

Victorian Cosmedic Service



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NON-SURGICAL TREATMENTS

- LASER THERAPY
 - Hair removal (Nd-YAG, Alexandrite)
 - Blood vessel removal (1064nm, IPL)
 - Tattoo removal (all colours)
 - **Permanent make-up removal**
 - Pigment removal
 - Laser resurfacing (semi-ablative) (PEARL)
- INJECTABLES
 - Botox, Dysport
 - Restylane, Perlane, Juvederm, Esthelis, Sculptra
- CHEMICAL PEELS
 - Glycolic, Jessners, TCA
- OTHER
 - Sclerotherapy
 - Diathermy

Conditions Treated

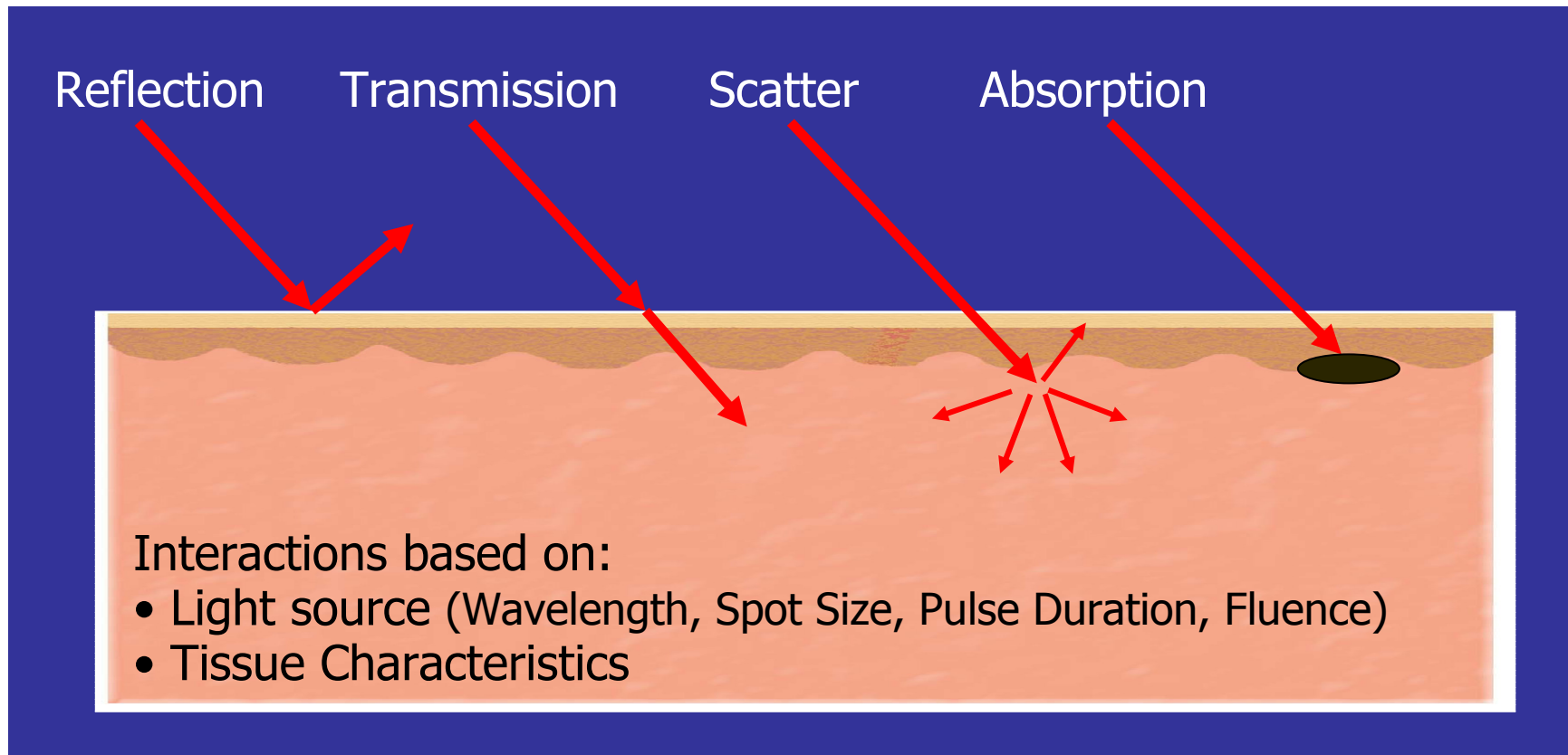
- Rosacea
- Poikiloderma di Civatte
- Seborrhoeic keratoses
- Solar lentigines, ephelides, dyschromias
- Cherry angiomas, Campbell de Morgan haemangiomas
- Birthmarks
- Telangectasia-facial, legs eg Reticular varicose veins
- Hair removal, ingrown hairs, pseudofolliculitis barbae
- Acne
- Wrinkles-dynamic, photoageing
- Lipoatrophy-photoageing
- Migraines, Tension related headaches
- Unwanted tattoos- including permanent make-up
- Skin lesion removal
- Scar minimisation, including stretchmark treatment
- Eczema, dermatitis

Laser-Tissue Interaction

Cutera Workshop Presentation

Laser – Tissue Interaction

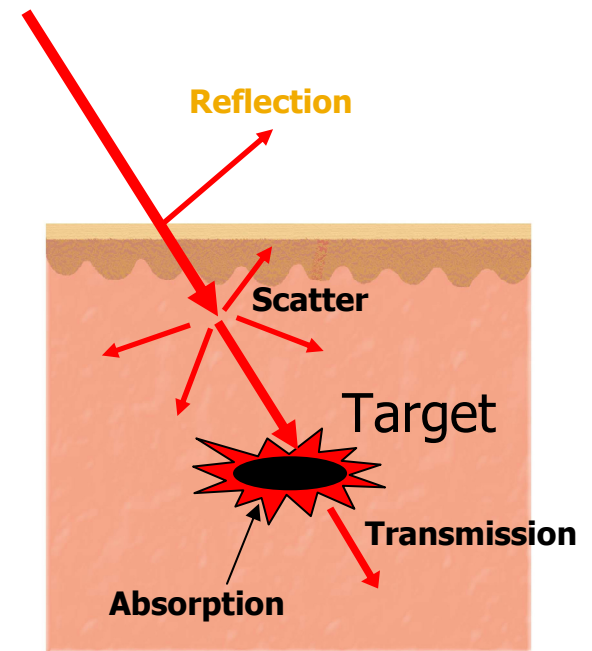
- Four Types of Interactions:
 - All four interactions occur to varying degrees with each exposure.



Selective Photothermolysis

Desired Response:

1. Sufficient light reaches target
2. Light absorbed by target (chromophore)
3. Absorbed light converts to heat
4. Temperature rise in target sufficient to provide desired effect
5. Minimal heating of surrounding tissue



Targets for Selective Photothermolysis

- A chromophore is a light-absorbing component that converts light to heat.
- There are 3 primary chromophores naturally present in skin.

Melanin

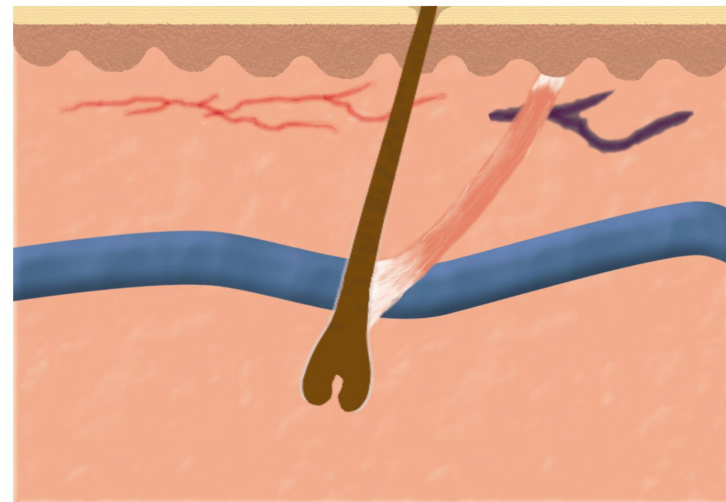
- Hair, epidermal pigment and pigmented lesions

Hemoglobin

- Vascular

Water

- Throughout skin
- Used for bulk heating



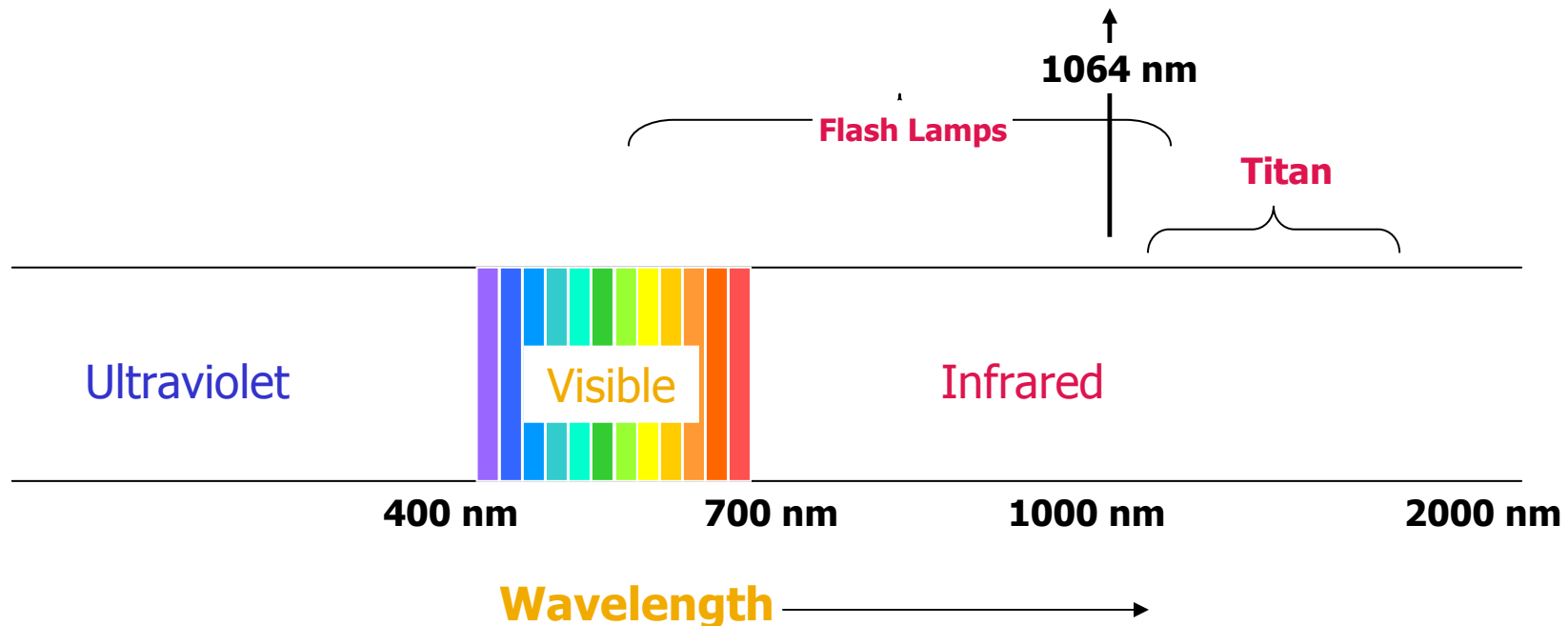
Key Parameters of Light Sources

- Wavelength
- Spot Size
- Pulse Duration
- Fluence

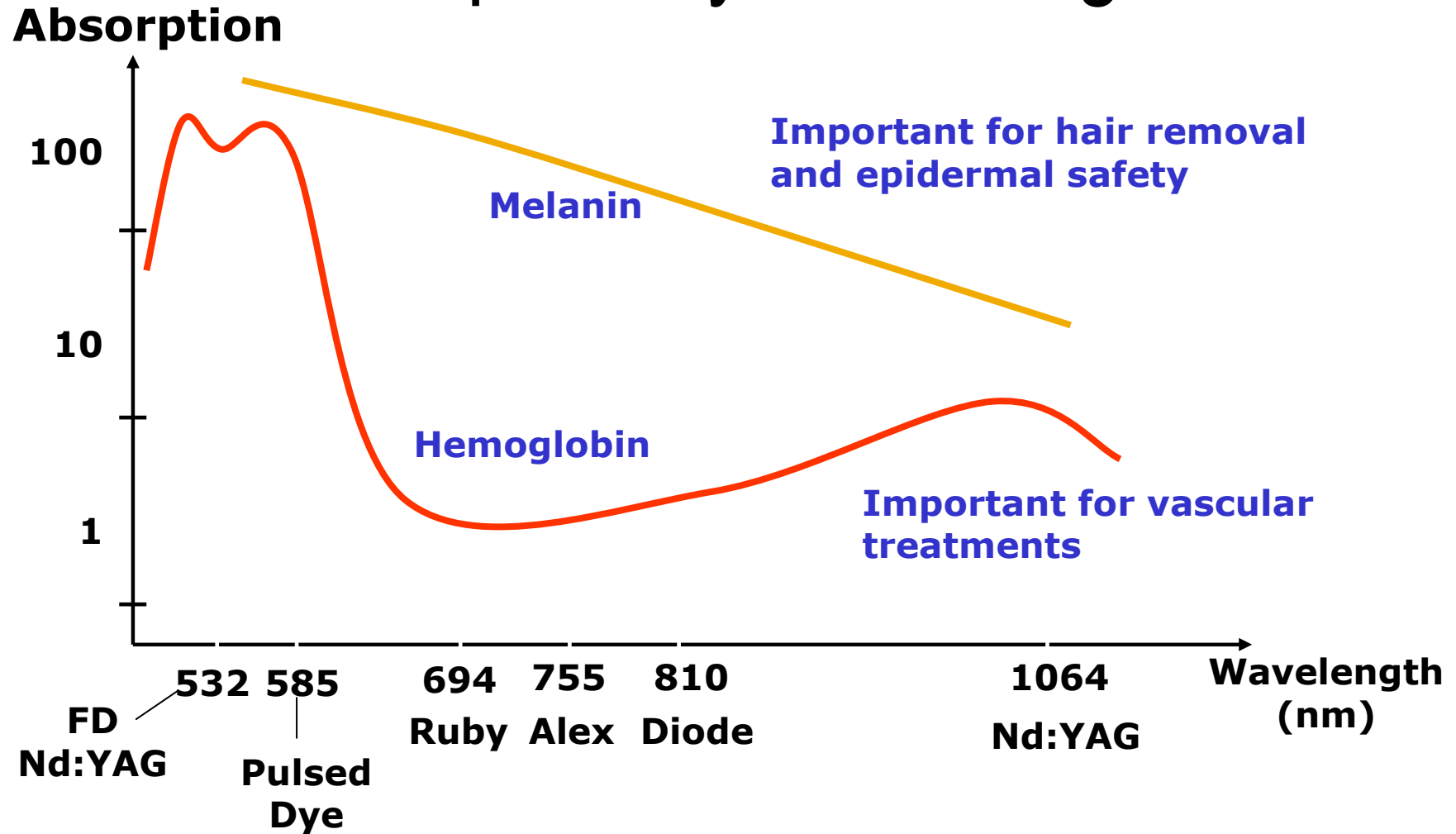
Selective Photothermolysis requires the right combination of parameters for safe and effective treatments.

Wavelength

- Expressed in nanometers (nm)
 - Corresponds to “color” in the visible spectrum
 - Selected for interaction with components of skin

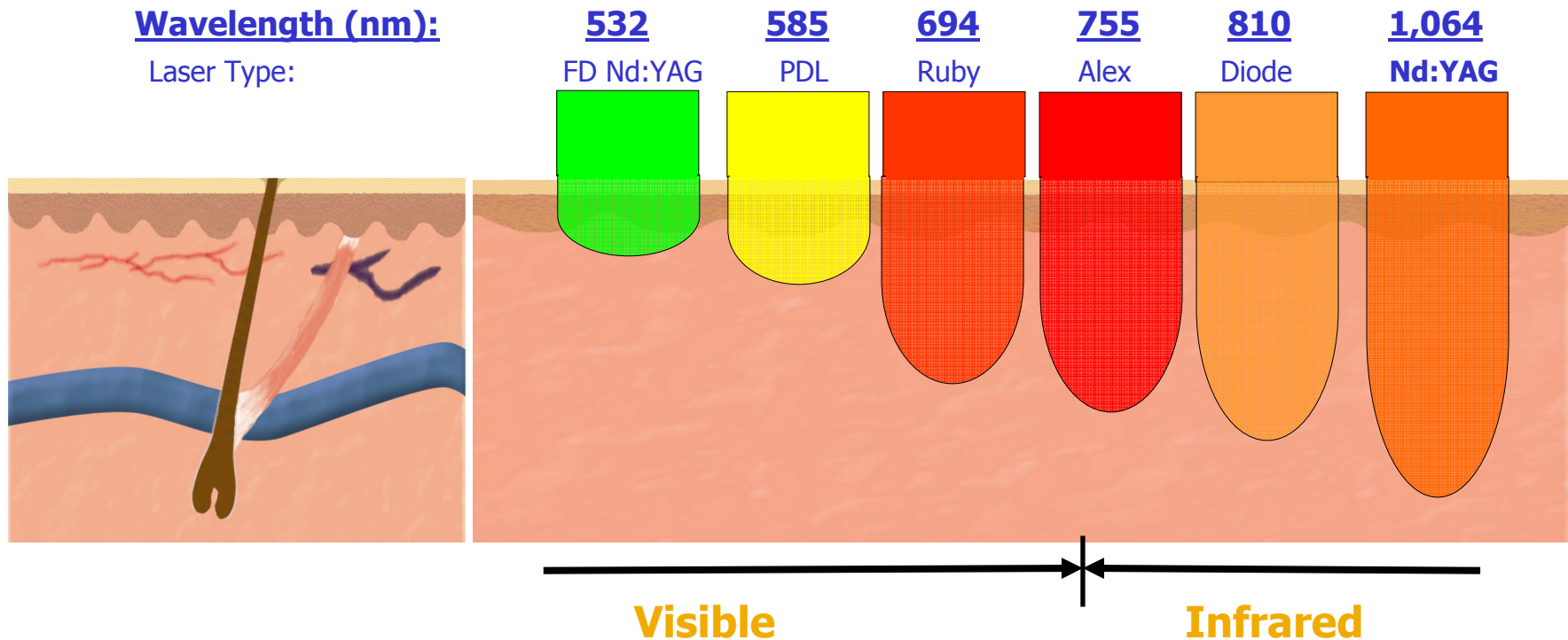


Absorption by Wavelength



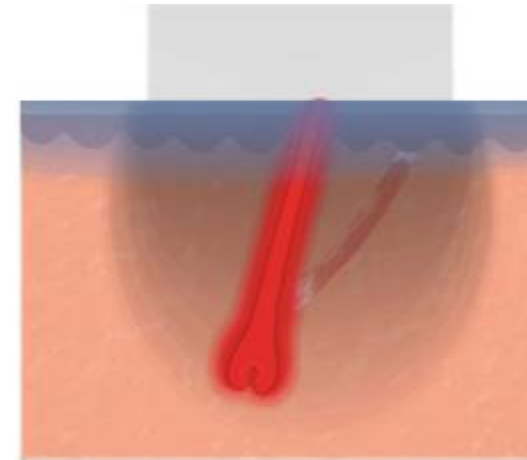
Wavelength: Effect on Depth of Penetration

- Wavelength affects depth of penetration.
 - Depth of penetration increases with wavelength over the range absorbed by melanin and hemoglobin.
 - Shorter wavelengths experience more scattering.
 - More of the longer wavelengths reach deeper targets.

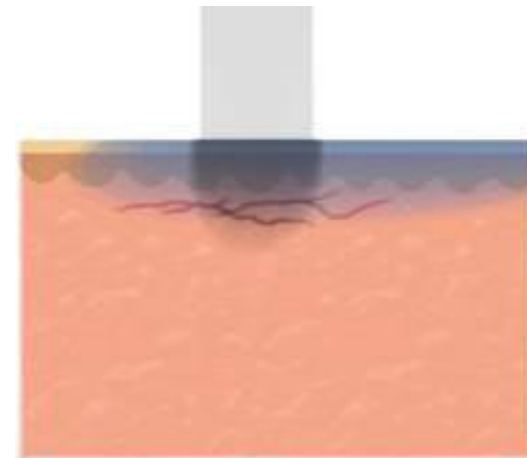


Selection of Spot Size

- Smaller spot sizes reduce penetration at a given wavelength, due to increased impact of scatter.
- Large Spot Sizes for:
 - Deep Targets
 - Hair removal, deep reticular veins
 - Large Area Coverage
 - Epidermal melanin
 - Bulk dermal heating
- Small Spot Sizes for:
 - Small, shallow targets
 - Where high fluences are required (such as telangiectasia)

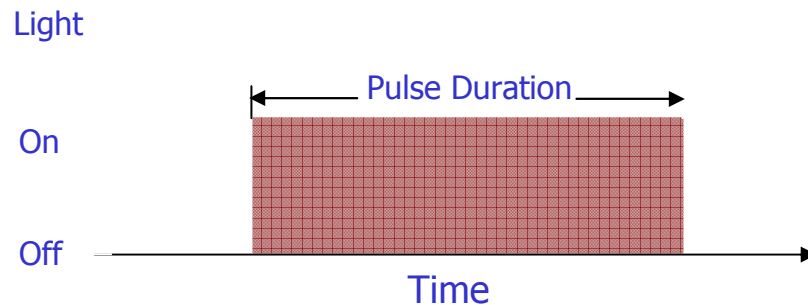


Large Spot Size

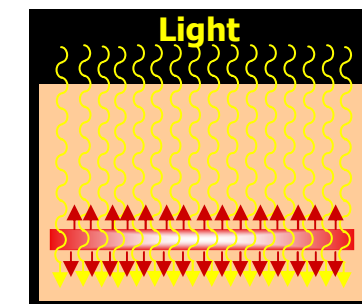
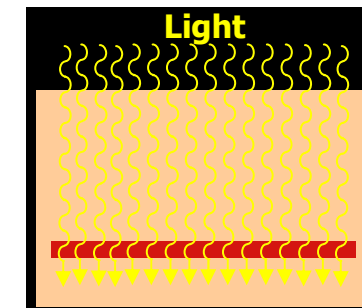
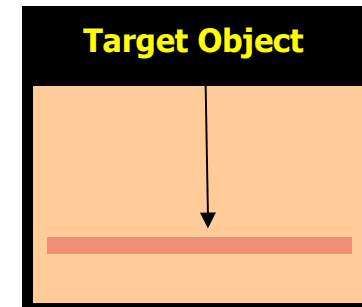


Small Spot Size

Selection of Pulse Duration

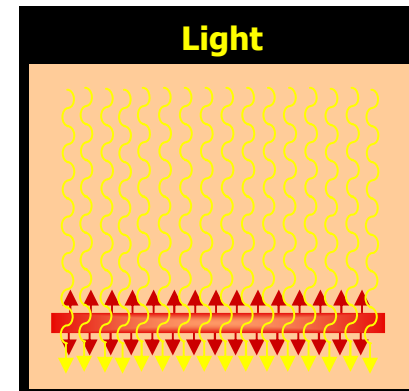


- Prior to the light exposure, the target is approximately the same temperature as the surrounding tissue.
- The target object is heated during the pulse of light.
 - As light is absorbed, the temperature of the target increases.
- As the target becomes hotter than the surrounding tissue, heat will begin to flow from the target to the surrounding skin.

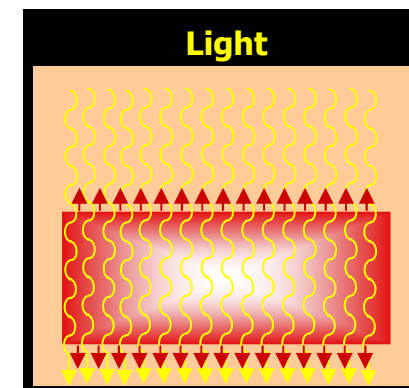


Selection of Pulse Duration

- Small objects in the skin cool off faster than large objects.
- For maximum heating efficiency, heating should occur rapidly enough so that most of the heat is confined to the target.
- In order to provide efficient heating of the target, **the optimal pulse duration for a small object is usually shorter than for a large object.**



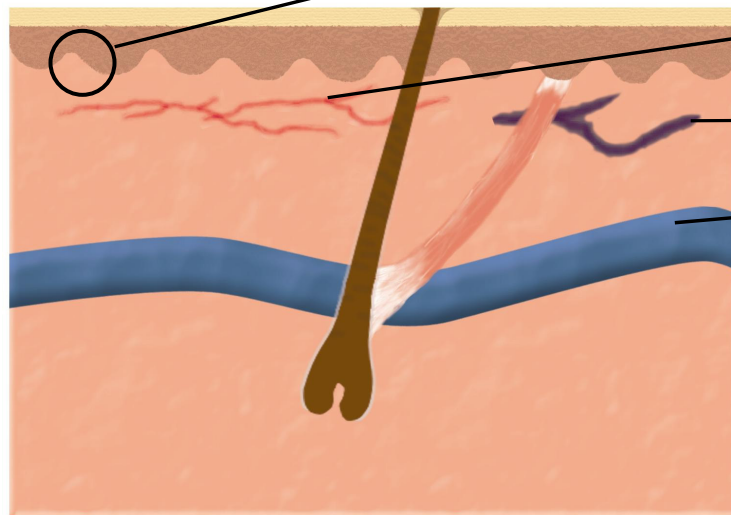
Small objects lose heat more rapidly, so optimal pulse duration will be shorter.



Large objects lose heat more slowly, so pulse duration can be longer.

Commonly Used Laser Pulse Durations by Application

- The pulse durations listed below are short enough to efficiently heat the target but long enough to provide minimal heating of the epidermis.

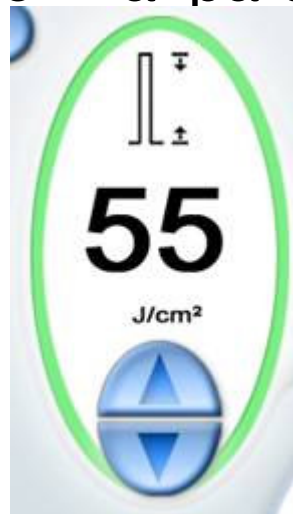


- Microvasculature (such as capillary loops) in Laser Genesis procedure: 0.3 ms
- Fine telangiectasia/fine hair: 10-20 ms
- Spider veins/coarse hair: 20-30 ms
- Reticular leg veins: 40-60 ms
- For bulk heating of dermis with Titan, common pulse durations are 3-5 seconds.

Fluence

energy of entire laser pulse (J)

- Fluence = $\frac{\text{energy of entire laser pulse (J)}}{\text{area of light beam where it strikes the skin (cm}^2\text{)}}$
- Describes energy density of entire pulse, independent of pulse duration
- Fluence is typically the final parameter adjusted, based on clinical response.



Fluence & Pulse Duration Combinations: Peak Power

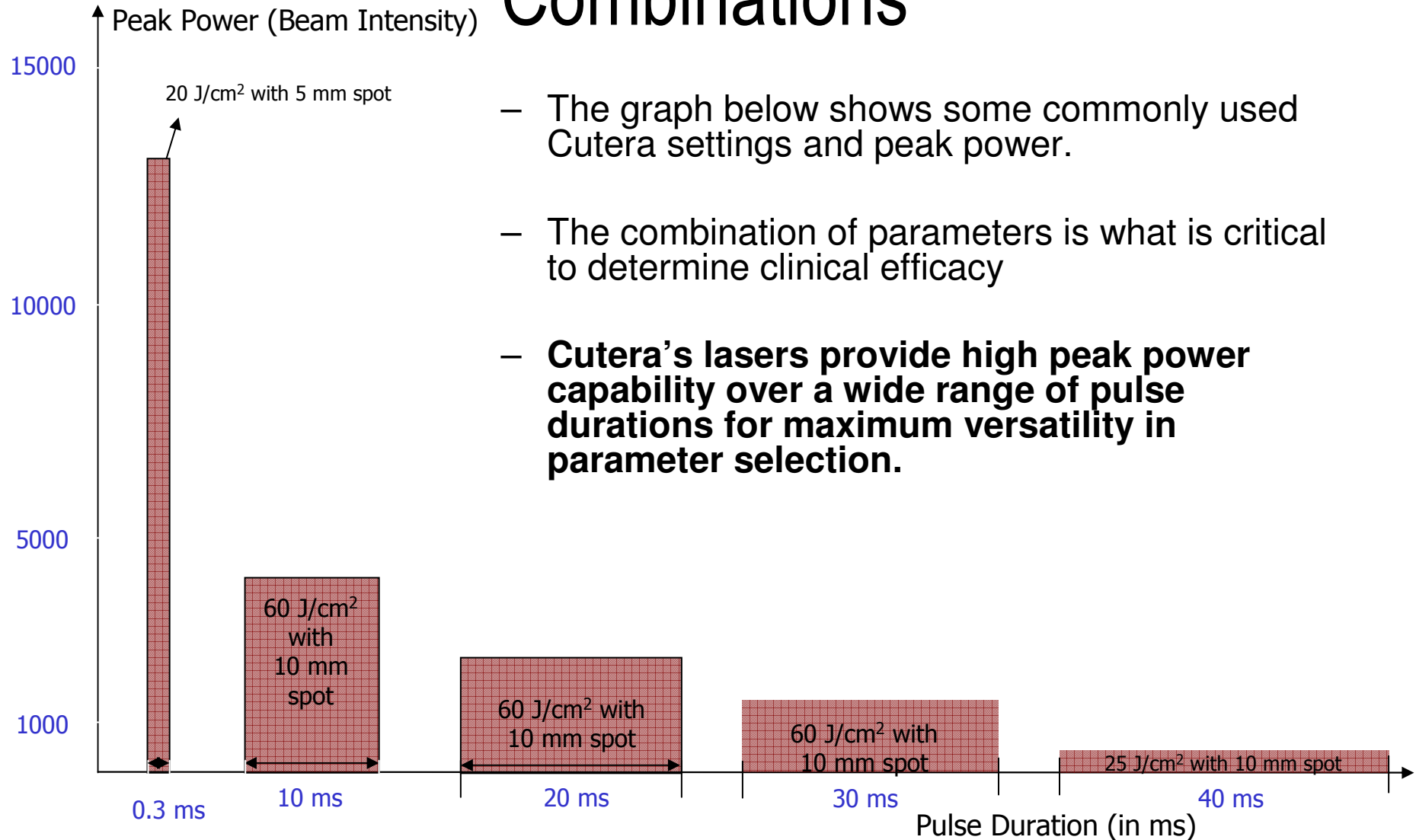
- One of the unique features of Cutera lasers is their ability to provide a wide range of fluence settings at a wide range of pulse durations.
 - **High fluences at short pulse durations require the ability to produce a lot of light in a short amount of time (high peak power).**

$$\text{Peak Power (W)} = \frac{\text{Energy (J)}}{\text{Pulse Duration (sec)}}$$

$$\text{Peak Power (W)} = \frac{\text{Fluence (J/cm}^2\text{)} * \text{Beam diameter}^2 \text{ (cm}^2\text{)} * \pi/4}{\text{Pulse Duration (sec)}}$$

Fluence, Pulse Duration & Spot Size

Combinations



- The graph below shows some commonly used Cutera settings and peak power.
- The combination of parameters is what is critical to determine clinical efficacy
- **Cutera's lasers provide high peak power capability over a wide range of pulse durations for maximum versatility in parameter selection.**

VISIA



Vascular Treatments

Cutera Workshop Presentation

Telangiectasia of the Legs

Spider Veins (0.5 – 1.5 mm)

-blue, purple or red



Fine Spider Veins

(< 0.5 mm)

-red

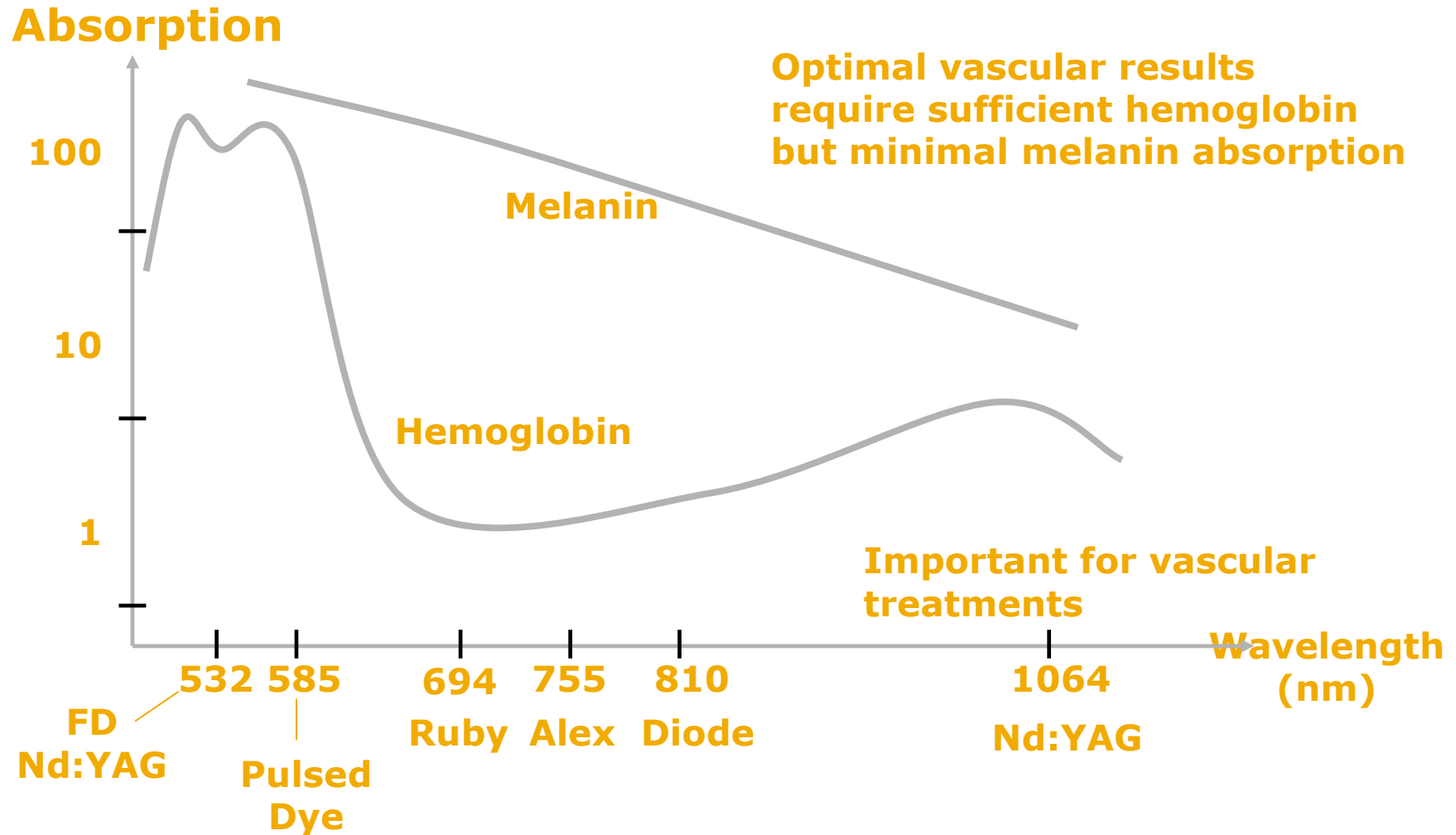


Deep Reticular Veins (1 – 4 mm)

-blue

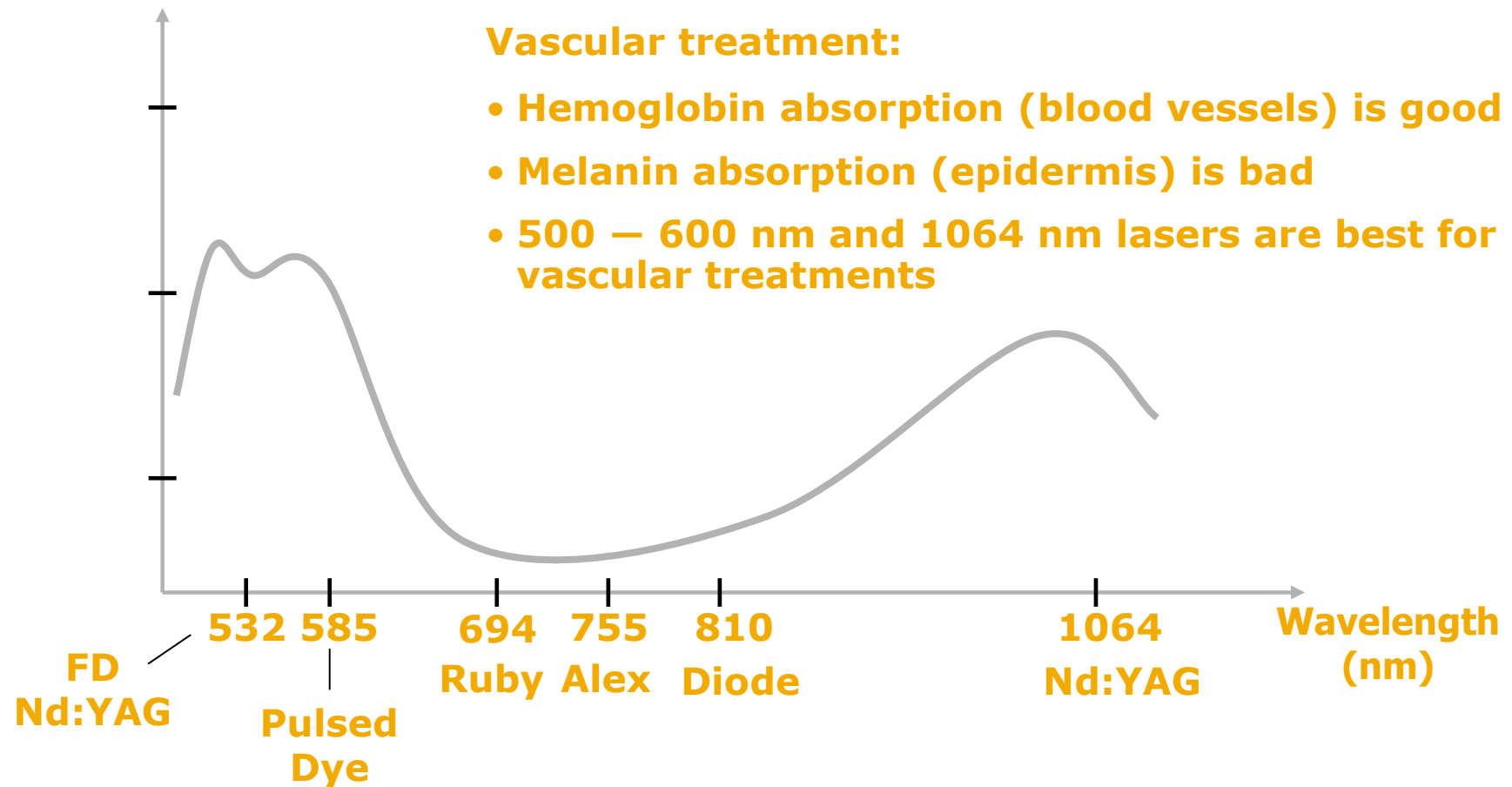
Patients want all vessels treated

Review of Absorption by Wavelength



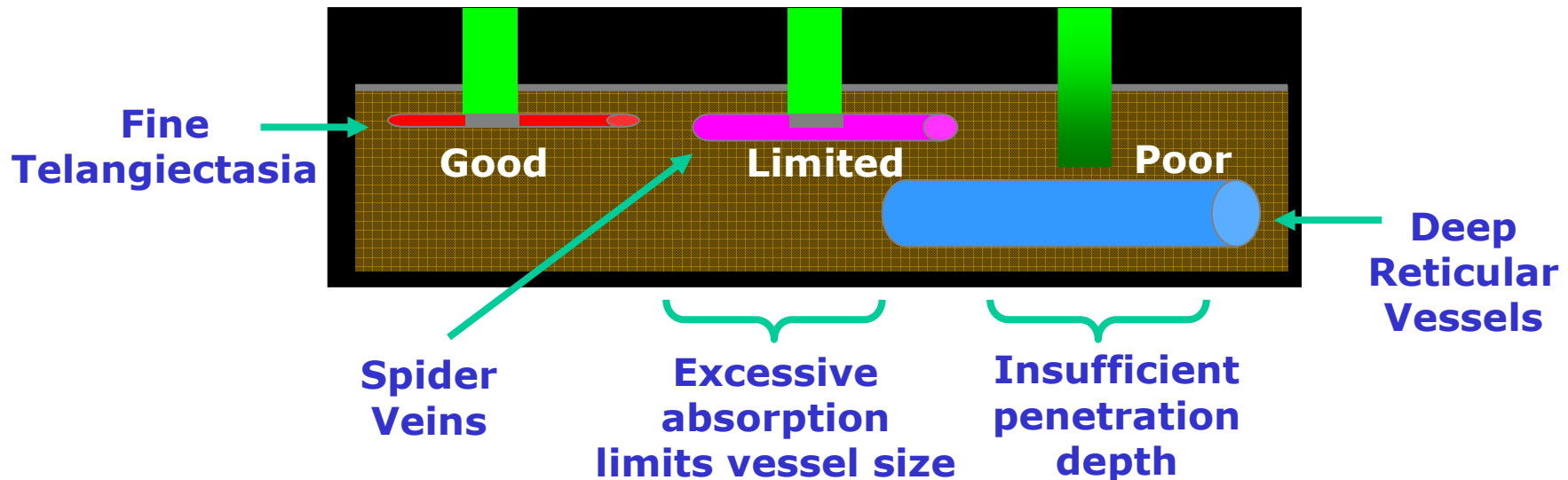
Ratio of Hemoglobin to Melanin Absorption

Hemoglobin/Melanin Absorption



Penetration Depths – Shorter Wavelengths

- Green/Yellow Wavelengths (500 – 600 nm)
 - High hemoglobin absorption - good for small veins, not large
 - High melanin absorption – not as gentle on epidermis
 - Low penetration depth
 - Incidence of purpura with pulsed dye lasers



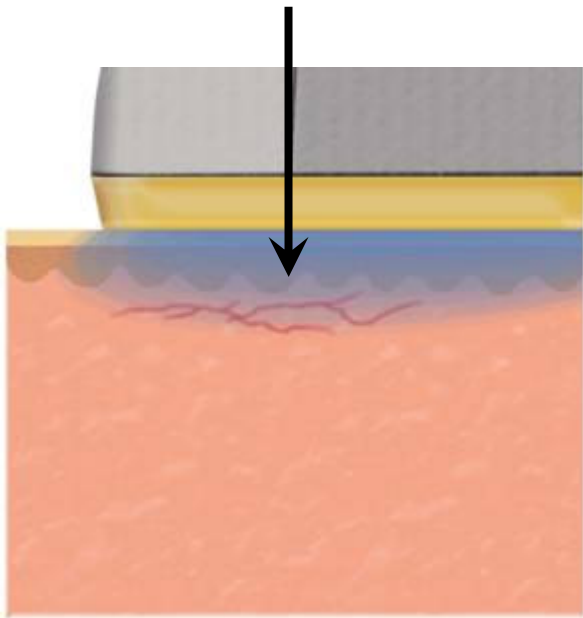
Easy-to-Use Handpiece



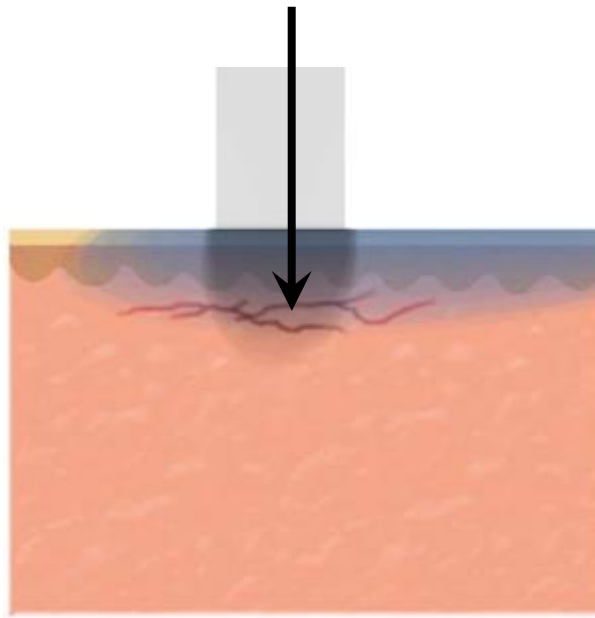
CoolGlide vascular handpiece with variable spot sizes (3, 5, 7 & 10mm)

Vascular Treatment

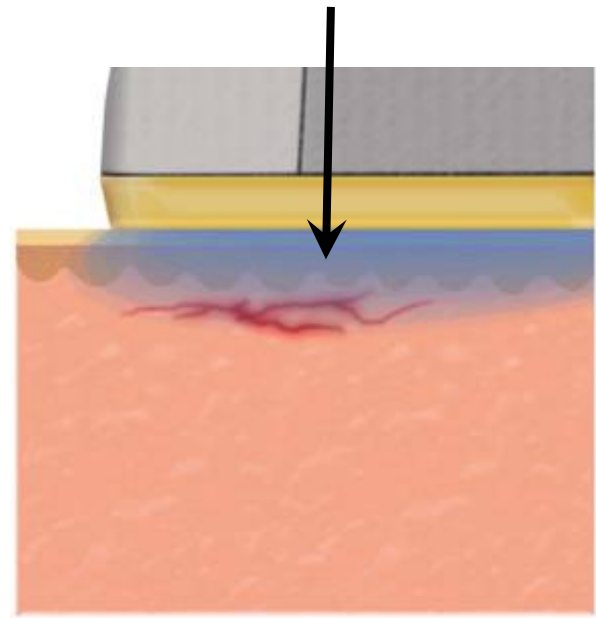
**Cool
Epidermis**



**Apply Laser
Pulse**



**Post Cool Over
Damaged Vessel**



Parameters for Vein Treatments



Vessel Type	Spot Size	Fluence	Pulse Width
Facial Telangiectasia	3mm	110—160 J/cm ²	10-30ms
Fine Leg Telangiectasia <0.5mm diameter	3mm 5mm	130-200 J/cm ²	10-25ms
Spider leg veins 0.5-1.5mm	3mm 5mm	110-160 J/cm ² 110-150 J/cm ²	20-40ms
Deeper Reticular Leg Veins 1-3.5mm	7mm 10mm	80-130 J/cm ² 80-100 J/cm ²	30-60ms

Telangiectasia on the Chin



Cherry Angioma on Upper Thigh

Parameters – One pulse @ 150 J/cm², 30 ms, 5 mm



Before Treatment

Wavelength
Well Absorbed
by Hemoglobin



Telangiectasia on Left Cheek

Parameters – 135 J/cm², 20 ms, 3 mm



Before Treatment



3 Weeks After 3rd Treatment

Telangiectasia on Left Cheek



Photos Courtesy of Dr. Kevin Smith

Spider Veins on Upper Thigh

Parameters – 135-165 J/cm², 20-25 ms, 5 mm

Parameters – 180 J/cm², 15 ms, 3 mm



Before Treatment

6 Weeks After 1 Treatment

Reticular Vein on Back of Knee



Photos Courtesy of Dr. Arielle Kauvar

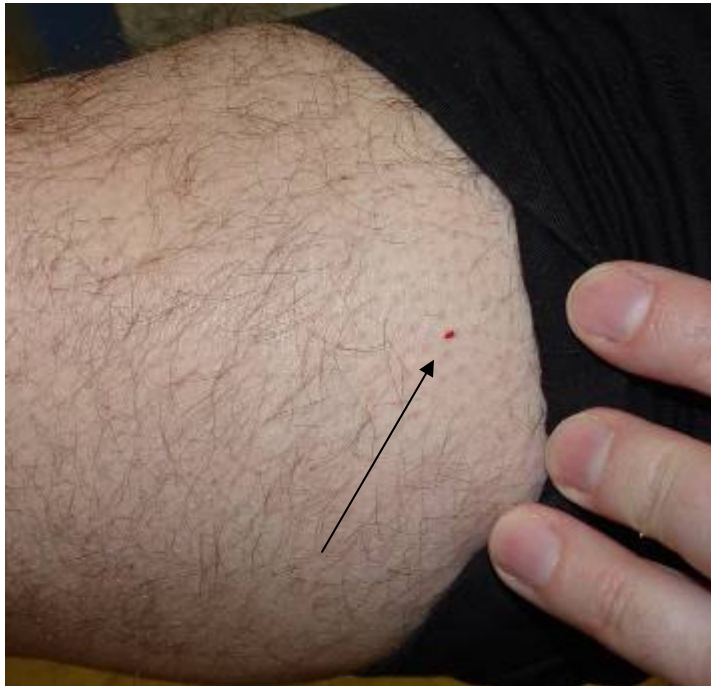
Complementary Vascular Solutions

- CoolGlide Nd:YAG system
 - Gold Standard for all vascular conditions
 - Maximum parameter control (spot size, pulse width)



- AcuTip 500™ for superficial vessels
 - Targeted treatment area
 - Great for facial telangiectasia and pigmented lesions
 - Easy to use, fast learning curve
- CoolGlide Nd:YAG + AcuTip 500 = ultimate versatility

AcuTip 500



Cherry Hemangioma



Thank you

