
LED LIGHT THERAPY • QUICK REFERENCE

What the Research Actually Says

Wavelengths, evidence, FDA clearance, and safety
for home LED skin devices

Where the evidence is strongest

LED devices sit under the broader umbrella of photobiomodulation (PBM): low-level light triggering biological responses in skin cells rather than heating or cutting tissue. Decades of research (including early NASA-funded wound-healing work) cluster around three wavelength bands. Everything else on a color wheel is a smaller, thinner body of evidence.

Band	Typical range	What it's linked to	Evidence depth
Blue	~405–420 nm	Activates porphyrins in <i>C. acnes</i> bacteria; used for mild-moderate acne	Strong, FDA-cleared indications
Red	~620–660 nm	Fibroblast stimulation linked to collagen and fine-line reduction	Strong, FDA-cleared indications
Near-infrared	~800–850 nm	Deeper tissue penetration; pain, circulation, wound support	Strong, FDA-cleared indications
Green / Yellow / Cyan / Purple	~490–590 nm (varies by maker)	Marketed for pigmentation, redness, calming; mechanisms less defined	Limited, mostly preliminary or anecdotal

A 7-color chart isn't wrong to publish, it's just worth knowing which three rows carry most of the clinical weight.

Two studies worth knowing

Acne, blue + red combination — A 12-week home-use trial in the *British Journal of Dermatology* (PMID 23278295) tested 420nm blue and 660nm red LED on 35 people with mild-to-moderate acne. The treatment group saw roughly 77% fewer inflammatory lesions and 54% fewer non-inflammatory lesions, with no meaningful change in the sham-light control group.

Wrinkles, red vs amber — A 2023 split-face randomized trial (Mota et al., PMID 36780572) compared 660nm red against 590nm amber PBM over 10 sessions in 137 women aged 40–65. Both wavelengths reduced periorcular wrinkle volume by around 30% on objective imaging, with no strong winner between the two.

Neither study proves a specific mask or device will produce those numbers for a specific person. They show the mechanism has been tested in controlled conditions, which is a different claim than a product page promising results.

What “FDA-cleared” actually means

FDA clearance (510(k)) means a device was reviewed as substantially equivalent to an already-legal device for a specific, narrow indication, not that the FDA endorses every claim on the box. A device can be cleared for “mild acne” and still be marketed with broader anti-aging or pigmentation language that was never reviewed. Worth checking:

- Which specific wavelength(s) the clearance covers, not the device as a whole
- Whether the indication matches your actual concern (acne vs. wrinkles vs. pain)
- Irradiance (mW/cm^2), not just wavelength, since output strength varies a lot between brands

Realistic timelines

Concern	Typical frequency	When people usually notice a change
Acne (blue)	3–4x / week	2–4 weeks
Fine lines (red)	4–5x / week	4–10 weeks, cumulative
Redness / sensitivity	2–3x / week	Varies; less standardized data

Safety checklist before you start

- Use goggles or closed eyes with bright red/blue panels
- Cleanse skin first, don't layer over heavy actives
- Clean the device panel between sessions
- Skip it if pregnant without checking with a doctor first
- Skip it with epilepsy or a photosensitive medication
- Stop if you get persistent redness beyond a session or two

The takeaway

Blue, red, and near-infrared carry the bulk of the clinical evidence and most FDA clearances. Extra colors on a 7-panel chart aren't necessarily useless, they're just resting on thinner research, so treat those claims as directional rather than proven.

Sources: British Journal of Dermatology (PMID 23278295); Photobiomodulation, Photomedicine, and Laser Surgery, Mota et al. 2023 (PMID 36780572); U.S. FDA 510(k) device clearance framework.

This guide is educational and not a substitute for advice from a dermatologist or physician.