First, let’s talk about laser-tissue interaction…
What are the five modes of laser-tissue interaction?
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- Photo-chemical
  aka *photoactivation*
- Thermal
- Photo-ablation
- Plasma-induced ablation
  aka *plasma-induced disruption*
Which mode is PRP an examplar of?
Which mode is PRP an examplar of?
Thermal
PRP and Its Complications

The five modes of laser-tissue interaction

- Photo-chemical aka photoactivation
- Photo-ablation
- Plasma-induced ablation
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*Thermal effects on tissue exist on a continuum. What are the five degrees (see what I did there?) of tissue effects?*
The five modes of laser-tissue interaction

- Photo-chemical (aka photoactivation)
- Photo-ablation (aka photoactivation)
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Thermal effects on tissue exist on a continuum. What are the five degrees (see what I did there?) of tissue effects?

-- Hyperthermia
-- Coagulation
-- Vaporization
-- Carbonization
-- Melting

PRP and Its Complications
Thermal effects on tissue exist on a continuum. What are the five degrees (see what I did there?) of tissue effects?

--Hyperthermia?
--Coagulation?
--Vaporization?
--Carbonization?
--Melting?

Which thermal effect is employed most frequently?
Thermal effects on tissue exist on a continuum. What are the five degrees (see what I did there?) of tissue effects?
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*Which thermal effect is employed most frequently?*  
**Coagulation**
Thermal effects on tissue exist on a continuum. What are the five degrees of tissue effects?

- Hyperthermia
- Coagulation
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Which thermal effect is employed most frequently? Coagulation.

What does it mean to say that tissue has ‘coagulated’?

It means the proteins have been denatured. It means the protein has been forced out of its native conformation by some sort of applied stress (in this case, heat). Because a protein’s function is inextricably tied to its shape, denatured proteins do not behave as they do in their native form.

Can you give an example of protein denaturation? Consider egg albumin. In its native state, it’s a clear liquid. But if sufficient heat is applied, it becomes a white solid. (And if sufficient salsa is applied to the white solid, it becomes delish.)


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Which thermal Coagulation

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**The five modes of laser-tissue interaction**

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At what temperature does retinal tissue start to coagulate?
65°C
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For more info on lasers, see slide-set FELT26
Which laser is used to perform PRP?
Which laser is used to perform PRP? Argon green or blue-green
Q

- Which laser is used to perform PRP? **Argon green or blue-green**
- How many shots constitute a full compliment of PRP? **21**
Which laser is used to perform PRP? Argon green or blue-green

How many shots constitute a full compliment of PRP? About 1200-1400
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PRP and Its Complications

- Which laser is used to perform PRP? Argon green or blue-green
- How many shots constitute a full compliment of PRP? About 1200-1400
- What spot size should be used? 500 \( \mu m \)
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How many shots constitute a full compliment of PRP? About 1200-1400
What spot size should be used? 500 µm
How much power?
Q/A

- Which laser is used to perform PRP? Argon green or blue-green
- How many shots constitute a full compliment of PRP? About 1200-1400
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- How much power? Enough to produce a gray or light cream-colored burn
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How much distance between burns?
Which laser is used to perform PRP? Argon green or blue-green

How many shots constitute a full compliment of PRP? About 1200-1400

What spot size should be used? 500 µm

How much power? Enough to produce a gray or light cream-colored burn

How much distance between burns? About half a burn’s width
PRP and Its Complications

PRP
Which laser is used to perform PRP? Argon green or blue-green

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What spot size should be used? 500 µm

How much power? Enough to produce a gray or light cream-colored burn

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Should it be done in one, or multiple sessions?
PRP and Its Complications

- Which laser is used to perform PRP? Argon green or blue-green
- How many shots constitute a full compliment of PRP? About 1200-1400
- What spot size should be used? 500 \( \mu \text{m} \)
- How much power? Enough to produce a gray or light cream-colored burn
- How much distance between burns? About half a burn’s width
- Should it be done in one, or multiple sessions? It doesn’t matter
What are known complications of PRP?

- Reduced peripheral vision
- Reduced color vision
- Reduced contrast sensitivity
- Loss of 1-2 lines BCVA
- Decreased night vision
What are known complications of PRP?

- Reduced *peripheral* vision
- Reduced *color* vision
- Reduced *contrast sensitivity*
- Loss of 1-2 lines BCVA
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- Reduced peripheral vision
- Reduced color vision
- Reduced contrast sensitivity
- Loss of 1-2 lines BCVA
- Decreased night vision
- Decreased parasympathetic function
- Decreased two words

Effects on vision
What are known complications of PRP?

- Reduced peripheral vision
- Reduced color vision
- Reduced contrast sensitivity
- Loss of 1-2 lines BCVA
- Decreased night vision
- Decreased accommodation
- Decreased corneal sensitivity
What are known complications of PRP?

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- Loss of 1-2 lines BCVA
- Decreased night vision
- Decreased accommodation
- Decreased corneal sensitivity

What do accommodation and corneal sensitivity have in common?

Both are mediated by the long ciliary nerves.

OK, but what do the long ciliary nerves have to do with PRP?

The long ciliary nerves run pretty deep (i.e., just under the choroid) in the horizontal meridian. Because of their location, they are vulnerable to damage during PRP.

How can one minimize the risk to the long ciliary nerves?

By avoiding the horizontal meridian during PRP.
What are known complications of PRP?

- Reduced peripheral vision
- Reduced color vision
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OK, but what do the long ciliary nerves have to do with PRP? The long ciliary nerves run pretty deep (i.e., just under the choroid) in the horizontal meridian.

- Decreased accommodation
- Decreased corneal sensitivity
What are known complications of PRP?

- Reduced peripheral vision
- Reduced color vision
- Reduced contrast sensitivity
- Loss of 1-2 lines BCVA
- Decreased night vision
- Decreased accommodation
- Decreased corneal sensitivity

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Decreased accommodation
Decreased corneal sensitivity
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- Reduced **color** vision
- Reduced **contrast sensitivity**
- Loss of 1-2 lines BCVA
- Decreased **night vision**
- Decreased **accommodation**
- Decreased **corneal sensitivity**
- Macular
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- Decreased *corneal sensitivity*
- Macular *edema*
- Inadvertent *yikes* burn

Effects on vision
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- Macular *edema*
- Inadvertent *foveal* burn
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- Loss of 1-2 lines BCVA
- Decreased *night vision*
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- Decreased *corneal sensitivity*
- Macular *edema*
- Inadvertent *foveal* burn
- Choroidal *...*
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- Decreased night vision
- Decreased accommodation
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- Macular edema
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- Choroidal detachment
- Iatrogenic break in Bruch’s
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- Decreased **night vision**
- Decreased **accommodation**
- Decreased **corneal sensitivity**
- Macular **edema**
- Inadvertent **foveal** burn
- Choroidal **detachment**
- Iatrogenic break in Bruch’s → **CNVM**

*(CNVM = Choroidal neovascular membrane)*