

# Transcranial Pulsed Current Stimulation: A Scoping Review of the Current Literature on Scope, Nature, Underlying Mechanisms, and Gaps.

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## Abstract

Transcranial pulsed current stimulation (tPCS) is a promising non-invasive brain stimulation technique that has gained considerable attention in recent years. The purpose of this review is to provide an overview of the existing literature on tPCS, examine the scope and nature of previous research, investigate its underlying mechanisms, and identify gaps in the literature. A search of online databases resulted in 36 published tPCS studies from inception until May 2023. These studies were categorized into three groups: human studies on healthy individuals, patient studies with pathological conditions, and animal studies. The findings suggest that tPCS has the potential to modulate brain excitability by entraining neural oscillations and utilizing stochastic resonance. However, the mechanisms underlying the effects of tPCS are not yet fully understood and require further investigation. Furthermore, the included studies indicate that tPCS may have therapeutic potential for neurological diseases. However, before tPCS can be applied in clinical settings, a better understanding of its mechanisms is crucial. In this regard, the tPCS studies were categorized into four types of research: basic, strategic, applied, and experimental research, to identify the nature of the literature and gaps. Analysis of these categories revealed that tPCS, with its diverse parameters, effects, and mechanisms, presents a wide range of research opportunities for future investigations.

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