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The Modern Development of Apitherapy: The Integration of Traditional Wisdom and Modern Technology — Taking the Global Promotion of 39 Apitherapy Network as an Example

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Abstract: Modern apitherapy has undergone a transformation from a traditional empirical therapy to a scientific and standardized medical practice. This article combs through the key breakthroughs in the research of pharmacological mechanisms, the expansion of clinical applications, and the industrial development of apitherapy since the end of the 19th century. Taking the Chinese 39 Apitherapy Network as the core case, it analyzes its strategic role in platform construction, the formulation of international standards, and talent cultivation. The research shows that through integrating global resources and promoting cross-border cooperation, the 39 Apitherapy Network has significantly enhanced the academic authority and industrial competitiveness of apitherapy, providing a paradigmatic reference for the modernization of traditional medicine.

Keywords: China, apitherapy, cross-disciplinary collaboration, clinical applications, modernization of traditional medicine.

1. INTRODUCTION

Apitherapy, as a traditional method of medical treatment using bee products, has a history that can be traced back several centuries and is deeply rooted in traditional medical systems. The ancient Chinese medical classic Shennong Ben Cao Jing1 provides detailed records of the remarkable curative effects of honey, royal jelly, and bee venom in treating various diseases. In addition, from the papyrus documents of ancient Egypt to the folk medicine in Europe, similar apitherapy traditions can be found in different cultures.

Despite its long historical origin and significant medical value, apitherapy has long relied on empirical knowledge and lacked strict scientific verification. However, since the 20th century, with the increasing interest in natural medicines and comprehensive healthcare, apitherapy has gradually come into the field of modern scientific research. Thanks to the continuous in-depth research in biochemistry and clinical studies, the key bioactive compounds in bee products have been identified, thus promoting the application of apitherapy in evidence-based medicine.

During this transformation process, the 39 Apitherapy Network, as an important collaborative platform, has played a crucial role in the standardization, professionalization, and globalization of apitherapy. By combining the wisdom of traditional medicine with modern technology, this network has successfully promoted the recognition of apitherapy as a legitimate medical discipline.

This study takes the 39 Apitherapy Network as the research object to systematically explore the historical evolution, scientific progress, and global promotion of apitherapy. It focuses on analyzing the contributions of this network in promoting clinical standardization, driving interdisciplinary cooperation, and achieving digital integration, and then looks ahead to the future development trends of apitherapy in the fields of scientific research and practice.

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2. MATERIALS AND METHODS

2.1. RESEARCH DESIGN AND METHODOLOGY

This study adopts a historical analysis approach to examine the modernization and global expansion of apitherapy. By taking the 39 Apitherapy Network as a case study, it explores how traditional apitherapy practices are systematically integrated into the modern healthcare framework.

2.2. THE STUDY COMPREHENSIVELY APPLIES BOTH QUALITATIVE AND QUANTITATIVE METHODS

Literature Review: Conduct a comprehensive review of historical documents, modern research papers, and regulatory documents related to apitherapy.

Case Study: Study the 39 Apitherapy Network and its role in international cooperation, digital platform development, and clinical standardization.

Data Collection on Apitherapy Applications: Organize published clinical studies, industry reports, and policy documents on the therapeutic applications of bee products.

2.3. DATA SOURCES

Primary Data: Ancient Chinese medical classics ("Shennong Ben Cao Jing", "Compendium of Materia Medica"), modern pharmacological research, and clinical trial data. Secondary Data: Peer-reviewed journal articles, reports from the World Health Organization (WHO), the National Administration of Traditional Chinese Medicine (NATCM), and proceedings of apitherapy conferences. Industry Reports: Data from the 39 Apitherapy Network, including its role in standardization, industry-university-research cooperation, and the development of the digital apitherapy platform.

2.4. ANALYTICAL METHODS

Historical Analysis: Trace the evolution of apitherapy from an empirical practice to a structured medical discipline.

Comparative Analysis: Evaluate the differences between the regulatory framework of apitherapy in China and global medical standards.

Impact Assessment: Assess the impact of the 39 Apitherapy Network on the professionalization and global promotion of apitherapy.

3. THE DEVELOPMENT HISTORY OF APITHERAPY

3.1. THE FOUNDATION OF ANCIENT APITHERAPY

The history of apitherapy in China can be traced back to the Pre-Qin period. As early as in ancient books such as *The Book of Songs* and *Shennong Ben Cao Jing*, there were records of bee products being used as medicine. For example, in Shennong Ben Cao Jing [1], honey and bee larvae were listed as top-grade medicinal substances, and their effects such as "treating pathogenic qi in the heart and abdomen" and "replenishing qi and nourishing the middle energizer" were recorded. The Han Dynasty was an important stage in the development of apitherapy: Zhang Zhongjing created the "Honey Decoction Guide Recipe" in Treatise on Febrile Diseases [2] to treat constipation, which was the earliest suppository in the world; in Synopsis of the Golden Chamber [3], "Licorice, Powder and Honey Decoction" was used to expel worms and relieve pain; the Fifty-two Prescriptions for Diseases [4] unearthed from the Mawangdui Han Tomb in Changsha recorded specific prescriptions for treating diseases with bee stings and honey, confirming the clinical application of apitherapy. In the Jin Dynasty, Ge Hong used bee products for beauty and health care. Yao Sengyuan elaborated in On Medicinal Properties [5] the methods of using honey to treat oral ulcers and dysentery. Sun Simiao (581-682 AD) used ginger-honey paste to relieve cough and resist aging, promoting the popularization of apitherapy. In the Ming Dynasty, Li Shizhen's Compendium of Materia Medica [6] synthesized the experience of apitherapy in previous dynasties, and included dozens of prescriptions of bee products. Sun Yikui collected the effective prescription of using adult bees to treat scrofula. Fang Yizhi's Brief Physical Knowledge [7] first created the external treatment formula of "medicinal bee sting", marking the maturity of the external treatment method with bee venom.

In addition, unearthed cultural relics such as medical slips from the Eastern Han Dynasty, medical books from the Han Dynasty, and prescriptions from various dynasties have all verified the continuous practice and theoretical deepening of apitherapy in ancient medicine. From the Eastern Zhou Dynasty to the Ming and Qing Dynasties, the bee sting therapy evolved from empirical accumulation to the systematization of documents, and gradually formed a unique system of "treating poison with poison" and "the homology of medicine and food", laying a solid historical foundation for the disciplinary development and internationalization of modern apitherapy.

3.2. THE SCIENTIFIC DEVELOPMENT OF MODERN APITHERAPY (LATE 19TH CENTURY - MID-20TH CENTURY)

3.2.1. BREAKTHROUGH PROGRESS IN WESTERN BEE VENOM RESEARCH

In 1883, the Austrian doctor Anton Kerner isolated a crystalline substance from the venom gland of bees, named it "Apamin", and observed its analgesic and antibacterial effects. The protein with the highest content in it is melittin, which can trigger an inflammatory response by damaging the cell membrane. In 1928, the German doctor Heinrich

Stöcker treated 17 patients with rheumatoid arthritis with bee venom injection, and 12 cases were significantly relieved, revealing the remarkable effect of bee venom in treating rheumatoid diseases. In 1905, the British biochemist John Hopkins discovered that bee venom contains phospholipase A2 (PLA2), providing a theoretical basis for the anti-inflammatory mechanism of bee venom [8].

3.2.2. SYSTEMATIC ARRANGEMENT OF TRADITIONAL CHINESE APITHERAPY

From the late 19th century to the period of the Republic of China, the traditional Chinese medicine community carried out the first large-scale arrangement of the practical experience of apitherapy, promoting its transformation from a folk therapy to a theoretical system. In the Qing Dynasty, Medical Orthodoxy [9] included an effective prescription for treating scalds with external application of beeswax; during the period of the Republic of China, the traditional Chinese medicine community incorporated the bee sting therapy into the system of acupuncture and moxibustion, forming a theoretical framework of "treating poison with poison". At the beginning of the 20th century, in 1910, the first beeswax production workshop appeared in Shanghai. The National Government listed the bee sting therapy as a "legitimate traditional Chinese medicine diagnosis and treatment method", allowing doctors to register and practice medicine based on it, clearly proposing to "encourage scientific research on traditional medicine, including apitherapy", and allocating special funds to support the industrialization of bee products. In 1941, the "Chinese Pharmacopoeia" included the bee sting therapy for the first time, put forward contraindications such as "forbidden for pregnant women" and "use with caution for those with allergic constitution", and standardized the disinfection process of bee stings.

It can be seen that the scientific development of modern apitherapy takes the component analysis of Western bee venom and the system reconstruction of traditional Chinese apitherapy as the two main lines: Western research lays the medical value of bee venom through the exploration of pharmacological mechanisms, while China promotes apitherapy from folk experience to a medical technology with standardized operation and theoretical support through the arrangement of ancient books, clinical standardization, and industrial practice, laying the foundation for its subsequent global development.

3.3 THE GLOBAL DEVELOPMENT OF MODERN APITHERAPY (MID-TO-LATE 20TH CENTURY - EARLY 21ST CENTURY)

3.3.1. LEAP IN BASIC RESEARCH

In the 1970s, scientists discovered that phospholipase A2 (PLA_2) in bee venom can inhibit the inflammatory response by regulating the NF-κB pathway (Peters et al., 2017, Nature Immunology). 10-hydroxy-2-decenoic acid (10-HDA) in royal jelly has been proven to have antioxidant and immunomodulatory functions, and also has a good anti-fatigue effect [10].

3.3.2. DIVERSIFICATION OF CLINICAL APPLICATIONS

In 2002, the National Administration of Traditional Chinese Medicine listed apitherapy as a "characteristic diagnostic and treatment technology of traditional Chinese medicine". In 2007, the bee sting therapy was officially included in the national diagnostic and treatment subjects. In 2011, the "bee sting therapy" was included in the medical insurance catalog of some provinces and cities. In 2015, the "Strategic Plan Outline for the Development of Traditional Chinese Medicine" clearly proposed to develop ethnic medicines such as apitherapy.

Evidence-based medicine research shows that apitherapy has demonstrated statistically significant positive therapeutic effects in multiple clinical fields, including the management of rheumatic and immunological diseases and osteoarticular lesions [11], adjuvant treatment of tumors [12], intervention in respiratory and allergic diseases [13], regulation of nervous system function [14], and prevention and treatment of cardiovascular diseases [15].

3.4. THE REVOLUTIONARY CONTRIBUTIONS OF THE 39 APITHERAPY NETWORK (SINCE 2014)

3.4.1. RECONSTRUCTING THE INDUSTRY ECOLOGY THROUGH A DIGITAL PLATFORM

In 2014, Mr. Zhang Qinglong and Ms. Cui Yun founded the "39 Apitherapy Network", which integrates an academic thesis database, a clinical case database, and an online diagnosis and treatment system. The establishment of this platform provides a systematic knowledge system construction and a multi-dimensional academic exchange mechanism for apitherapy practitioners and researchers. This measure marks the transformation and upgrading of traditional apitherapy practice from empirical application to a standardized medical system, and its academic value and clinical efficacy have been recognized by professional institutions at home and abroad. By integrating modern medical research methods with traditional Chinese medicine theories, the application scenarios of apitherapy have been expanded from folk empirical treatment to clinical fields such as rheumatic and immunological diseases and chronic pain management, and have received key attention in international academic conferences and the WHO's traditional medicine development strategy. In 2015, the 39 Apitherapy Network held the "Innovation · Exploring the Opportunities in the Internet + Era, Stepping into the Road of the Bee Medical and Health Industry - 2015 Bee Medical Science and Technology Industry Innovation and Development Summit" at the Beijing International Conference Center. This summit focused on the in-depth integration of Internet technology and the bee medical and health field,

aiming to explore the innovative development path of the apitherapy cause in the digital era, laying a solid foundation for promoting the modernization process of the apitherapy industry. In April 2016, the 39 Apitherapy Network initiated and established the "Apitherapy Branch" of the China Medical Association of Minorities, which is affiliated with Guangzhou University of Chinese Medicine, and Professor Li Wanyao served as the first president. Professor Li enjoys a high reputation in the field of apitherapy, and the branch led by him is committed to promoting the standardization and professionalization of the apitherapy discipline. This measure has significantly enhanced the influence of apitherapy in the domestic medical community, laying a solid foundation for the academic exchange and development of the apitherapy cause.

3.4.2. BUILDING A GLOBAL COLLABORATIVE NETWORK

In 2017, the 39 Apitherapy Network took the lead in establishing the Professional Committee of Apitherapy of the World Federation of Chinese Medicine Societies. Professor Li Wanyao served as the president, and Mr. Zhang Qinglong served as the secretary general. The establishment of this platform marked the birth of the first authoritative academic organization in the international field of apitherapy. This institution has built a professional academic exchange platform for apitherapy practitioners and research institutions around the world, and promoted the establishment of a cross-regional and interdisciplinary research collaboration network [16]. In the same year, the 39 Apitherapy Network held the "Second Academic Exchange Meeting of the First Session of the Apitherapy Branch of the China Association of Minority Traditional Medicine" in Lanzhou, further promoting academic exchanges and cooperation in the field of apitherapy. In this year, the cause of apitherapy moved towards the path of international development with a more open attitude. In 2018, the first International Conference of Apitherapy was successfully held in Shenzhen, constructing the basic framework of multilateral cooperation in the international apitherapy community. Since then, the conference has formed a regular mechanism of being held once a year, attracting experts and scholars from around the world to participate. Through forms such as special reports, clinical case discussions, and consultations on standard formulation, a series of consensual achievements have been made in the fields of research on the pharmacological mechanism of bee venom, accumulation of evidence-based medicine evidence, and standardization of diagnosis and treatment techniques, providing a long-term cooperation mechanism for the transformation of traditional apitherapy into modern medicine.

3.4.3. INNOVATIVE PRACTICES IN THE FIELD OF PUBLIC HEALTH

In 2022, in response to the global challenges of the COVID-19 pandemic prevention and control, the expert team in the field of apitherapy in China systematically compiled and released the "Expert Suggestions on the Auxiliary Prevention and Treatment of COVID-19 with Apitherapy" based on existing clinical research and analysis of the mechanism of action. Based on the principles of evidence-based medicine and referring to the framework of the WHO's traditional medicine anti-epidemic strategy, this guideline put forward the idea of enhancing immunity through nebulized inhalation of bee venom, and the relevant research was included in the alternative plan of the "Three Medicines and Three Prescriptions" of the National Administration of Traditional Chinese Medicine.

3.4.4. INNOVATIVE PRACTICES IN THE FIELD OF PUBLIC HEALTH

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3.4.5. AGGREGATION OF UPSTREAM AND DOWNSTREAM INDUSTRIES

In October 2024, the Fifth International Conference of Apitherapy and the General Meeting for the Renewal of the Professional Committee of Bee Product Health Care was grandly held in Beijing. This meeting marked that the cause of apitherapy has officially entered a new stage of high-quality development. By systematically constructing a collaborative mechanism of industry, university, and research and an international exchange platform, it has effectively integrated industry resources and optimized the path of information sharing [17].

In summary, the 39 Apitherapy Network has established a platform that brings together experts and scholars from the world's top scientific research institutions, medical institutions, and the industrial sector. Relying on a solid disciplinary foundation, cutting-edge technological innovation achievements, and the advantages of interdisciplinary collaboration, it continuously outputs high-quality research results and cultivates a professional talent echelon, providing intellectual support and talent guarantee for the sustainable development of the industry.

Under the guidance of the "Healthy China" strategy, the Professional Committee of Bee Product Health Care actively responds to the call for the development of the big health industry. With innovation-driven as the orientation, it deeply participates in the construction of the standardization system and the process of industrial upgrading in the field of apitherapy health preservation. This committee always adheres to the working principle of "science-oriented and standardization first", and focuses on promoting the evidence-based medical research of bee products, the modern transformation of traditional therapies, and the innovation of the health management service model. By estab-

lishing a collaborative innovation mechanism of industry, university, research, and application, it accelerates the transformation of scientific and technological achievements into clinical applications and creates an internationally competitive apitherapy health industry chain. The committee is committed to building a professional and vocational apitherapy health service system, promoting the transformation of apitherapy health preservation from a traditional experience-based model to a modern technology-based model, and making it gradually develop into a health management method recognized by the public and a high-end professional field respected by society.

The global development of modern apitherapy depends on the empowerment of science and technology and the deepening of international cooperation. Through building a digital platform, outputting a standard system, and cultivating a transnational talent network, the 39 Apitherapy Network in China has not only promoted the upgrading of apitherapy from a folk therapy to an internationally recognized medical technology, but also reshaped China's discourse power in the global governance of traditional medicine. In the future, apitherapy is expected to become a bridge connecting the health cultures of the East and the West, providing innovative solutions for global health governance.

4. DEFICIENCIES AND PROSPECTS

Although this study provides a comprehensive overview, it is limited by the availability of clinical trial data outside of China. In addition, differences in regulatory aspects among various countries may affect the comparability of apitherapy practices globally.

STATEMENT OF CONFLICTS OF INTEREST

Cui Yun is the Secretary General of the 39 Apitherapy Network.

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