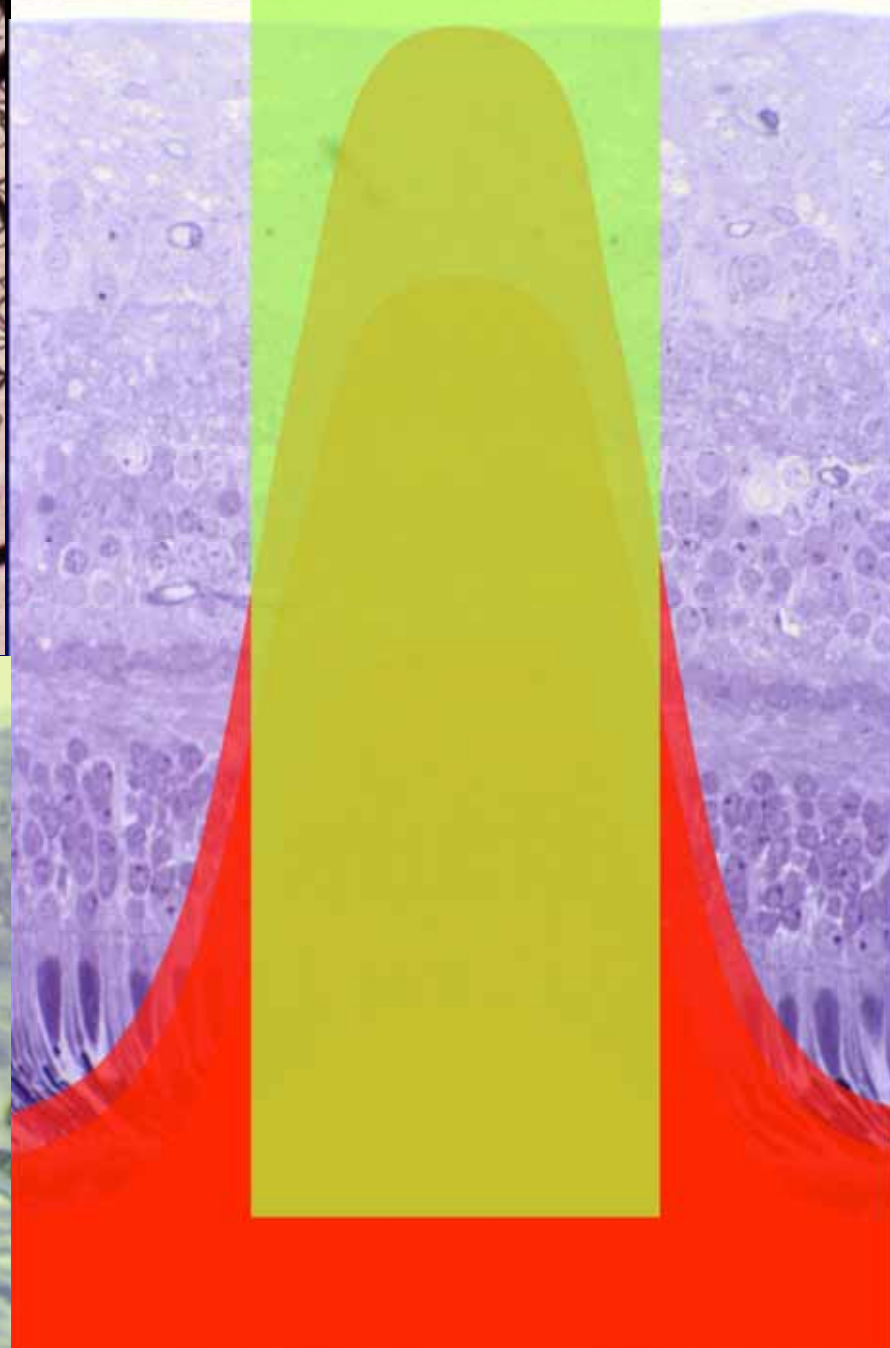
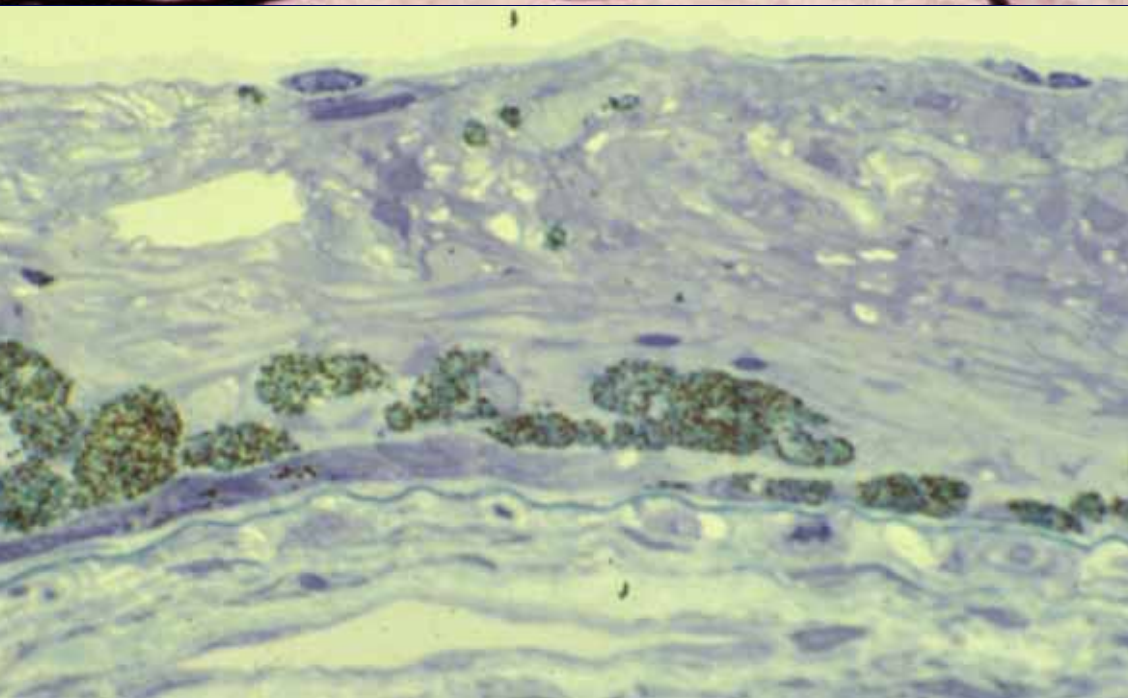
MMPs
Immune Response

Macrophages
Growth Factors
Apoptosis

Ischaemic Retina Angiogenic Factors

MEYER-SCHWICKERATH G. [Experiments with light-coagulation of the retina and iris.], [German] [Journal Article] *Documenta Ophthalmologica Proceedings Series*. 10:91-118; discussion, 119-31, 1956.

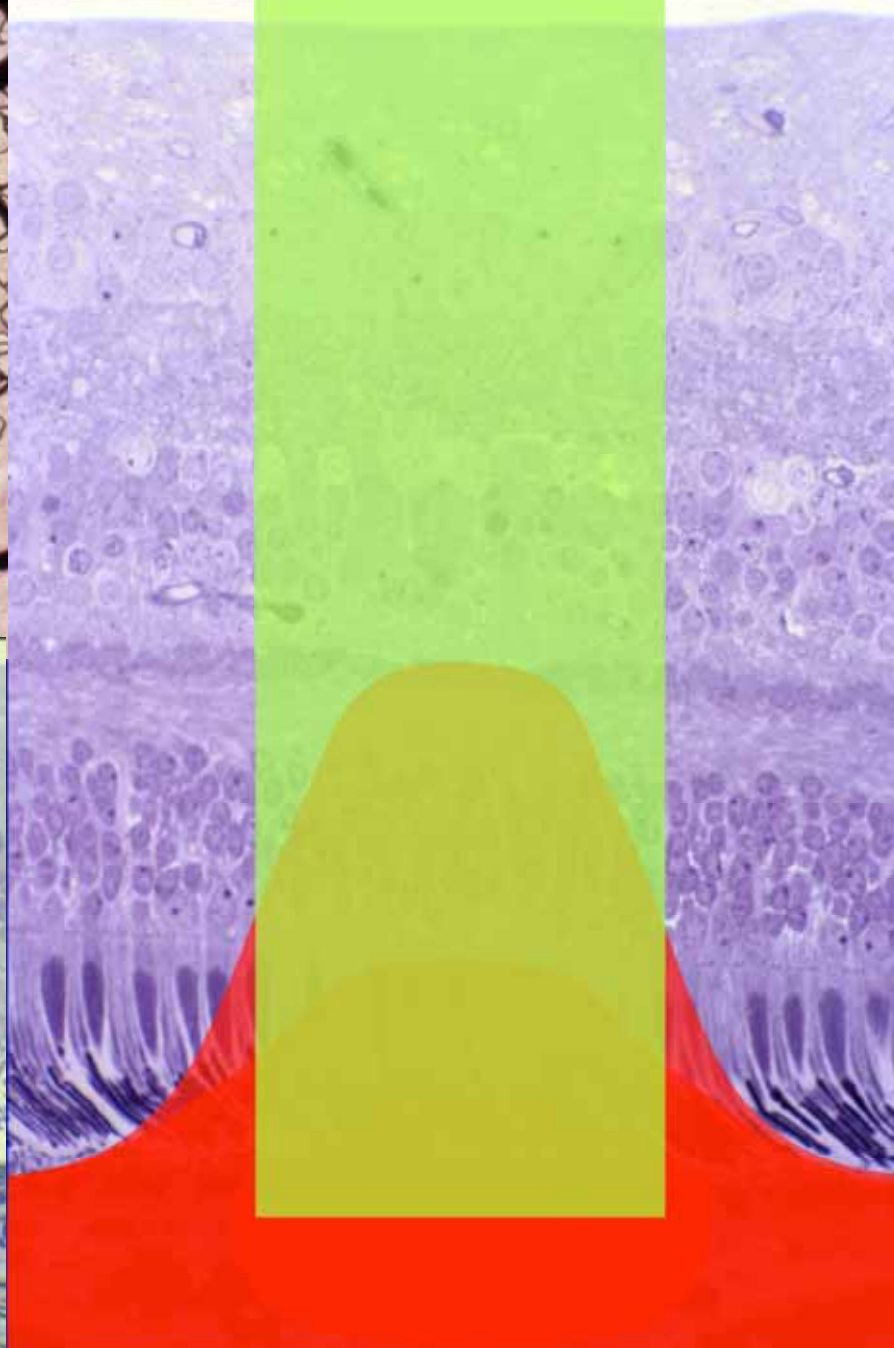
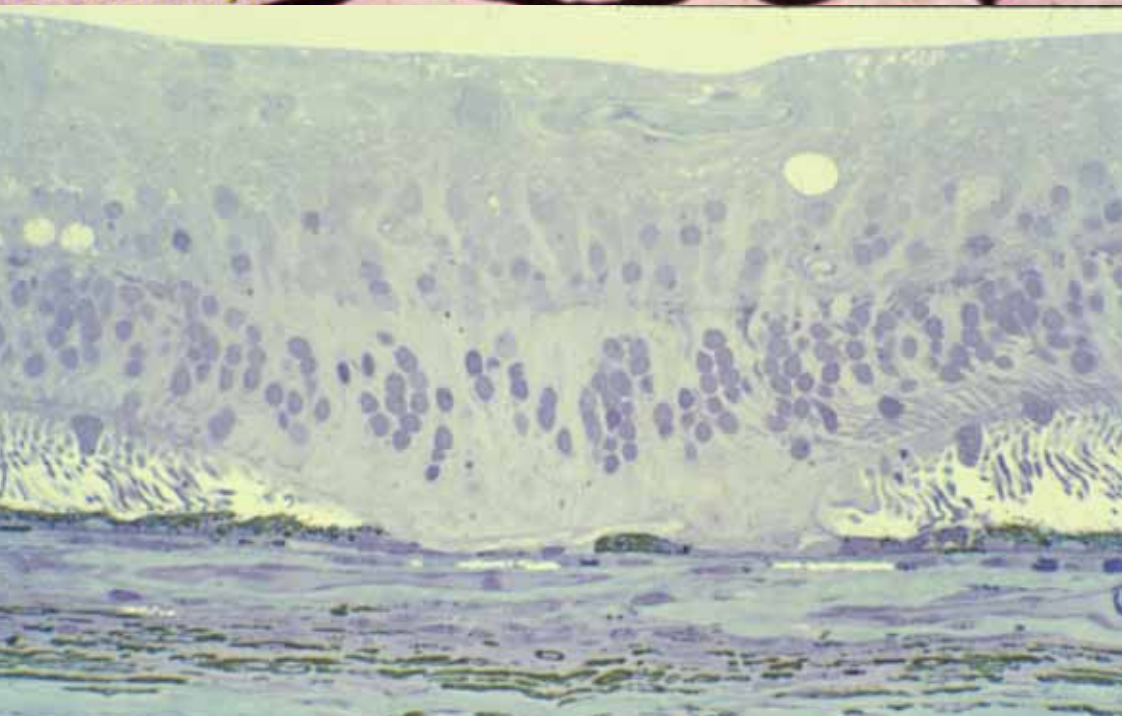
ASHTON N. STUDIES OF THE RETINAL CAPILLARIES IN RELATION TO DIABETIC AND OTHER RETINOPATHIES. [Journal Article] *British Journal of Ophthalmology*. 47:521-38, 1963 Sep

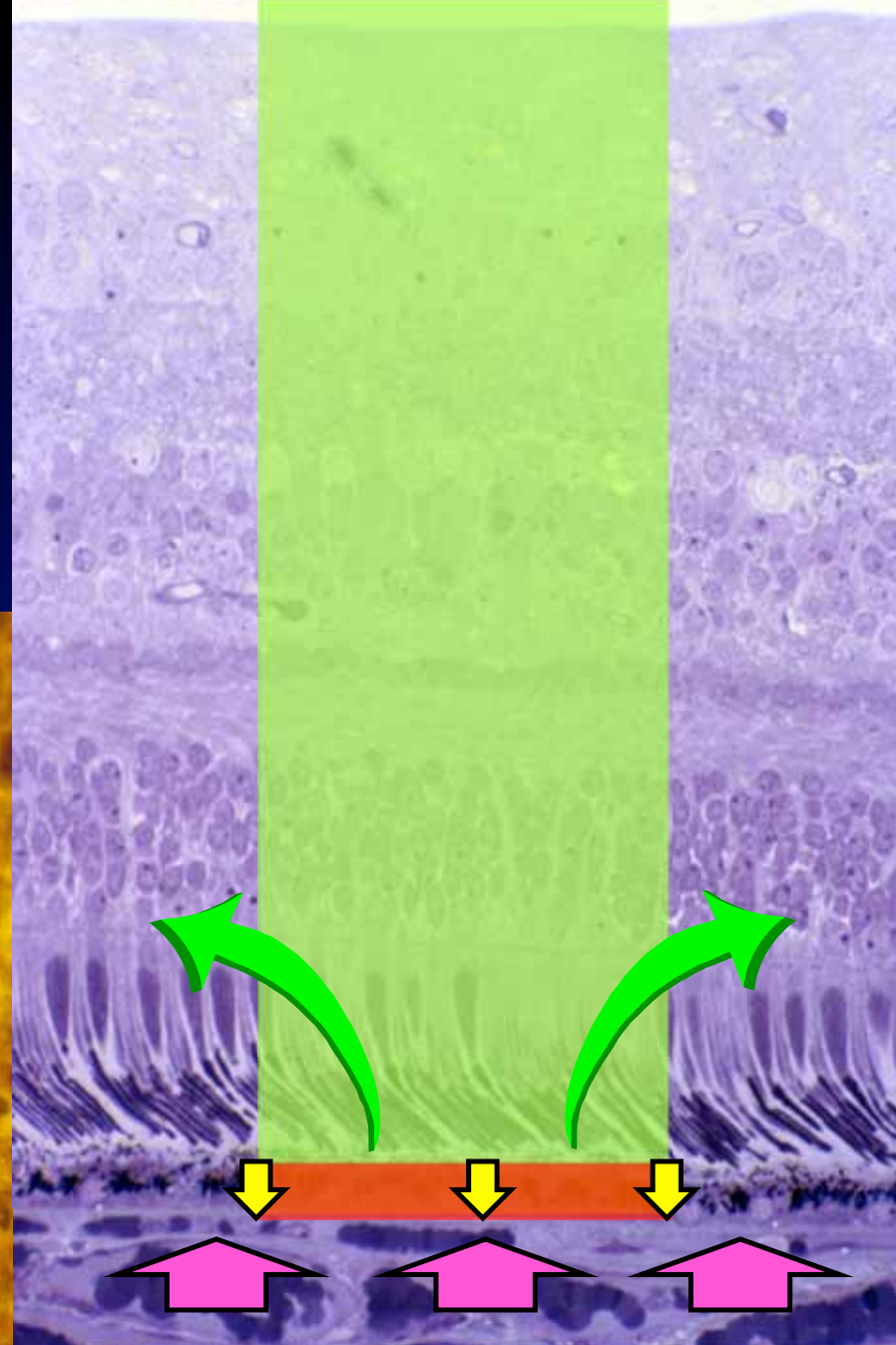
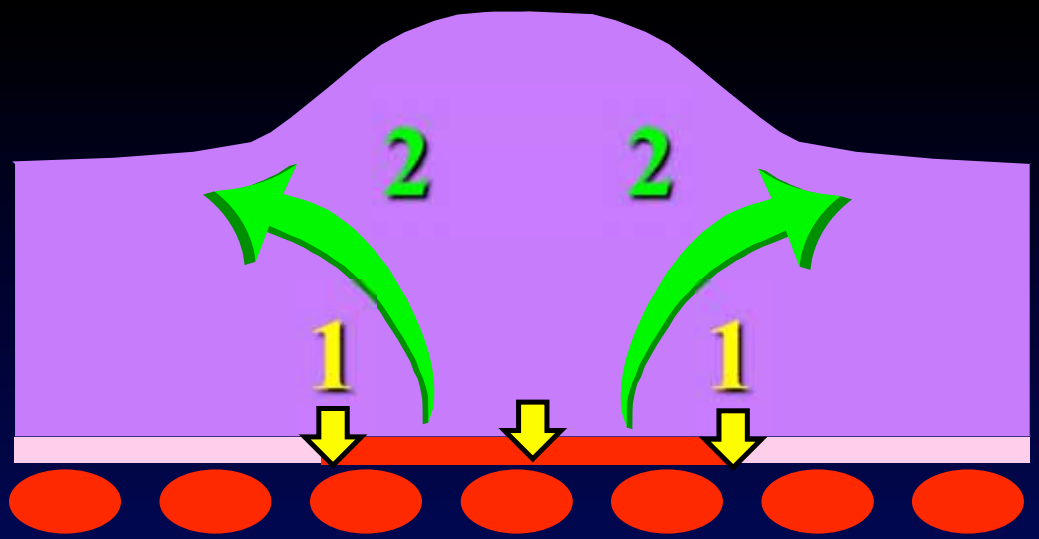


Oxygen Transfer

Wolbarsht & Landers

Wolbarsht ML, Landers MB 3rd. The rationale of photocoagulation therapy for proliferative diabetic retinopathy: a review and a model. [Review] [65 refs] [Journal Article. Review] *Ophthalmic Surgery*. 11(4): 235-45, 1980 Apr.





Migrating RPE

1. MMPs
2. Cytokines
3. Immune Response

4 -7 Days 7 + Days

320 μm

Argon
200 ms

Micropulse
200 μs

20 μm

Nd:YLF

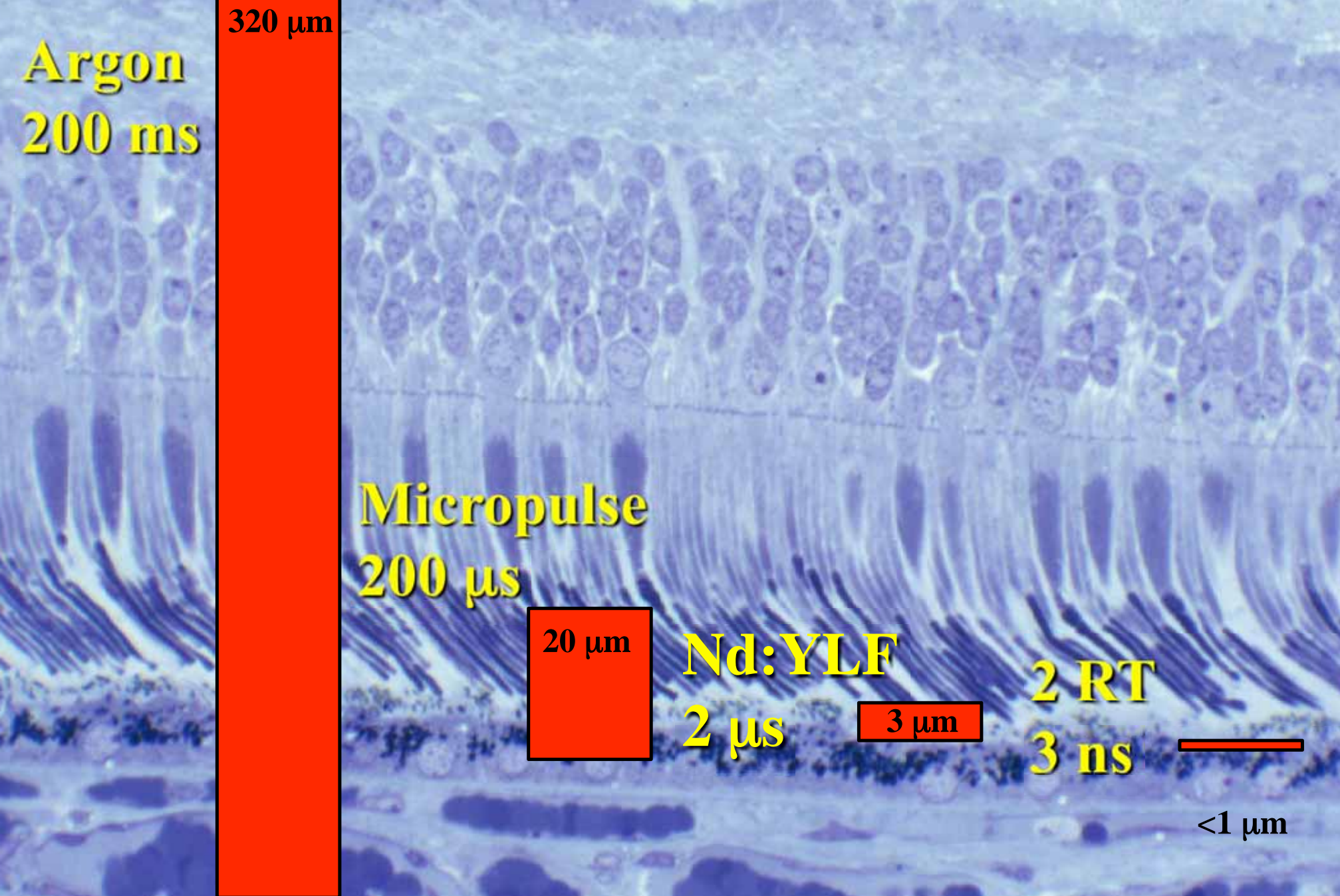
2 μs

3 μm

2 RT

3 ns

<1 μm



Photoreceptor cell Secondary Damage

Microseconds (“Micropulse”)

No Transport Photoreceptor Death



2RT

**Wavelength
532nm**

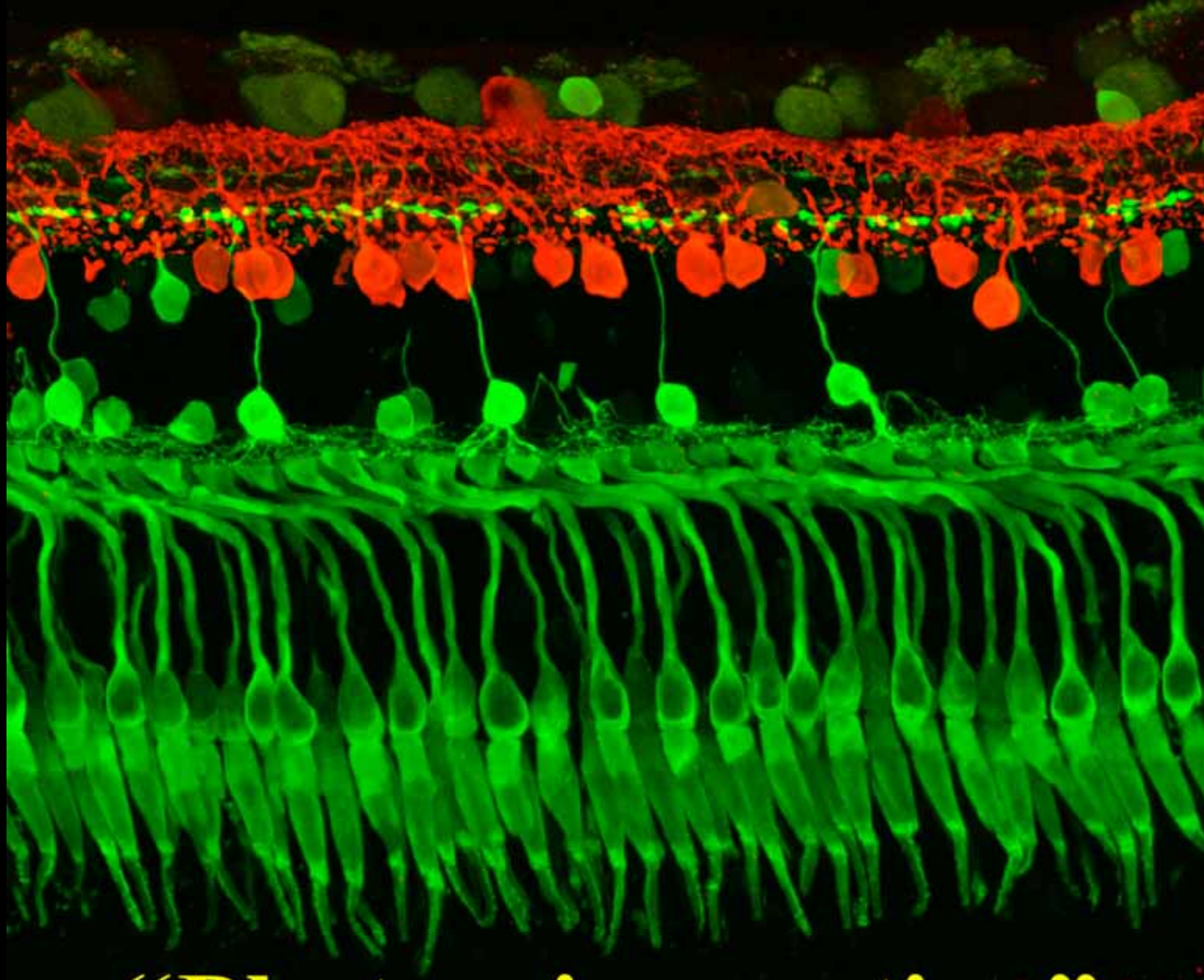
**Pulse duration
3 nanoseconds**

**Discontinuous
Beam
Distribution**

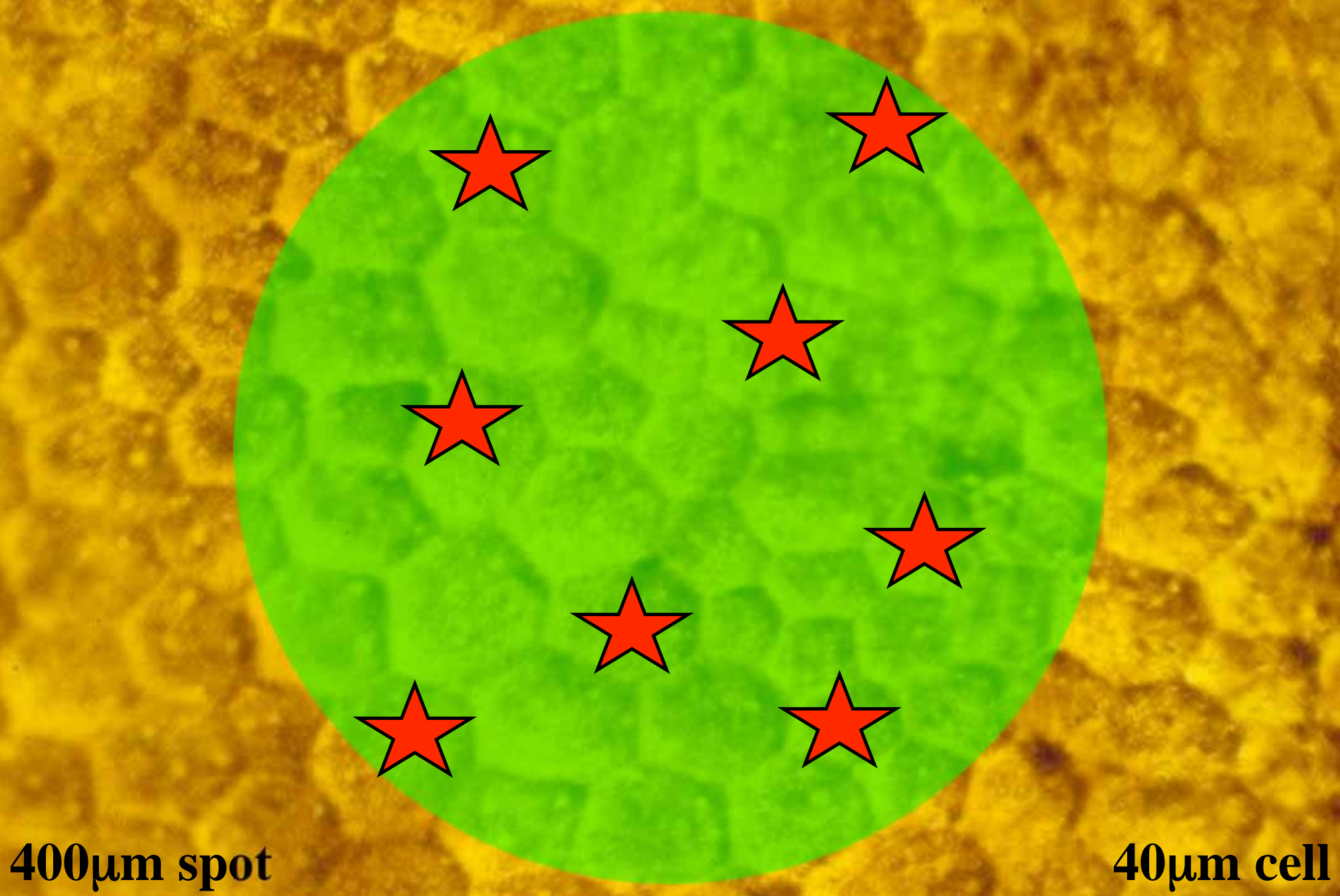
**Max energy
1mJ/pulse**

**Spot size
400 microns**

**Not
SLT Laser**



“Photorejuvenation”



400µm spot

40µm cell

2RT

No Damage to Neural Retina

