

# 810 nm Photobiomodulation (PBM) Protocol for the Head/Brain

This document outlines clinical-style protocol guidelines for the use of 810 nm Near-Infrared (NIR) light in transcranial photobiomodulation (PBM). The parameters are derived from published studies and best-practice recommendations. These are research-based reference values and not prescriptive medical advice.

## General Dosage Parameters

Wavelength	810 nm (NIR)
Irradiance (at scalp)	10–100 mW/cm <sup>2</sup> (keep <250 mW/cm <sup>2</sup> )
Fluence (at scalp)	10–60 J/cm <sup>2</sup>
Fluence (at cortex)	2–10 J/cm <sup>2</sup> (after transmission losses)
Time per site	10–20 minutes
Sessions	2–5x per week for 4–12 weeks
Mode	Continuous Wave or Pulsed (10–40 Hz common)

## Condition-Specific Suggested Parameters

Condition	Parameters
Traumatic Brain Injury (TBI)	810 nm, 20–60 J/cm <sup>2</sup> per site, 10–20 min, 3–5x/week, CW or 10 Hz pulsed
Alzheimer's / Dementia	810 nm, 10–40 J/cm <sup>2</sup> , 20 min, 3x/week, pulsed 40 Hz (gamma entrainment)
Depression / Anxiety	810 nm, 10–20 J/cm <sup>2</sup> , 10–15 min, 2–3x/week, CW or 10 Hz pulsed
Migraine / Headache	810 nm, 10–20 J/cm <sup>2</sup> , 10 min, 2–3x/week, CW
Cognitive Enhancement	810 nm, 10–30 J/cm <sup>2</sup> , 10–15 min, 2–3x/week, pulsed 40 Hz

## Safety Notes

- Avoid irradiance above 250 mW/cm<sup>2</sup> at the scalp to prevent heating.
- Use protective eyewear if light source could reach the eyes.
- Contraindications: active brain tumors, recent intracranial bleeding, photosensitive epilepsy (caution with pulsing).
- Ensure consistent application sites (frontal, temporal, parietal).
- Long-term safety data is promising but still under investigation.