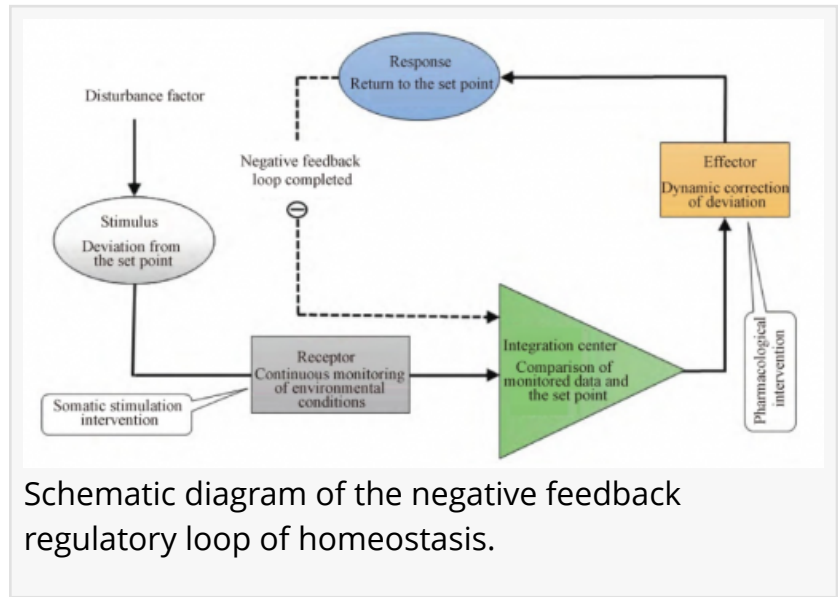


# How acupuncture maintain the body's internal balance through bidirectional regulatory effect

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Physiological balance is fundamental to health, yet this process rarely operates in a single direction. This study re-examines the widely cited “bidirectional regulation” effect of acupuncture based on modern neurobiological theories, proposing that therapeutic outcomes arise from coordinated activation of two sets of relatively independent regulatory systems rather than a single, self-contradictory mechanism. By analyzing how acupuncture influences [homeostasis](#) across blood pressure, digestive, metabolic, and urinary functions, the research clarifies how opposing physiological states—such as excess and deficiency—are stabilized through different neural pathways. This paper elaborates on the acupuncture’s negative feedback mechanisms and their bidirectional regulatory patterns, and offer a more precise framework for understanding how targeted somatic stimulation contributes to systemic balance.



Homeostasis—the dynamic equilibrium of the internal environment—is a core principle of physiology and a cornerstone of traditional Chinese medical thought. Disruptions in this balance, whether excessive or insufficient, can lead to disease. Conventional biomedical interventions often act directly on effector organs, sometimes bypassing endogenous feedback systems. In contrast, acupuncture has long been described as capable of restoring balance in opposite pathological states, a concept known as “bidirectional regulation.” However, this notion has often been applied broadly without sufficient mechanistic clarity. Based on these challenges or due to these unresolved questions, there is a need to conduct in-depth research into how acupuncture modulates physiological process.

Researchers from the Institute of Acupuncture and Moxibustion, China Academy of Chinese Medical Sciences, reported their findings (DOI: [10.13702/j.1000-0607.20250005](https://doi.org/10.13702/j.1000-0607.20250005)) in May 2025 in the journal of [Acupuncture Research](#). The study systematically analyzed experimental and

clinical evidence to elucidate how acupuncture recruits autonomic and central regulatory circuitry to sustain homeostasis. By integrating neurophysiology, homeostatic theory, and clinical observations, the authors propose a refined model in which different acupoints activate distinct neural circuits, collectively contributing to the stabilization of physiological set points rather than producing contradictory effects through a single pathway.

The study demonstrates that physiological stability depends on bidirectional regulatory mechanisms comparable to opposing yet coordinated forces, such as sympathetic and parasympathetic activity. Acupuncture exerts its effects by engaging these mechanisms through somatic afferent inputs that converge on integration centers within the nervous system, including but not limited to the brain. Experimental evidence shows that stimulation of acupoints located in specific spinal segments can produce segmental sympathetic reflexes, while stimulation at other sites triggers systemic responses mediated by supraspinal centers.

Importantly, the research distinguishes between two functional modes of acupoint action. The first type, referred to as “homotopic acupoints,” exerts specific regulatory effects on target organs innervated by the same spinal segment through somatic–sympathetic–visceral reflex pathways. The second type, known as “heterotopic acupoints,” modulates organ function across spinal segments via somatic–parasympathetic–visceral reflexes. This framework explains why the same acupoint may appear to produce opposite clinical effects—such as alleviating both diarrhea and constipation—by acting on different target organs or regulatory loops. The findings also clarify why acupuncture often shows greater efficacy in conditions characterized by regulatory insufficiency rather than excessive pathological activity.

According to the study’s author, acupuncture should not be understood as a single stimulus producing inherently opposite outcomes. Instead, its effects emerge from structured interactions between somatic inputs and autonomic regulation. “Overextending the concept of bidirectional regulation risks obscuring the true biological logic of acupuncture,” the author noted. By grounding acupuncture theory in established neurophysiological principles, the study provides a clearer scientific basis for acupoint selection and challenges assumptions that have limited both experimental reproducibility and clinical interpretation.

This refined understanding of acupuncture’s regulatory mechanisms has important implications for both research and clinical practice. By distinguishing segment-specific from system-level effects, practitioners can design more precise treatment strategies aligned with the underlying neural pathways of disease. For researchers, the framework offers testable hypotheses that bridge traditional concepts with modern neuroscience, potentially improving experimental design. More broadly, this study provides a solid and objective scientific explanation for the bidirectional regulatory effect of acupuncture from the perspectives of modern neuroscience and life sciences, and the articulation of the homeostatic negative feedback regulatory loop and the classification theory of unit acupoints–collective acupoints lays a foundation for constructing a modern theoretical framework for acupuncture and for advancing its clinical standardization.

## References

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