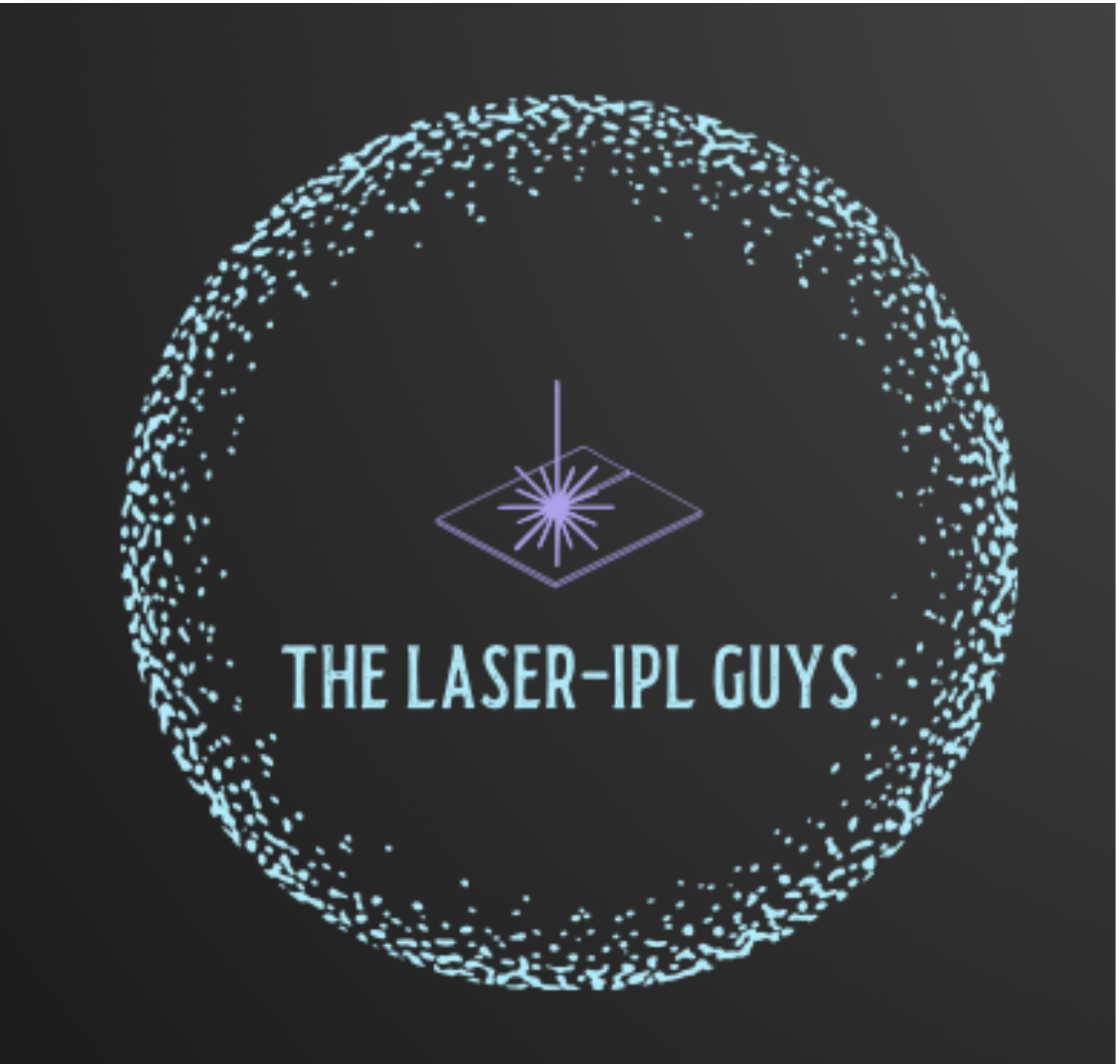
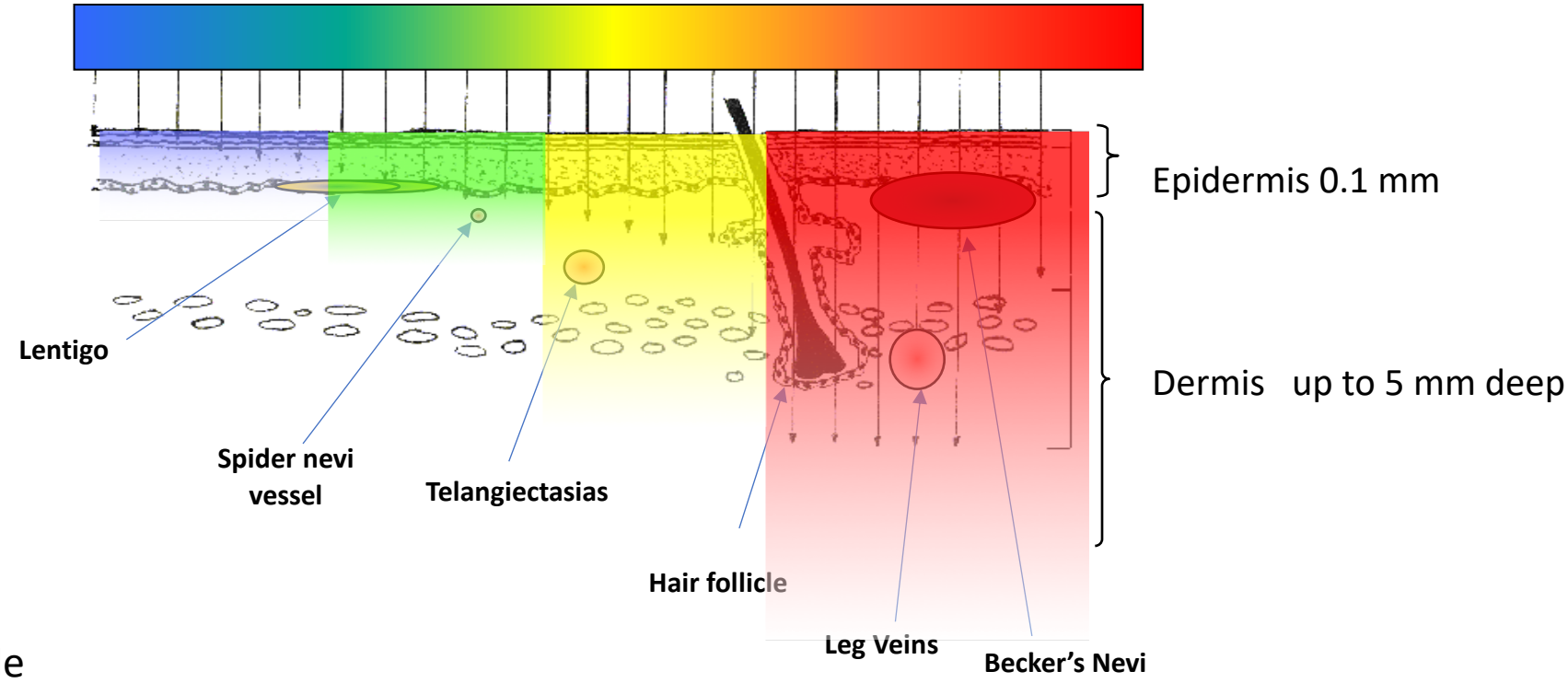


Light Penetration into the Skin and Absorption – How are they Related?

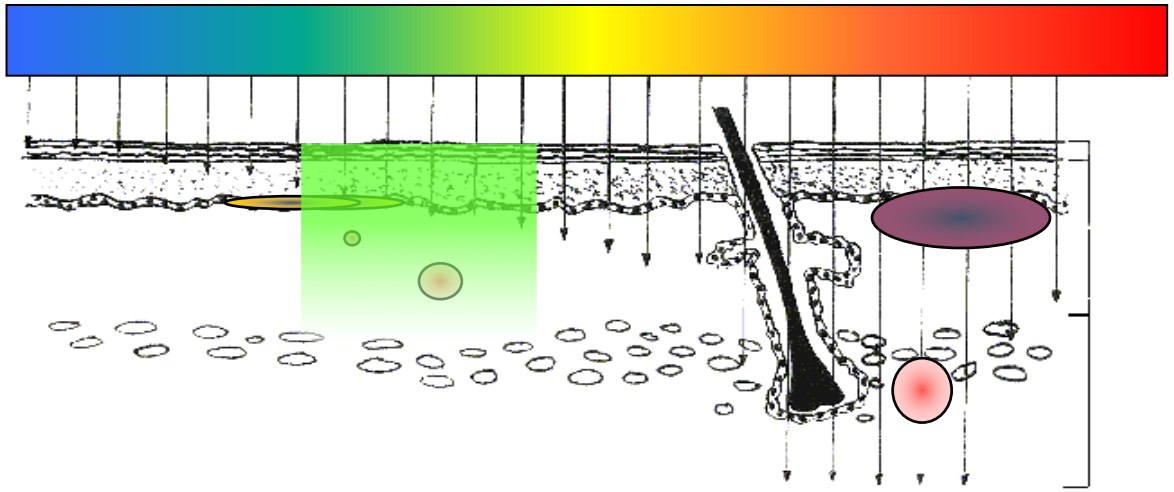
Light Penetration in Skin and Absorption – How are they related?

Wavelength	400 - 500nm	500 - 550nm	550 - 600nm	600 - 1100nm
Penetration depth	0.1 – 0.2 mm	~ 0.6 mm	~ 2 mm	~ 6 mm



Not to scale

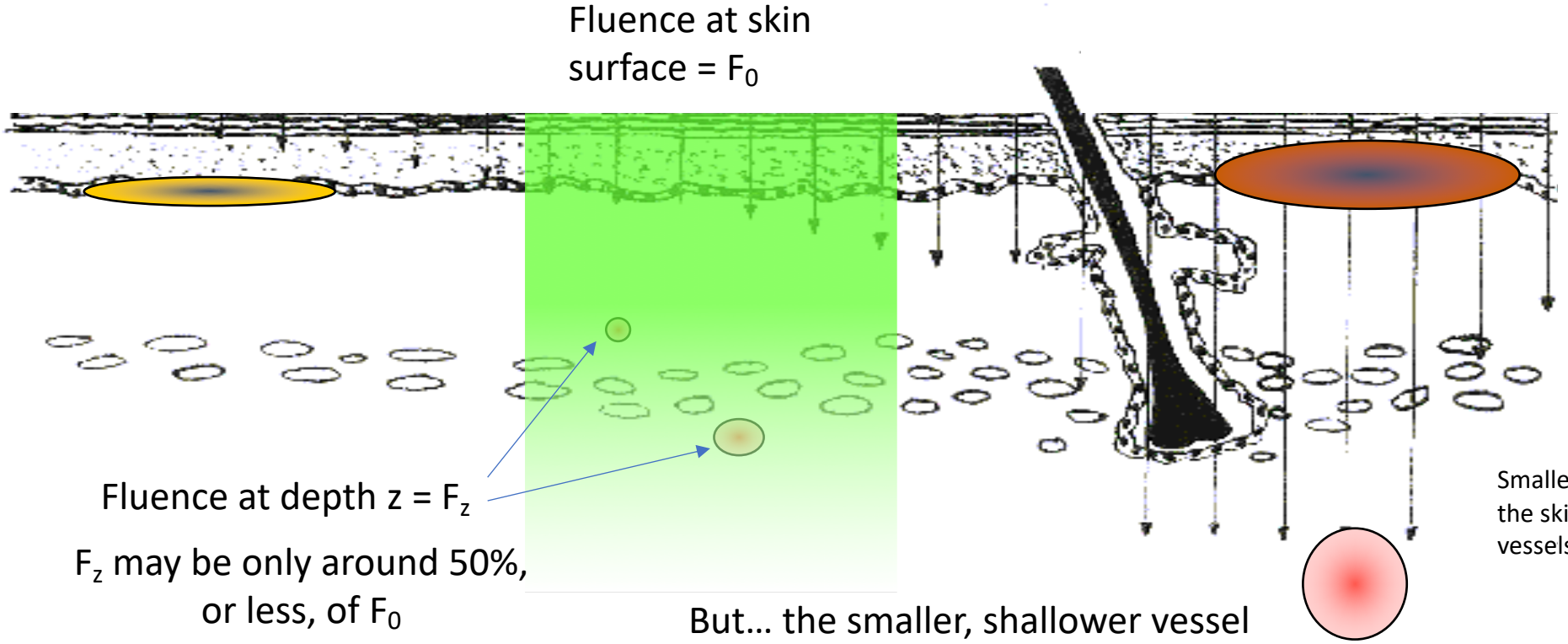
Light Penetration in Skin



Not to scale

Absorption

Fluence at skin surface = F_0



Fluence at depth z = F_z

F_z may be only around 50%, or less, of F_0

Absorption coefficient is the same for both of these vessels

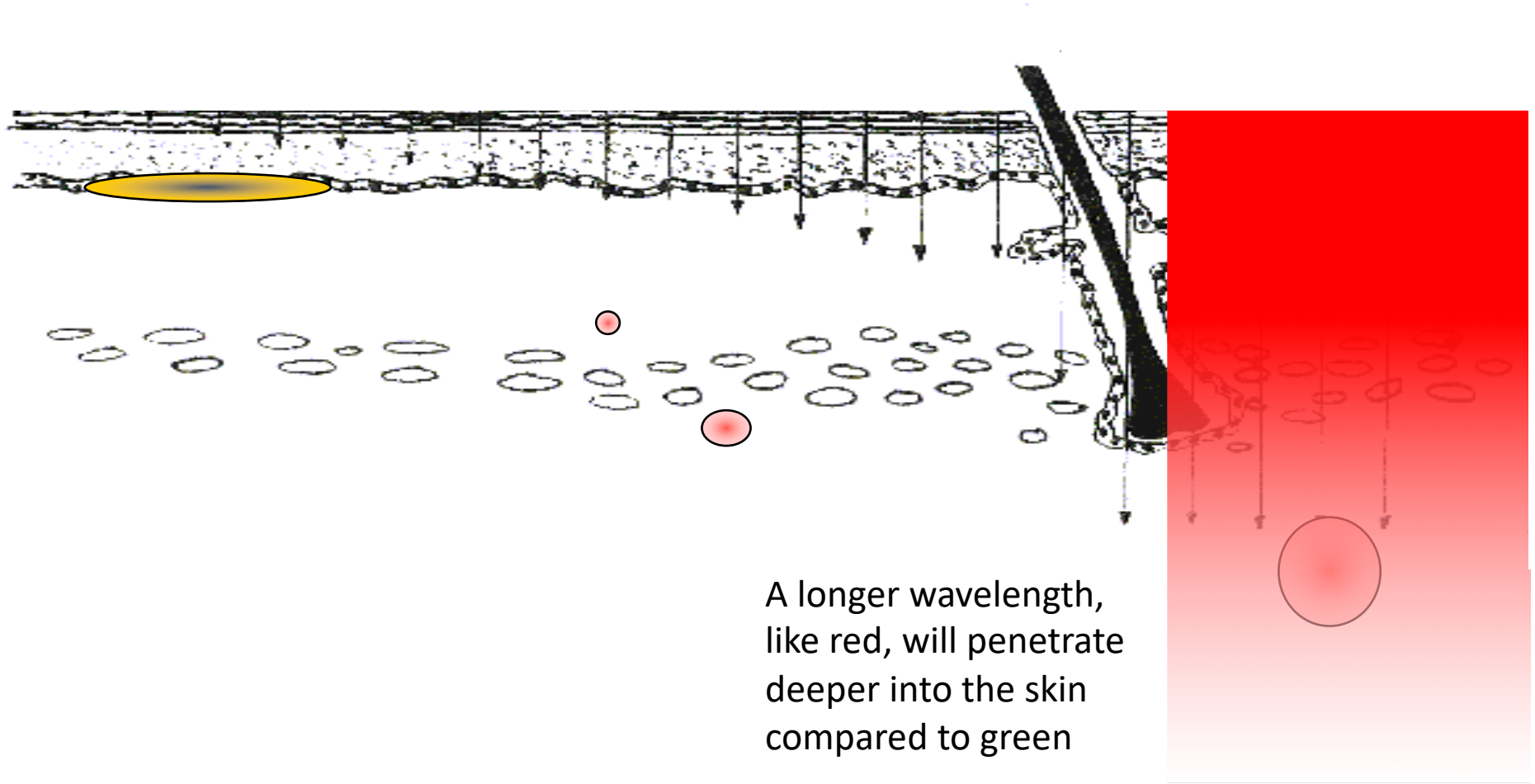
But… the smaller, shallower vessel may absorb MORE energy than the bigger, deeper vessel

Smaller vessels tend to be nearer the skin surface, while larger vessels tend to be deeper…

So, the smaller vessel disappears, while the larger vessel survives

Not to scale

Different wavelength



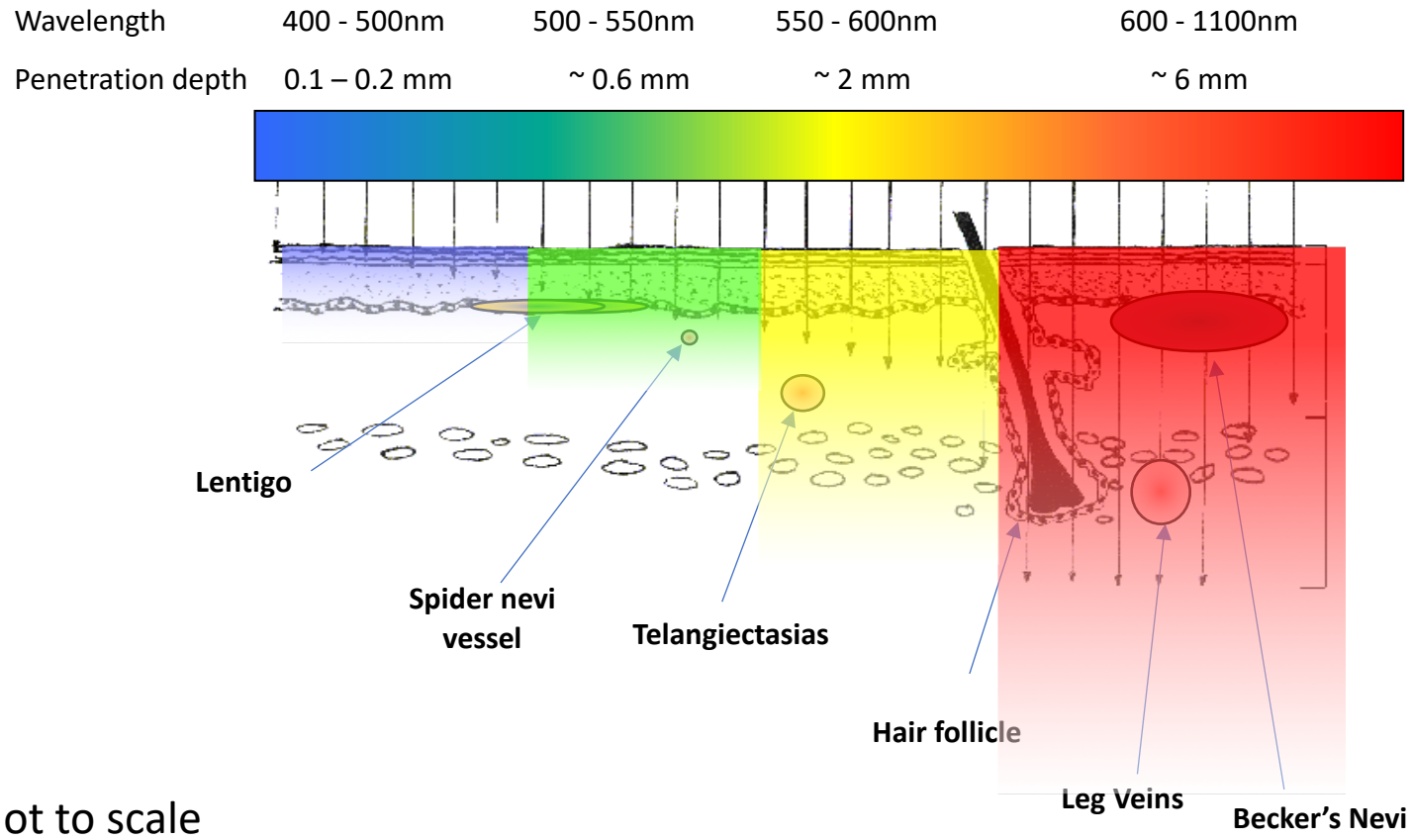
A longer wavelength, like red, will penetrate deeper into the skin compared to green

But, the absorption coefficient at red is much less than that at green!

So there is less heat generated by the absorbed red light energy

Not to scale

Wavelength and Absorption



Not to scale

The temperature rise in the targets depend on both the amount of light energy which reaches the depth of the target

AND the amount actually absorbed by the target:

i.e. wavelength
and
absorption coefficient

Thanks for listening

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