



# Mechanistic Theory of Acupuncture for Insomnia Based on Parasympathetic Nervous System Mediation

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**Abstract:** Insomnia is one of the most common sleep disorders worldwide and has become a major public health concern. Acupuncture has long been used to treat insomnia, and clinical studies have confirmed its effectiveness. However, most existing research still explains its therapeutic mechanisms through separate, isolated pathways. A unified regulatory framework is currently lacking. This paper, therefore, attempts to fill that gap. We combine modern neurobiological findings with traditional Chinese medicine (TCM) theory and propose a mechanistic model of acupuncture for insomnia with parasympathetic regulation as its core. To develop this model, we conducted a literature-based theoretical analysis. We reviewed three main topics: (1) the pathogenesis of insomnia in modern medicine and TCM; (2) the role of the parasympathetic nervous system in sleep regulation; and (3) current evidence showing that acupuncture modulates autonomic activity and sleep-related neurotransmitters (e.g., serotonin, GABA, acetylcholine, norepinephrine, dopamine). Based on this evidence, we propose a “parasympathetic-Yin-Yang Ti-Yong integration model”. According to the present data, insomnia can be regarded as a disorder of the autonomic nervous system characterized by decreased parasympathetic activity and an increase in sympathetic activity. This pattern is in line with the TCM pathomechanism of “excessive Yang due to Yin deficiency” and “failure of Yang to enter Yin”, and clinical and mechanistic studies have found that acupuncture can stimulate the parasympathetic nervous system, reduce sympathetic overactivity, and regulate the neurotransmitter system mentioned above. In our model, the parasympathetic nervous system is considered a modern physiological manifestation of Yin, and the sympathetic nervous system corresponds to Yang. Therefore, it is expected that acupuncture will treat insomnia by “supporting Yin and restraining Yang”. That is to say, it is hoped that it can adjust the balance of the autonomic nervous system at a physiological level to promote the transition from wakefulness to sleep. Based on this system, we can optimistically select acupoints according to syndrome diagnosis, adjust stimulation parameters, and use combination therapy reasonably to optimize acupuncture therapy for insomnia. In short, this model has provided an all-system theoretical basis for the effect of acupuncture on insomnia and may serve as an effective foundation for future clinical and mechanistic studies.

**Keywords:** Acupuncture; Insomnia; Parasympathetic nervous system; Autonomic nervous system; Yin-Yang Ti-Yong

**Online publication:** September 20, 2026

## 1. Introduction

Insomnia is a common sleep disorder. It seriously harms both physical and mental health. Epidemiological studies report that about 10% of adults have chronic insomnia, and many more experience intermittent sleep problems <sup>[1]</sup>. Insomnia not only lowers quality of life and daytime function, but it is also closely linked to depression, anxiety, cardiovascular disease, and other chronic conditions. As a result, it places a heavy burden on individuals and on healthcare systems.

Current mainstream treatments fall into two categories: drug therapy and psychological-behavioral interventions. Hypnotic drugs can relieve symptoms quickly, but long-term use often runs into problems such as tolerance, dependence, residual sedation, and cognitive side effects. Non-drug approaches, like cognitive behavioral therapy for insomnia, work well and are relatively safe. However, wider use is limited by long treatment cycles, poor patient adherence in some cases, and a shortage of trained professionals. Therefore, finding complementary therapies that are safe, effective, and practical for clinical use remains an important goal in insomnia research.

Acupuncture has been used to treat insomnia for centuries, and modern studies confirm its clinical benefits <sup>[2]</sup>. Growing evidence points to the autonomic nervous system as one of the key routes through which acupuncture produces its therapeutic effects <sup>[3]</sup>. In people with insomnia, autonomic dysfunction typically appears as increased sympathetic activity together with reduced parasympathetic activity <sup>[4,5]</sup>. This pattern matches the hyperarousal model of insomnia proposed in modern medicine. Therefore, the parasympathetic nervous system becomes a natural focus for understanding how acupuncture works for insomnia.

But even with more research on how acupuncture works, most existing studies still focus on single indicators, one or two neurotransmitters, or just one signaling pathway. We still lack a broader theoretical framework that puts parasympathetic regulation at the center.

So, in this paper, we try to build that framework. We combine modern neurobiology with TCM theory and propose a mechanistic model where parasympathetic mediation is the core of acupuncture treatment for insomnia.

Specifically, we review three main topics and then propose a theoretical model:

- (1) How modern medicine and TCM explain the cause of insomnia;
- (2) What the parasympathetic nervous system does during sleep;
- (3) What evidence shows that acupuncture can change parasympathetic function;
- (4) A theoretical model based on Yin-Yang Ti-Yong, which links autonomic regulation with the TCM view of insomnia. We also discuss what this framework might mean for clinical practice, specifically, how it could help optimize acupuncture treatment.

## 2. Pathogenesis and physiological basis: A comparative framework

### 2.1. Understanding insomnia: Modern and TCM perspectives on pathogenesis

In modern medicine, the hyperarousal hypothesis is one of the most influential explanations for insomnia. It says that people with insomnia stay in a constant state of high central and autonomic arousal. This shows up as too much sympathetic activity and too little parasympathetic activity. As a result, they have trouble falling asleep, staying asleep, and feel tired during the day <sup>[5]</sup>. This hyperaroused state also closely links to activation of the hypothalamic-pituitary-adrenal axis and higher cortisol secretion, which keep the body awake. Heart rate variability (HRV) is a common tool to measure autonomic nervous system function. Patients with

insomnia often show reduced high-frequency (HF) power—which reflects parasympathetic activity—along with increased low-frequency (LF) power and a higher LF/HF ratio. These changes point to a sympathovagal imbalance<sup>[5]</sup>. In addition, problems with neurotransmitter systems also play a role in insomnia. Patients often have lower levels of inhibitory neurotransmitters like gamma-aminobutyric acid (GABA) and serotonin (5-HT), and higher levels of excitatory ones such as norepinephrine and dopamine<sup>[6]</sup>.

In TCM, insomnia falls under the category of Bumei. It is seen as a disorder of Yin-Yang imbalance, especially the failure of Yang to enter Yin. Classic texts like the Huangdi Neijing describe insomnia this way: defensive Qi (Wei Qi) cannot enter the Yin domain and stays in Yang instead, which keeps the person awake. From the Yin-Yang Ti-Yong perspective, the normal state of the body can be described as a balanced and mutually regulating state of Yin and Yang. If this balance is disrupted, Yang may fail to enter Yin, resulting in insomnia.

## 2.2. Convergence between TCM and modern medicine

Modern medicine and TCM actually share a lot of common ground when it comes to understanding insomnia. If we look at broad function, sympathetic activity is excitatory, activating, and outward-directed; these traits resemble the TCM attributes of Yang. Parasympathetic activity, on the other hand, is restorative, inhibitory, and inward-conserving, which fits the description of Yin. So, too much sympathetic activity can be seen as “Yang excess”, and not enough parasympathetic activity as “Yin deficiency”. From this angle, the autonomic imbalance we see in insomnia can be understood as a modern physiological expression of “exuberant Yang due to Yin deficiency” and “failure of Yang to enter Yin”.

This connection gives us a useful bridge between the two theoretical systems. If we think of autonomic balance as one of the physiological foundations of “Yin being tranquil and Yang being secured”, then treatments that reduce sympathetic overarousal and boost parasympathetic function can reasonably be seen as restoring Yin–Yang harmony. This bridge matters especially for acupuncture research. Why? Because the traditional principle of “regulating Yin and Yang” may, in modern physiological terms, actually mean regulating autonomic function.

## 2.3. Role of the parasympathetic nervous system in sleep regulation

The parasympathetic nervous system is the main neural pathway for the “rest-and-digest” state. It helps the body recover physically, save energy, and fall asleep<sup>[8]</sup>. Its main route is the vagus nerve. This nerve starts from brainstem nuclei, including the dorsal motor nucleus of the vagus and the nucleus ambiguus. It gathers visceral sensory information through the nucleus tractus solitarius. Then higher brain centers, such as the hypothalamus and amygdala, further adjust its activity

During normal sleep, parasympathetic activity slowly goes up as the body moves from wakefulness into non-rapid eye movement (NREM) sleep. At the same time, heart rate and blood pressure go down. Parasympathetic tone usually reaches its highest point during deep sleep. Then, during rapid eye movement (REM) sleep, it becomes relatively suppressed. In REM sleep, sympathetic activity can become more variable and may even increase<sup>[4]</sup>. This back-and-forth change is essential for both falling asleep and staying asleep. In people with insomnia, lower parasympathetic tone can make it harder to shift from wakefulness to sleep. As a result, they may stay in a long-lasting state of physical alertness<sup>[5]</sup>. So, from both a modern medical and a TCM viewpoint, restoring parasympathetic activity seems to be an important target for treating insomnia.

### 3. Evidence for acupuncture-mediated parasympathetic regulation

#### 3.1. Overall evidence that acupuncture modulates autonomic function

Research on how acupuncture works has shifted from just observing its effects to looking for neurobiological explanations. More and more studies now suggest that acupuncture can regulate autonomic function. As a result, heart rate variability (HRV) has become one of the most common objective markers in this field <sup>[3]</sup>.

Hamvas and colleagues did a systematic review and meta-analysis <sup>[9]</sup>. They looked at randomized controlled trials that tested how acupuncture affects HRV. Their main finding: real acupuncture significantly raised HF power, but sham acupuncture did not produce similar changes. Real acupuncture also lowered the LF/HF ratio, which points to better sympathovagal balance.

These results support the idea that acupuncture can boost parasympathetic tone and adjust autonomic function, beyond what you would expect from a placebo effect.

#### 3.2. Clinical evidence in insomnia based on heart rate variability

Clinical studies on insomnia also support the idea that acupuncture can regulate autonomic function.

Take the study by Guo and colleagues <sup>[2]</sup>. They used a method called tiaoshen acupuncture to treat patients with primary insomnia. The acupoints they selected included Baihui (GV20), Shenting (GV24), Sishencong (EX-HN1), Benshen (GB13), Shenmen (HT7), Neiguan (PC6), and Sanyinjiao (SP6).

After four weeks of treatment, the patients' Pittsburgh Sleep Quality Index scores improved a lot.

At the same time, their HRV indices showed some clear changes: LF power and the LF/HF ratio went down, while HF power went up. That means less sympathetic overactivity and more parasympathetic activity.

Zhao et al. investigated transcutaneous auricular vagus nerve stimulation for primary insomnia by stimulating auricular regions corresponding to the heart and kidney within the auricular concha <sup>[10]</sup>. After four weeks of treatment, the total Pittsburgh Sleep Quality Index score decreased significantly, the proportion of deep sleep increased, and sleep latency was shortened. HRV analysis showed significant increases in HF power and improvements in the LF/HF ratio; time-domain indices, such as the standard deviation of normal-to-normal intervals and the root mean square of successive differences, also increased. The auricular concha gets its nerve supply from the auricular branch of the vagus nerve. That explains why these findings offer fairly direct anatomical and physiological support for an "ear-vagus-brainstem" pathway. Thus, the acupuncture-like stimulation can activate the parasympathetic nervous system and induce sleep in people.

#### 3.3. Evidence that acupuncture regulates sleep-related neurotransmitters

Neurotransmitter imbalance is another key part of how insomnia works.

Serotonin and GABA are both inhibitory and can help one sleep well at night. Acetylcholine can promote REM sleep in humans and animals.

Norepinephrine, dopamine, and orexin are more closely tied to wakefulness and arousal.

In people with insomnia, inhibitory neurotransmitter activity often goes down, while arousal-promoting systems become overactive <sup>[6]</sup>.

Acupuncture seems to influence this chemical balance.

Li and colleagues looked at the evidence and found that acupuncture may improve sleep structure by regulating several neurotransmitters: 5-HT, GABA, acetylcholine, norepinephrine, dopamine, and orexin <sup>[6]</sup>. Reported effects include raising serum GABA and 5-HT levels and lowering norepinephrine and dopamine.

These changes can reduce nighttime awakenings, increase total sleep time, and improve sleep architecture.

Zhu et al. reported a study where acupuncture was combined with a Yin-nourishing, fire-clearing, spirit-calming herbal formula <sup>[11]</sup>. They treated patients whose insomnia fit the pattern of Yin deficiency with hyperactive fire. After treatment, 5-HT and GABA levels went up, dopamine went down, and sleep quality got better.

Put all together, it looks like acupuncture will help you with sleep because it does more than change your autonomic function; it could be helping to balance how chemicals in the brain are used as well. 3.4. Potential pathways for acupuncture to activate the parasympathetic system Place this heading on a separate line.

In terms of the transmission process from acupoints through the signals that will lead to some organs that would be considered as targets, probably there will be several sorts of pathways; in particular, the autonomic nerve is an intermediary <sup>[3]</sup>.

At the local level: Stimulation of a certain body part would activate peripheral nerves at that location. And it might also set off some automatic reaction because of being in close vicinity (local), as far as reflex and neural networks go, in that area.

Let's say we take the auricular concha. You can make that one directly excite the vagal afferents. And the ones that end up coming through and going through the jugular ganglion before they go into the nucleus tractus solitarius. From there, they have an effect on output from the dorsal motor nucleus of the vagus and the nucleus ambiguus. And the end result is sympathetic control over the heart and guts being messed around with <sup>[10]</sup>.

Central level. Acupuncture signals can go up the spinal cord to the brainstem and subcortical areas. Once up there, they become part of several autonomic nuclei. The following are some: nucleus tractus solitarius, nucleus ambiguus, ventrolateral medulla, hypothalamus (paraventricular nucleus), amygdala, and insular cortex <sup>[3]</sup>.

Nucleus tractus solitarius is among the most noticeable of these. It is also the main way station for information from within one's body. Also, it might be very important for transferring peripheral acupuncture signals to autonomic adjustments.

Acupuncture activates the "nucleus tractus solitarius - nucleus ambiguus - vagus nerve" axis as a relatively precise way to enhance parasympathetic output.

Also, acupuncture could have an effect on the NE system. How? Through modification of the activity of the hypothalamic-pituitary-adrenal axis, reducing cortisol levels, restoring the normal melatonin circadian rhythm, and regulating sleep-associated neurotransmitters. With it, we can move from being overly excited to something that is going to make for better slumber <sup>[3]</sup>.

## **4. Theoretical construction: From Yin-Yang dysregulation to parasympathetic activation**

### **4.1. Proposal of a parasympathetic-Yin-Yang Ti-Yong integration model**

As for what has been reviewed before, I think that this is a "parasympathetic-Yin-Yang-Ti-Yong integration model", and it can clarify the effect of acupuncture on insomnia. This model uses ancient Chinese medicine theory called Yin-Yang along with how your body's nervous system (parasympathetic) works, supported by modern evidence on insomnia and autonomic function changes due to acupuncture.

## 4.2. Theoretical core: the parasympathetic nervous system as a modern expression of Yin

In accordance with the Traditional Chinese Medicine concept, it's about being asleep and awake because you get those waxes and un-waxes from Yin-Yang. When it's time for us to fall asleep, Yang has gone inwards and Yin rules; when it's time to get up, Yin leaves, and Yang appears outwards. In this framework, insomnia occurs when Yang fails to enter Yin and remains externally active..

From the perspective of functional correspondence, the parasympathetic nervous system promotes rest, conservation, nourishment, and recovery, all of which closely resemble the traditional attributes of Yin, namely quietness, inwardness, restraint, and nourishment. By contrast, the sympathetic nervous system supports vigilance, mobilization, outward action, and stress responsiveness, which resemble the attributes of Yang, namely excitation, outward movement, activation, and defense. The balanced interaction of these two systems is similar to the dynamic balance of Yin and Yang that maintains physiological homeostasis.

On this basis, the parasympathetic nervous system may be understood as a modern physiological expression of Yin, while the sympathetic nervous system may be regarded as a physiological expression of Yang. Therefore, if our Autonomic Nervous System's state was to be described in terms of Traditional Chinese Medicine theory, the corresponding state would be one that has an abundance of Yin with enough Yang contained within it. By contrast, insomnia is characterized by excessive sympathetic activation and insufficient parasympathetic regulation, corresponding to Yin deficiency with excessive Yang and failure of Yang to enter Yin.

## 4.3. Mechanism of acupuncture as “supporting Yin and restraining Yang”

Our model proposes that acupuncture treats insomnia by supporting Yin and restraining Yang. In physiological terms, this means enhancing parasympathetic activity while reducing sympathetic overactivity, thereby restoring a balanced and mutually regulating state of Yin and Yang and normalizing the sleep-wake cycle.

Understand the mechanism at three levels.

Structural level: Acupuncture might be able to fire up neural circuits associated with parasympathetic activity. Which is helping Yin have an operational base. Like when you stimulate the ear concha, it goes right into the auricular branch of your vagus nerve <sup>[10]</sup>. Needle-puncturing points like Neiguan (PC 6) and Shenmen (HT 7) could affect the brainstem's autonomous centers through ascending nerve pathways <sup>[3]</sup>.

Functional level: Acupuncture could adjust neurotransmitters and help the body fall asleep. GABA, Serotonin: Excitement inhibitors; norepinephrine, Dopamine: Inhibition exciters <sup>[6,11]</sup>. This way of doing it, acupuncture helps the central nervous system move from being excited to calmer and at rest. In TCM terms, this process may be understood as helping Yang enter Yin.

Systemic level: And it could also have wider effects on things like your whole neuroendocrine system, helping out with that bigger stuff, getting that overall body back in some kind of harmony. To regulate the HPA axis and reduce the chronic stress response. So the body is able to switch out of this constant state of alertness, and towards something that is much more settled internally <sup>[3]</sup>. This sort of full-body healing lines up with TCM thoughts on harmony between Yin and Yang.

## 4.4. Clinical implications of the model

The model cannot just say how acupuncture works but also possibly has an application with clinical

treatment.

And if our primary purpose is getting parasympathetics excited, stopping our centers from being hyper-aroused, and balancing out those Yin and Yang, then in deciding which points to utilize we must follow three general laws of selection.

We need to concentrate on acupoints or stimulation areas that have access straight up into the parasympathetic path. In other words, we're talking about the heart and kidneys portion of that auricular concave<sup>[10]</sup>.

Second, it calms the mind and decreases middle awakening as well. Baihui (GV20), Shenting (GV24), Sishencong (EX-HN1), Shenmen (HT7), Neiguan (PC6)<sup>[2]</sup>.

Third, treatment must adhere to syndromic differentiation, for the goal is general regulation of Yin-Yang. Selecting such points as Sanyinjiao (SP6), Zusanli (ST36), and Taixi (KI3) for a particular type, if we wish, so that we might be able to bring about some internal kind of physiological harmony and balance<sup>[11]</sup>.

This way, we get to meaningfully mix up our current knowledge on the structure of your brain with those old-school ways they talk about what happens in your body when something bad goes down.

## 5. Application of the model: Strategies to Optimize acupuncture treatment for insomnia

### 5.1. Syndrome-based acupoint selection

In our framework, the main treatment goal is to support Yin and restrict Yang. Do this by enhancing the parasympathetic system and reducing sympathetic overactivity.

But each type of imbalance has its own pattern. We then want to look at the specific symptoms and use that as a basis for finding the best acupoint to use.

Insomnia from Yin deficiency with hyper-fire. In this case, what we really have to do is that it has its source in kidney Yin, and then a secondary kind of an attack of this sort of kind of situation with respect to fire that disturbs the Shen. It's like a thing that just keeps being there, like when you have the same old problems over again without anything new happening<sup>[11]</sup>. When that happens, it's like, okay, but on the non-restorative, like sympathetic, it can go down.

So, treatment should focus on points that nourish Yin, like Sanyinjiao (SP6) and Taixi (KI3). At the same time, we can use auricular heart and kidney points to engage vagal pathways, plus Shenmen (HT7) and Neiguan (PC6) to calm the mind<sup>[2,10]</sup>.

Heart-spleen deficiency insomnia. When insomnia comes from heart-spleen deficiency, the main problem is that qi and blood are low. This means the spirit does not get enough nourishment.

For treatment, we can focus on Zusanli (ST36) and Sanyinjiao (SP6). These two points help tonify Qi and blood.

At the same time, we add calming points: Shenmen (HT7), Neiguan (PC6), Baihui (GV20), and Sishencong (EX-HN1). They help calm the mind and support central regulation<sup>[2]</sup>.

Liver depression turning into fire insomnia. When insomnia is caused by liver depression that turns into fire, the condition shows more signs of excessive Yang-type activity. Patients often have emotional ups and downs.

For treatment, we can use Taichong (LR3) and Xingjian (LR2) to soothe the liver and clear fire. We may

also add calming points like Baihui (GV20) and Shenting (GV24). In addition, auricular vagal-related points can help counter the dominance of sympathetic activity<sup>[10]</sup>.

## 5.2. Optimization of stimulation parameters based on parasympathetic activation

Acupoint selection is not the only thing that matters. Stimulation parameters can also change how acupuncture affects the autonomic nervous system.

**Stimulation site.** The auricular branch of the vagus nerve is the only place on the body surface that has direct vagal distribution. It lies mainly in two areas: the cyma conchae and the cavum conchae. So, when our goal is to activate parasympathetic afferent pathways, stimulating the ear becomes especially important<sup>[10]</sup>.

**Stimulation frequency.** Studies in animals and humans show that different electroacupuncture frequencies can lead to different autonomic effects.

For low frequencies like 2-10 Hz, it might be able to excite the parasympathetic more. In contrast, high frequencies can possibly have other or lesser effects on autonomic function<sup>[3]</sup>.

Zhao et al.<sup>[10]</sup> applied a sparse-dense wave at 4/20 Hz and reported increases in HF power, RMSSD, and SDNN, accompanied by improved sleep outcomes. The authors suggested that these changes might involve enhanced parasympathetic activity.

**Timing of treatment.** Parasympathetic activity increases with the onset of sleep. This way, we can fall asleep<sup>[4]</sup>.

It stands to reason, then, for acupuncture and other such neuromodulatory techniques to be scheduled in the hour or so leading up to bedtime. This way, treatment lines up with the body's own circadian and autonomic rhythms.

## 5.3. Synergistic effects of combination therapies

And it says that we should also be able to do it if we use a combination of strategies. At various levels: peripherally, centrally, behaviorally, and systemically.

First: combining peripheral and central regulation

Transcutaneous auricular vagus nerve stimulation mainly targets peripheral vagal afferents. Body acupuncture, on the other hand, uses calming and spirit-regulating points. It may produce stronger effects through central limbic-cortical and brainstem networks<sup>[2,10]</sup>. When we put them together, they can give us a complementary effect: peripheral initiation with central maintenance.

Second: combining acupuncture with breathing training

Slow, deep breathing from the diaphragm is known to boost vagal tone and raise HF power in HRV<sup>[4]</sup>. Doing breathing exercises before bed—for example, paced slow breathing—can help amplify the sleep-promoting effects of acupuncture.

Third: combining acupuncture with cognitive behavioral therapy for insomnia (CBT-I)

Behavioral therapy works on poor sleep habits and unhelpful thoughts. It has good long-term results, but it often takes time before patients feel clear relief<sup>[1]</sup>. Acupuncture, on the other hand, can improve symptoms and sleep structure relatively quickly<sup>[2,10]</sup>. So, acupuncture can fill the gap while behavioral therapy takes effect.

Fourth: combining acupuncture with herbal medicine. Zhu and colleagues reported good results when they combined acupuncture with a herbal formula<sup>[11]</sup>. The formula was designed to nourish Yin, clear fire,

and calm the spirit. They used it in patients whose insomnia fit the pattern of Yin deficiency with hyperactive fire.

In theory, herbal medicine works by helping the body regulate Yin and Yang on a systemic level. Acupuncture, on the other hand, may offer more targeted modulation of neural pathways.

## **6. Limitations and future directions**

### **6.1. Limitations**

But this paper only provides an integrated theory; it must be acknowledged that we must also be sure it doesn't work.

First of all, it was theoretical and literature-based research; there was no newly conducted medical experiment. That way, it'll only have to go off what information the rest of us already know, whether our findings were as good as the ones we've found before, and whether or not those were just the sort that would be true for everyone.

Second, it does make sense as a general matter of the way in which concepts work (it has what we might call "face validity") and seems at first blush like something that could actually be useful in a clinical setting. But we still have no way to verify if it is really capable of doing so, let alone predicting what happens when people go through real life.

Thirdly, we lack sufficient proof at some essential points, such as which exact points of the body's system correspond with any given acupuncture point, what kind of link could be formed between changing numbers in the things that stimulate us, and exactly when alterations in our autonomic nervous system would turn into something good for someone's sleep.

### **6.2. Future directions**

Future research should go in several directions.

We want big, multi-center randomized controlled studies<sup>[1]</sup>. Those trials will be to check if acupuncture has an effect on self-regulation in various kinds of insomnia cases. The best thing is that it combines poly with HRV. This gives us a concrete means to examine both sleep structure and autonomic regulation.

Neuroimaging and neurophysiological studies would be able to do that. Acupuncture engages central autonomic nuclei like the nucleus tractus solitarius, nucleus ambiguus, and hypothalamus.

More studies on the acupoints themselves and what each one does (its specificity), as well as dose-response relationships, are needed. Includes frequencies of stimulation and intensities of the treatment, and when to do the treatment.

And now comparative studies of effectiveness. Could look at it in connection with some other things, like maybe acupuncture. This will show up to us if those things which are made based off this Parasympathetic-Yin-Yang Ti-Yong concept actually do have any meaningful, measurable, and relevant impacts on someone's medical experience out there in reality?

## **7. Conclusion**

Insomnia, we can see it both with today's neuroscience and traditional Chinese medicine as just some issue about how your brain's trying to go from being awake and wide-eyed to just being at ease.

We do see an association between the kind of unbalanced nerves we now know to be true and that old-school Chinese medicine that goes under the name of “the Yin/Yang pattern”.

Specifically, reduced parasympathetic tone as well as an increase in sympathetic tone seems analogous to the TCM pathologies: “excessive Yang from a Yin deficiency” and “failure of Yang to enter Yin”.

As is clear from the evidence, it could be possible that acupuncture enhances sleep in many other ways. Activating parasympathetic pathways, reducing sympathetic over-arousal, balancing neurotransmitters, and adjusting the neuroendocrine stress system.

Based on this kind of proof, I would offer up something called my “parasympathetic-Yin-Yang Ti-Yong integration mode,” which will give me some kind of a way to look at how everything is connected. So, what does it tell us when the needle goes into your head? Does it work? How do people who have insomnia get better with these needles?

As per us, the Parasympathetic Nervous System is an expression of the Yin in the human body. On the contrary, the sympathetic nervous system is Yang. So maybe acupuncture helps to make things better with sleep because it would be supporting the Yin and controlling the Yang.

It would also possibly assist in enhancing how we use treatments in practical situations. Choose according to TCM patterns: pick acupoints, adjust stimulation parameters for parasympathetic, and combine them smartly.

We still need some more real-life studies to check them out. Even if that is true, it can help promote integration of conversations about TCM and neurobiology as modern science tries to understand why and how acupuncture might relieve people of insomnia.

## Funding

Key Specialty Project of Traditional Chinese Medicine in Chaoyang District, Beijing (Tuina Department) (Project No.: Chaoweitongzi [2023] No. 233); Key Research Project on Postgraduate Education and Teaching Reform, China Academy of Chinese Medical Sciences (CACMS): “Development of a High-Quality SPOC Course for Tuina Clinical Reasoning and Practice Based on the Concept of Case-Based Learning (CBL)” (Project No.: JG24-04); Weight Health Management Cultivation Team Project, Wangjing Hospital, China Academy of Chinese Medical Sciences (Project No.: WJYY-PYTD-2025-05)

## Disclosure Statement

The authors declare no conflict of interest.

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