Photobiomodulation (PBM) for Hair Growth: Evidence and Protocols

What is Photobiomodulation?

Photobiomodulation (PBM), also known as red light therapy or low-level laser therapy (LLLT), utilizes red and near-infrared light to enhance cellular function, stimulate blood flow, and reduce inflammation. In the context of hair growth, PBM is believed to activate dormant hair follicles, extend the anagen (growth) phase, and improve scalp vascularization.

PBM is a promising non-invasive treatment for androgenetic alopecia (male and female pattern baldness), telogen effluvium, and hair thinning related to aging, stress, or hormonal imbalance. Its safety and ease of application make it ideal for home use with devices like the SPRB and GRPB.

Clinical Benefits for Hair Growth

1. Androgenetic Alopecia (AGA)
- A 2020 systematic review of 11 RCTs confirmed that PBM significantly increases hair density and hair shaft diameter in AGA patients. [Live link](https://pubmed.ncbi.nlm.nih.gov/31952976/)
- A 26-week study found that PBM improved hair count by 35–40% compared to baseline, with no adverse effects. [Live link](https://pubmed.ncbi.nlm.nih.gov/27012933/)

2. Telogen Effluvium and Stress-Related Hair Loss
- PBM improved hair regrowth in patients with telogen effluvium caused by hormonal changes, medication, or stress. [Live link](https://pubmed.ncbi.nlm.nih.gov/31403061/)

3. Hair Quality and Scalp Health
- Studies show PBM improves hair shine, thickness, and overall scalp microcirculation, contributing to healthier hair regrowth. [Live link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3944668/)

Mechanistic Evidence

PBM acts on the mitochondria within dermal papilla cells to increase ATP production and stimulate growth factor release (e.g., VEGF, IGF-1). It improves oxygen delivery, enhances angiogenesis, and reduces local inflammation in the scalp, enabling better follicle cycling and reactivation of miniaturized follicles. [Live link](https://pubmed.ncbi.nlm.nih.gov/32038251/)

Suggested Protocols: SPRB & GRPB

1. SPRB – Focused treatment for crown and hairline
- Wavelength: 660 nm (red) 50% + 850 nm (near-infrared) 50%
- Application: Place belt gently on the scalp along thinning areas (e.g., frontal hairline, vertex)
- Duration: 15 minutes per session – 3x per day until sufficient growth has been achieved
- Frequency: 1× per day week for maintenance once results have been achieved
- Benefit: Targets localized hair loss regions and supports follicular regeneration

2. GRPB – For full scalp stimulation
- Wavelengths: 660 nm (1/3) + 850 nm (2/3)
- Application: Drape across the entire scalp or wrap across top of the head using a flexible headband configuration
- Duration: 15 minutes per session x 2 equals 30 minute treatment – 3x per day until sufficient growth has been achieved
- Frequency: taper to 3 - 5× weekly for ongoing scalp maintenance
- Benefit: Promotes overall scalp circulation and systemic effects, especially for diffuse hair thinning

Avoid oil-based products before treatment. Apply PBM to a clean, dry scalp for optimal light penetration.

📌 Monitoring & Safety Tips

- PBM is painless and free from adverse side effects.
- Consistent use over at least 12–16 weeks is necessary to observe meaningful changes.
- Safe for use in men and women across most hair loss types.

👨‍⚕️ Conclusion

Photobiomodulation offers an evidence-backed, non-invasive approach to stimulate hair regrowth and improve scalp health. With consistent use of SPRB and GRPB devices, users can expect improved hair density, reduced shedding, and enhanced confidence. PBM's ease of use and proven biological effects make it a reliable solution for both early and established stages of hair loss.

Disclaimer

The information provided in this document is for educational and informational purposes only. It is not intended as a substitute for professional medical advice, diagnosis, or treatment. Individuals should always consult with a licensed physician or qualified healthcare provider before beginning any new therapy, including the use of photobiomodulation (PBM) devices.

PBM devices such as the SPRB and GPRB are wellness tools designed to support general health and well-being. They are not medical devices and are not intended to diagnose, treat, cure, or prevent any disease or medical condition. No medical claims are made or implied. Results may vary based on individual factors, and PBM should not be considered a replacement for appropriate medical care.