

Laser-Tissue Interaction & Chromophores

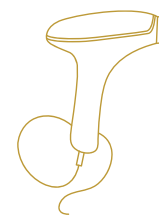
Laser-Tissue Interaction & Chromophores

How laser energy interacts with the skin

Types of Laser–Tissue Interaction

- Absorption – energy taken in by the target (chromophore)
- Reflection – energy bounces off the skin surface
- Scattering – energy spreads within the tissue

When laser energy is delivered to the skin, it can be absorbed, reflected, or scattered. For effective treatments, we want as much energy as possible to be absorbed by the target, while minimizing loss through reflection and scattering.



Maximize absorption = better results with less risk

Chromophore Targeting

Understanding how laser energy selectively targets structures within the skin

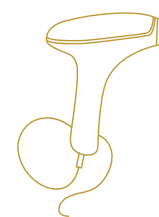
- Melanin – pigment (hair, dark spots)
- Hemoglobin – blood (vascular lesions)
- Water – tissue / collagen

Laser treatments work by targeting specific chromophores in the skin. By selecting the correct wavelength, we can direct energy to these targets and create a controlled treatment effect without damaging surrounding tissue.

Penetration depth

- Depth of penetration varies by wavelength

Longer wavelengths penetrate deeper into the skin



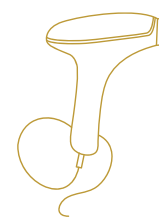
The right wavelength determines what you're treating

Heat & Tissue Response

How absorbed laser energy creates controlled thermal effects in the skin

- Light energy converts to heat
- Heat damages the target structure
- Surrounding tissue is preserved when done correctly

Laser energy that is absorbed by the target is converted into heat, creating a controlled thermal injury. This heat is what produces the desired treatment outcome, whether that's destroying a hair follicle, targeting pigment, or stimulating collagen. Proper settings ensure the energy stays focused on the target while protecting surrounding tissue.



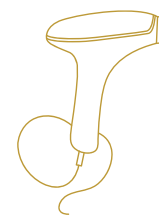
The right wavelength determines what you're treating

Selective Photothermolysis

The process of using laser energy to selectively target and heat a specific structure without damaging surrounding tissue

- Specific wavelength targets a chromophore
- Energy is absorbed and converted to heat
- Heat damages the target
- Surrounding tissue remains protected

Selective photothermolysis is the principle that allows us to safely and effectively treat the skin with laser. By choosing the correct wavelength and settings, we can selectively heat and destroy the intended target while minimizing damage to surrounding tissue.



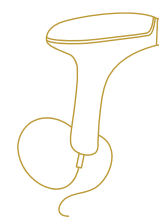
Right target + right settings = safe, effective treatment

Energy Delivery Matters

Understanding how laser settings control energy delivery and treatment outcomes

- Fluence = energy delivered
- Pulse duration = time energy is applied
- Spot size = treatment area

Laser settings directly influence how energy interacts with the skin. By adjusting fluence, pulse duration, and spot size, we can control how deeply energy penetrates, how heat is distributed, and how effectively the target is treated while minimizing risk to surrounding tissue.



These settings determine how energy interacts with tissue and impact both safety and results