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Review

The Impact of Shenmen and Yin Tang Auriculotherapy on Immune System Enhancement in Individuals Infected with Human Papillomavirus: A Narrative Review Study

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Abstract

Human papillomavirus (HPV) is one of the most common sexually transmitted viral infections and plays a significant role in the development of precancerous lesions and cervical cancer. The immune system plays a crucial role in controlling and clearing this virus. Since complementary therapies, such as auriculotherapy, can modulate immune system function, it is important to investigate the effects of these therapies in individuals infected with HPV. This study was conducted as a review using keywords such as "auriculotherapy," "shenmen," "yin tang," "HPV," and "immune system" in scientific databases including PubMed, Scopus, Web of Science, and Google Scholar. Relevant articles published between 2000 and 2024 were reviewed and analyzed. The findings showed that stimulation of the Shenmen and Yin Tang points in acupuncture and auriculotherapy can contribute to improving immune system function by reducing anxiety, regulating the hypothalamic-pituitary-adrenal (HPA) axis, and increasing the activity of immune cells such as lymphocytes and macrophages. Additionally, other observed effects in the reviewed studies included the reduction of chronic inflammation, improvement in sleep, and an increase in parasympathetic tone. Although initial evidence suggests positive effects of auriculotherapy on immune regulation and improvement of psychological conditions in HPV patients, the lack of extensive and homogeneous clinical trials limits the ability to draw definitive conclusions. Given the safety of these interventions, auriculotherapy can be considered as a complementary approach in the management of HPV patients. Future studies with more precise designs and valid immune indicators are recommended.

Keywords: Auriculotherapy; Shenmen; Yin tang; HPV

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Introduction

Human papillomavirus (HPV[1]) is one of the most prevalent sexually transmitted viral infections worldwide, associated with a range of lesions, from benign to malignant, and is responsible for more than 5% of cancers globally [1,2]. The virus belongs to the *Papillomaviridae* family, and to date, 118 types of the virus have been identified based on biological characteristics, oncogenic potential, and phylogenetic positioning [2]. Approximately 35 types of HPV, commonly found in the genital tract, are classified within the alpha papillomavirus group [3].

Since in many cases the immune system is capable of clearing the virus naturally, about 90% of HPV infections are resolved or become inactive within 1 to 2 years following infection. However, statistics indicate that the majority of women who test positive for high-risk HPV serotypes develop cervical cancer within 3 to 5 years [4]. These viruses can lead to severe infections, with reports showing that infection with a high-risk genotype of the virus occurs in 60% of sexually active individuals during their lifetime. Nonetheless, in some individuals, the virus persists and leads to serious complications. Therefore, enhancing the immune response in these patients plays a vital role in preventing disease progression [1].

In recent years, complementary and alternative medicine methods, including acupuncture and auriculotherapy, have garnered attention as strategies for modulating the immune system [1]. Auriculotherapy is a complementary therapy method that involves the stimulation of the auricle or external ear and is considered a branch of acupuncture in traditional Chinese medicine [2]. It employs various techniques, including electrical stimulation, the use of needles or bead-like patches (such as magnetic beads and herbal beads like Vaccaria), and manual pressure on the ear [2,3]. Auriculotherapy and ear work are based on the rich and extensive connections between the ear and the central nervous system. Acupuncture influences the modulation of endogenous systems, the sympathetic-parasympathetic nervous systems, as well as the endocrine and neuroendocrine systems. Auriculotherapy, being a branch of ear acupuncture, follows a similar process [3]. It has been observed that acupuncture as a therapeutic method can have a general impact on overall body health; however, auriculotherapy, in addition to affecting the general health of the body, can also have an influence on individual internal organs [1]. By stimulating specific points on the ear, the benefits of auriculotherapy can be felt for days or even weeks [4]. Auriculotherapy has been used to treat conditions such as irregular menstrual bleeding, pain relief, anxiety reduction, and improved blood circulation [5,6]. Deep relaxation, brain stimulation, and enhanced immune system function are also among the preventive health benefits of auriculotherapy [1]. Among these, the Shenmen and Yin Tang points are of particular significance due to their documented effects on stress reduction, improvement in sleep quality, and regulation of the neuro-immune system [7-9]. The Shenmen point is one of the most commonly used points in auriculotherapy and has calming properties, helping to reduce stress and anxiety. The Yin Tang point, located between the eyebrows on the forehead, is used to calm the mind and reduce psychological tension [8]. Given the role of chronic stress in weakening the immune system and its connection to the progression of HPV, stimulating these points can help balance the autonomic nervous system and the hypothalamic-pituitary-adrenal axis, potentially enhancing immune responses [1]. Considering that studies on auriculotherapy are limited, and despite extensive searches, no research was found regarding the impact of auriculotherapy on immune system enhancement in individuals infected with the human papillomavirus, this article aims to review the existing evidence regarding the effects of auriculotherapy on the immune system, particularly in individuals with HPV, with a focus on the Shenmen and Yin Tang points.

1 Human Papilloma Virus

Methods

This study was conducted as a narrative review. A systematic search of sources was performed in the PubMed, Scopus, Web of Science, and Google Scholar databases from 2000 to 2024 using the keywords: "Auriculotherapy," "Shenmen," "Yin Tang," "Immune System," "Acupuncture," and their combinations. The included studies comprised review articles, clinical trials, experimental studies, and mechanistic studies related to acupuncture, auriculotherapy, and the immune system. Exclusion criteria included studies unrelated to the topic, non-English articles, or those without access to the full text. Ultimately, approximately 25 reliable sources were selected for the final analysis.

Results

The Role of the Immune System in Controlling HPV

The immune system plays a critical role in clearing the HPV. Cellular immune responses, particularly T lymphocyte activity, are essential in eliminating the virus and preventing the progression of HPV-related lesions. Studies have shown that in patients with an inefficient immune response, HPV infection can become chronic, increasing the risk of cervical neoplasia [9]. The innate immune response is activated through

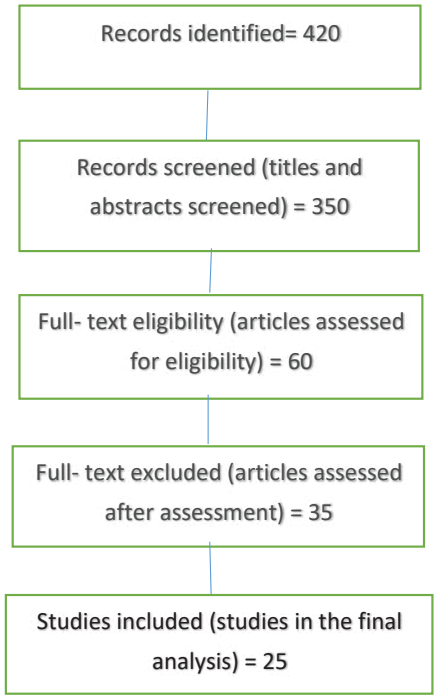

Figure 1. Flowchart: Study Selection

dendritic cells, macrophages, and natural killer cells, which recognize and destroy the virus. However, HPV lacks characteristics such as cell lysis or severe inflammation, which shields it from rapid detection by the innate immune system [10]. The adaptive immune response, particularly the CD4+ helper T cells and CD8+ cytotoxic T cells, plays a vital role in eliminating HPV-infected cells. HPV evades detection by T cells by reducing the expression of MHC-I [2]molecules on infected cells [11]. In patients with immune deficiencies, such as those infected with HIV or organ transplant recipients, the virus clearance rate is lower, and the likelihood of progression to premalignant lesions is higher.

In healthy individuals, approximately 90% of HPV infections are cleared spontaneously within two years, indicating the effectiveness of the body's natural and adaptive immunity. Specific antibodies against HPV, particularly IgG, also play a preventive role in recurrent infections. However, for initial virus clearance, the cellular immune response is of greater importance [12]. In this context, the development of prophylactic HPV vaccines such as Gardasil and Cervarix, which stimulate adaptive immunity, has led to a significant reduction in the incidence of genital warts and cervical cancer [13]. Overall, the immune system's ability to recognize and eliminate HPV determines the clinical outcome of the infection. Impairment of this immune response, whether due to viral factors or host conditions, can lead to chronic infection and the development of neoplastic lesions [14].

2 Major Histocompatibility Complex

Auriculotherapy and Immune System

Auriculotherapy focuses on stimulating specific points on the external ear, and it has broad effects on the autonomic nervous system, which in turn influences the immune system. The human ear contains a map of the entire body, and points such as Shenmen, when stimulated through vagal nerve activation, exhibit calming and anti-stress effects that can enhance immune responses by reducing cortisol levels [15]. Studies have shown that electrical or manual stimulation of specific ear points can regulate cytokine activity and increase the production of T cells and natural killer (NK) cells, which are crucial in antiviral immunity [16]. The Shenmen point, in particular, is widely used to boost immunity, reduce inflammation, and manage anxiety [17]. This point, through the stimulation of ear nerve branches connected to brainstem nuclei, helps modulate neuroimmune responses [18].

Research on patients with autoimmune diseases or those with weakened immune systems has demonstrated that auriculotherapy can lead to improvements in immune markers, such as IL-2[3], IFN-γ[4], and a decrease in CRP[5] levels [19]. Additionally, auricular therapy, whether used in combination with traditional acupuncture interventions or independently, has been shown to enhance the immune system by reducing chronic stress, which is often implicated in conditions like insomnia, depression, and anxiety [6]. One of the primary mechanisms behind this approach is the balance of the hypothalamic-pituitary-adrenal (HPA) axis and the stimulation of the vagus nerve to modulate the body's inflammatory responses [20].

Given these mechanisms, auriculotherapy could be considered an effective complementary treatment for individuals with HPV, particularly those who require enhancement of cellular immunity. Given its safety and non-invasive nature, the use of auriculotherapy in clinical settings, especially for modulating immune responses in the context of chronic infections, could prove to be valuable [21].

Shenmen Point and Its Effects

The Shenmen point, also known as the "Spirit Gate" in auriculotherapy, is one of the most recognized and widely used points on the external ear. It is considered a key point in regulating the body's nervous and immune systems. Shenmen stimulation is commonly employed to reduce anxiety, stress, pain, insomnia, and to modulate autonomic functions of the body [15].

Physiologically, Shenmen works by stimulating

3 Interleukin 2
4 Interferon gamma
5 C-reactive protein

branches of the vagus nerve that are connected to the central nuclei in the brainstem. This activation promotes parasympathetic nervous system function, leading to reduced cortisol levels and enhanced neurohormonal balance, which in turn strengthens the immune system [22].

Studies using fMRI[6] imaging have shown that Shenmen stimulation leads to changes in the activity of brain areas such as the amygdala, hypothalamus, and prefrontal cortex, all of which play crucial roles in stress regulation and immune response [23]. Clinical studies have demonstrated that Shenmen stimulation, either electrically or with herbal seeds, results in reduced stress and anxiety symptoms in cancer patients, as well as alleviates withdrawal symptoms in individuals overcoming addiction. These effects have been associated with improvements in immune parameters, such as increased natural killer cells and T cells [3,17,24]. Additionally, Shenmen has been reported to be effective in treating insomnia and depression, both of which, if chronic, can suppress immune function [25].

In summary, Shenmen, through neuroimmunological pathways including the inhibition of the hypothalamic-pituitary-adrenal axis, vagus nerve stimulation, and modulation of brain activity, exerts positive and measurable effects on enhancing immune function. It can thus play a significant role in complementary therapies for chronic infectious diseases such as HPV.

Yin Tang Point and Its Effects

The Yin Tang point, located between the eyebrows (commonly referred to as the "third eye"), is one of the most frequently used points in acupuncture and Eastern complementary medicine. This point is known for its calming effects and is commonly employed to reduce anxiety, stress, headaches, insomnia, and to regulate the central nervous system [26]. Stimulation of this point, whether through needling, gentle pressure, or electrical stimulation, affects the autonomic nervous system and can contribute to improving immune function [27].

From a physiological perspective, Yin Tang stimulation decreases sympathetic activity and increases parasympathetic tone, which is associated with reduced levels of cortisol and adrenaline. These effects are linked to improvements in mental well-being, enhanced sleep quality, and the reduction of chronic inflammation—all of which are important factors in boosting immune function [28,29]. In patients with anxiety disorders or chronic pain, Yin Tang stimulation has led to a reduction in symptom severity and an improvement in quality of life [30,31]. Clinical research has also shown that stimulation of the Yin Tang point reduces the activity of the hypothalamic-pituitary-adrenal axis, increases the activity of immune cells such as natural killer cells, and improves cytokine balance [30,32,33]. The use of this point in cancer patients, ICU patients, and those with sleep disorders has also led to a reduction in the need for sedative medications and improvement in physiological stress indicators [33,34]. Specifically, in the context of viruses like HPV, where cellular immunity plays a crucial role in viral clearance, the reduction of anxiety and psychological stress through Yin Tang stimulation can indirectly support immune response. Therefore, the Yin Tang point, alongside points like Shenmen, serves as a simple yet effective tool in complementary medicine to enhance immune function [35-37].

Studies Related to Acupuncture in HPV

In recent years, there has been increasing interest among researchers regarding the role of acupuncture in improving immune function and assisting in the control of viral infections, including HPV. Although direct studies specifically focused on acupuncture and HPV remain limited, there is significant evidence suggesting that acupuncture can be effective in the recovery process of patients with HPV by modulating the immune system and reducing stress.

1. Cellular Immunity Enhancement and HPV Clearance:

A study by Wang et al. demonstrated that acupuncture, by modulating the Th1/Th2 response and enhancing natural killer (NK) cell activity, can increase the body's ability to combat chronic viruses such as HPV. These immune changes play a crucial role in the spontaneous clearance of HPV [23].

2. Reduction of Anxiety and Depression in HPV Patients:

Chronic anxiety and depression are known to suppress immune function. In a study conducted on patients with HPV, acupuncture significantly reduced anxiety and depression scores, improved quality of life and, consequently, the body's ability to fight the virus [38].

3. Anti-inflammatory Effects of Acupuncture:

Chronic inflammation is a risk factor for the progression of HPV lesions to pre-cancerous or cancerous stages. Studies have shown that acupuncture can reduce levels of inflammatory cytokines such as IL-6 and TNF-α, which helps decrease local inflammation and the likelihood of disease progression [29,37].

4. Acupuncture and Cervical Health:

An experimental study on women with cervical dysplasia due to HPV showed that combining acupuncture with conventional treatments led to a higher rate of cervical cell return to normal compared to the control group [31,39].

Discussion

6 Functional Magnetic Resonance Imaging

Table 1. Characteristics and key findings of included studies

Study	Design	Sample	Intervention	Comparator	Key Finding
Wang et al. (2008)	Systematic review of RCTs	Randomized controlled trials	Acupuncture & acustimulation methods	Sham acupuncture or no treatment	Effective for short-term pain relief; long-term effects uncertain; more research needed.
Wunsch JK, et al.)2018)	Prospective controlled investigation with a non-randomized arm	62 female patients scheduled for ambulatory gynecological surgery	Auricular Acupuncture	Control Group: No intervention	Auricular acupuncture reduced preoperative anxiety significantly before surgery; control group anxiety increased.
Huang et al. (2005)	Prospective controlled trial	111 healthy subjects Acupuncture Group: 39 subjects Sham Acupuncture Group: 38 subjects No Treatment Group: 34 subjects	Acupuncture at Neiguan (P6) Point Sham Acupuncture	Sham Acupuncture No Treatment	Acupuncture at the P6 point may enhance vagal activity, which could help explain its effect in reducing nausea and vomiting.
Jacobs et al. (2004)	Molecular analysis study	Patients with common warts induced by HPV types 2, 27, and 57	Topical application of imiquimod cream (an immune response modifier) on the warts	Untreated warts	Imiquimod induced macrophage infiltration into wart tissue and significantly reduced viral load.
Mousavi FS et al. (2017)	Randomized clinical trial	66 post-cesarean women	Auriculotherapy Points included Shenmen, Subcortex, Uterus, Pelvis, and Abdomen	Routine care only	Anxiety decreased after 2 hours but not significantly; no change in vital signs
Chao Hsing Yeh et al.(2016)	Randomized clinical trial	31 breast cancer patients	Auricular Point Acupressure (APA(	Sham APA (control group)	Significant reductions in pain (↓71%), fatigue (↓44%), and sleep disturbance (↓31%) in APA group
Jiang et al.(2024)	Randomized Controlled Trial	60 insomnia patients	Acupuncture	Sham acupuncture control group	Real acupuncture enhanced emotional network, reduced anxiety/depression scores, and improved sleep quality compared to sham. |
Azizjalali et al.(2012)	RCT (prospective)	160 patients (2×80)	CO_2 laser	Cryotherapy (liquid nitrogen)	CO_2 laser was about twice as effective as cryotherapy with lower recurrence.
Yin et al.(2010)	RCT	Adults aged 50 years or more	Active hexose correlated compound (AHCC)	None	Increases the immune response by producing interferon (IFN)-γ and tumor necrosis factor (TNF)-α by CD4(+) and CD8(+) T cells
Ying Zhang et al.(2025)	Systematic review	RCTs	Acupuncture and/or moxibustion treatment	None	Enhance the immune function and improve the prognosis of malignant tumor patients
Yuan Wang et al.(2024)	Briefs	Microsatellite-Stable Colorectal Cancer	Combination of Anti-PD-1 and Electro acupuncture	None	Electro acupuncture is safe, well-tolerated, and feasible for clinical translation as a promising strategy for treating MSS colorectal cancer

The results of the literature review indicate that the Shenmen and Yin Tang points used in auriculotherapy and acupuncture have significant regulatory effects on the autonomic nervous system, the hypothalamic-pituitary-adrenal (HPA) axis, and immune parameters. Stimulation of the Shenmen point reduces anxiety and modulates cortical brain activity—including regions such as the amygdala and hypothalamus—leading to enhanced cellular immune responses, particularly through the activation of NK cells and helper T cells [15,34]. Similarly, the Yin Tang point, by reducing sympathetic tone and increasing parasympathetic activity, contributes to lower cortisol levels and improved immuno-hormonal balance in the body [28]. These findings are consistent with previous studies on various HPV treatments, which highlight the role of immune system enhancement and stress reduction as key factors in controlling HPV infection. Common pharmaceutical treatments such as Imiquimod work by stimulating the innate immune response and activating antiviral cytokines, thereby leading to the clearance of HPV lesions [40]. A significant similarity between auriculotherapy and this pharmaceutical treatment lies in the increased activity of NK cells and the production of anti-inflammatory cytokines, which can effectively accelerate the process of viral clearance. Additionally, studies on the use of CO_2 laser and cryotherapy—recognized as local treatments for HPV-induced precancerous lesions—have demonstrated that these methods, through direct destruction of infected tissue and stimulation of a localized inflammatory response, create conditions favorable for mucosal regeneration and reduction of viral load [41-43]. Unlike Imiquimod, which directly stimulates innate immune responses, or CO_2 laser and cryotherapy that physically destroy infected tissue, auriculotherapy may offer a unique complementary approach by reducing systemic immune suppression and improving overall physiological resilience, thereby potentially enhancing the body's natural viral clearance mechanisms as an adjunct to these therapies. Active hexose correlated compound (AHCC) is a natural compound with the potential to be used as an immunoenhancer in cases in which the immune system is compromised. This drug also increases the immune response by producing interferon (IFN)-γ and tumor necrosis factor (TNF)-α by CD4(+) and CD8(+) T cells. Unfortunately, one of the problems with this drug is the very high cost which creates a great economic burden on people with HPV and cervical cancer [44]. Since cellular immune responses play a crucial role in controlling and clearing the HPV virus, the use of non-invasive techniques such as auriculotherapy may be effective in improving disease progression. The reduction of psychological stress, improvement in sleep quality, and enhancement of cytokine function are additional benefits of these approaches [9,23]. Moreover, studies on acupuncture have shown that the stimulation of specific points can lead to a reduction in chronic inflammation and enhance mucosal immunity, which is important for preventing the progression of HPV-related lesions to precancerous stages [8]. Research has shown that acupuncture can increase NK cell activity and enhance the immune response by stimulating the secretion of important cytokines such as IFN-γ and IL-2 [45]. It leads to a reduction in tumor growth, which may indicate a strategy known as immune evasion and tumor progression [46]. Additionally, acupuncture enhances antitumor immunity by increasing lymphocytes and granzyme B levels, as well as activating interferon-mediated signaling pathways [47]. Clinical observations further highlight their role in improving immune function and the prognosis of cancer patients. For instance, a study demonstrated that acupuncture increased the number of NK cells and reduced tumor burden in cervical cancer [48, 49]. Taken together, these findings underscore the ability of acupuncture to reprogram immune responses, shifting the immune balance toward effective control of cancer cells while simultaneously preventing immune dysregulation. Although direct studies on the impact of auriculotherapy on HPV remain limited, the physiological mechanisms shared with acupuncture and its effects on reducing immune-suppressing factors (such as chronic stress and insomnia) provide a promising foundation for more extensive and precise clinical research in the future [50]. The limitations of this study include its narrative review design, which lacks a systematic framework for the selection and rigorous evaluation of studies. Additionally, the methodological diversity and varying quality of the included studies, as well as limited access to certain sources, have reduced the comprehensiveness of the review. Direct clinical studies on the effects of auriculotherapy on HPV are very limited; therefore, many of the findings are based on indirect evidence. Moreover, the incomplete assessment of side effects and long-term outcomes constitutes another significant limitation of this review.

Conclusion

Based on the available evidence, auriculotherapy—particularly through the stimulation of Shenmen and Yin Tang points—appears to be a promising non-invasive complementary intervention for enhancing the immune system in patients with HPV. The regulatory effects of these points on the autonomic nervous system, their ability to reduce stress, and their influence on immune parameters may directly and indirectly contribute to improved patient quality of life and potentially accelerate viral clearance. Further research through well-designed, large-scale randomized controlled trials is warranted to confirm efficacy and to establish standardized therapeutic protocols.

Conflict pf Interests

The authors declare that they have no competing interests.

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Not applicable.

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