

Biomedicine and traditional Chinese medicine: a fruitful scientific and cultural interaction

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Abstract. Over the years, the approach of traditional Chinese medicine has changed, as has the concept of the health status. Particularly in this article we will focus on the importance of some techniques that we can define millennial, as acupuncture. We will highlight the relationship between a millenary system and the principles of modernity, emphasizing the relevance of a technique that appears to be in line with the latest scientific research and numerous studies of effectiveness, proposing therapeutic integration as a usable way. We will see how acupuncture has an anti-inflammatory effect, and has a beneficial role in subjects suffering from allergic or autoimmune diseases, including an antihistamine action and downregulation of proinflammatory cytokines (e.g. IL-1, IL-6 and TNF-). In addition, acupuncture could also act as an immunomodulatory agent, involving the neuroimmune network, T helper and natural killer cells. Traditional Chinese medicine, acupuncture in particular, is widely used within Western health systems and there are many studies done regarding its efficacy in the clinical field. In addition to scientific validation, however, a comparison on a cultural level is also necessary. To build a constructive dialogue, indeed, it is necessary to deconstruct the preconceptions and prejudices concerning both biomedicine and traditional Chinese medicine. In fact, only through deconstruction we can understand that biomedicine and traditional Chinese medicine are both culturally connoted knowledge. In this article it will first be underlined how clinical observations can be better understood if we pay attention to analyzing the cultural context of the medical systems that here interact with each other. (www.actabiomedica.it)

Key words: Traditional Chinese medicine, biomedicine, acupuncture, Western health system.

Traditional Chinese medicine and its interaction with Western health system

In this article it has been remarked how crucial it is to deconstruct the concept of biomedicine and traditional Chinese medicine. Acupuncture is a thousand-year-old Chinese technique that is widely used within Western health systems and there are many studies done regarding its efficacy in the clinical field.

In the health care system, the introduction of complementary and alternative therapies requires specific stands of scientific validation. Traditional Chinese medicine is no exception. One of the advantages of

acupuncture is that it has a lower incidence of side effects than drugs. The list of conditions most susceptible to this type of treatment are anxiety, headache, post-surgical emesis, chemotherapy and so on. Over the last 40 years, it has been possible, regardless of the scientific evidence of clinical efficacy, to identify possible mechanisms of operation of acupuncture and an analgesic, immunomodulatory, endocrine and antidepressant effect has been found (1).

In addition to scientific validation, however, a comparison on a cultural level is also necessary. To build a constructive dialogue, in fact, it is necessary to deconstruct the preconceptions and prejudices

concerning both biomedicine and traditional Chinese medicine.

With the recent researches carried out in Italy in the field of acupuncture and traditional Chinese medicine, it is believed to have demonstrated that acupuncture and biomedicine can cooperate not only in a diagnostic and therapeutic sense, but also in a cultural sense, since, as recently underlined (2, 3), the scientific world will allow to understand the basic mechanisms described by traditional Chinese medicine and this will give back a humanistic depth to a technocratic medicine, maybe too distant from the real and primary human needs (4).

In this article we will show how the deconstruction of the concepts of biomedicine and traditional Chinese medicine can constitute a necessary starting point to analyze their interaction within the clinical field.

Deconstruct the concept of biomedicine and traditional Chinese medicine

Traditional Chinese medicine has emerged as a global medicine whose practices have spread all over the world and in different contexts. In the West in particular, the theories and techniques of traditional Chinese medicine have come to constitute a repertoire of common images and narratives, related to the world of health and well-being, which are used by doctors and patients all over the world. The therapeutic techniques have expanded considerably: there are doctors who use Chinese acupuncture, pharmacology and moxibustion, centers that offer *Taiji* and *Qigong* courses, as well as dietetics and *Tuina* massage. These practices are now used by different professionals and in different contexts. This growing diffusion has contributed to the creation of a varied therapeutic landscape within which the dynamics with which traditional Chinese medicine and biomedicine interact are still unclear and are mostly analyzed by placing them in the broader context of alternative medicine. In fact, traditional Chinese medicine is often associated with unconventional medicines, that is “a wide and very heterogeneous range of diagnostic and therapeutic knowledge and practices that differ substantially from biomedicine

and which, usually (although not always) are practiced and taught in official medical institutions” (5).

Given the relationship that has been created between biomedicine and traditional Chinese medicine, and the growing diffusion of the latter, it is important to open a dialogue between these two medical systems, trying to address any preconceptions and prejudices that can undermine the interaction between them. It is relevant to call it interaction and not integration since, the latter brings with it, not only the idea that two subjects can collaborate, but also that one of the two is lacking in something. The term interaction, on the other hand, highlights the reciprocal relationship, without one of the two subjects being perceived as missing. In the term integrate there is inherent the concept of assimilation, incorporation, aimed at filling a defect. We should try to overcome the term integration in favor of the term interaction, which on the contrary emphasizes the reciprocal influence between two elements acting on each other. To achieve this goal, it is useful to deepen the notions relating to the historical, social and cultural context in which biomedicine and traditional Chinese medicine are inserted. In this paragraph, in fact, it will be illustrated how, by clarifying a few and simple premises obtained by selecting some bibliographic contributions, it is possible to create the necessary conditions to overcome the main obstacles that arise when it comes to the interaction between two medical systems. As far as biomedicine is concerned, it is crucial to take into consideration the theories developed within the Harvard School, which had the merit of paving the way for the cultural analysis of biomedical knowledge. These theories allow us to observe the limits that characterize the biomedical paradigm, above all when it is not recognized as a cultural and social system, as well as a medical system. As for traditional Chinese medicine, on the other hand, given that “the spread of unconventional medicines is often accompanied by a lack of knowledge of their history, of their actual characteristics and above all of the channels through which they have established themselves in contemporary societies” (6), it is necessary to briefly analyze the historical and cultural landscape in which Chinese medicine was formed.

First of all, biomedicine and traditional Chinese medicine, as health systems, are to be understood as

open systems that include not only elements belonging to the medical sphere, but also to the social and cultural one (7). The first obstacle, which must be overcome, is therefore the failure to recognize biomedicine as culturally connoted knowledge. Often, in the debates involving unconventional medicines, we often forget that what we consider scientific truths are, in fact, the result of a knowledge that has its roots in a well-defined cultural context. This is an essential assumption that has been highlighted by scholars such as Kleinman (7). It must be remembered, however, that the Harvard school, of which they were part, was initially criticized because it ended up affirming the same dichotomies it aspired to overcome. However, they let us understand that our diagnostic biomedical categories are actually impartial descriptions that we have built by selecting and interpreting the reality on which they are based. In fact, biomedicine “represents only one of the possible ways of organizing, structuring and institutionalizing the theoretical knowledge and practical actions relating to the disease and its treatment” (8). As everyone knows, biomedicine, as a science, lays its foundation in what is empirically observable. However, this way of proceeding ended with considering as relevant only the body and its biochemical processes or the single organ, in the belief that breaking down reality in small parts leads to a deeper knowledge. Biomedicine, defined as “modern, scientific, western, official”, makes the cultural and social aspects of the disease less relevant, implementing an “overall reorientation of gaze and language” (9). When these cultural and social aspects are excluded, problems arise not only within the medical system itself, but also in the interaction with other medical systems. Those who do not take these aspects into consideration, in fact, will inevitably tend to discredit all the versions that contrast with what they believe to be the truth, delegitimizing them by any means. For this reason, in order to open a dialogue, it is good to deconstruct one’s own certainties questioning our medical system of reference first.

The second obstacle concerns the set of some ideas such as, for example, the concepts of tradition, nature, holism that are intrinsically linked to the spread of traditional Chinese medicine in the West. Traditional Chinese medicine in its path to the West has brought a particularly rich and evocative imagery

and its diffusion is linked to a ‘romantic critique of modernity’ (10). This contributed to build mythical vision of this medical system, seen as an untouchable millenary knowledge in which the reference to tradition played a fundamental role. In the Chinese context, on the contrary, traditional medicine is seen as multiple and heterogeneous (10) and has always been permeable to external influences, in some historical periods in particular. This means that it is not a monolithic entity, closed on itself and definable only in its relationship with the concept of tradition. On the contrary, especially after 1949, traditional Chinese medicine was strongly adapted to the Western context already within China itself, configuring the interaction between Western medicine and Eastern medicine as an institutional choice (11). Traditional Chinese medicine, in fact, was systematized and rationalized within the process of modernization of the country, carried out after the end of the Empire, first by the Republican forces and then carried out by the Maoist government. The modernization process, on which the nation building project was based, has led to the attempt to combine traditional Chinese medicine with biomedicine concepts defined as modern and scientific (10). Hsu (12) explains how the medical system in question was invented during the 1950s, a period in which the Communist Party had implemented a work of recovering nationalist sentiment for the construction of a new state. Chinese medicine, therefore, was formed in a short period of time easily traceable within the history of the Chinese state and has come to constitute an important part of its identity. For this reason, it can be analyzed by comparing it to the concept of ‘invented tradition’ coined by Hobsbawm and Ranger (13). We can speak of invented tradition when we are faced with a set of practices that spread certain values and rules of behavior that have an implicit continuity with the past, but the past to which they refer is ‘appropriately selected’ (13). In this case, the past was selected by deciding to eliminate some elements considered backward and part of popular superstition. In doing so, traditional Chinese medicine could have been placed side by side with biomedicine, thus leading China to follow developed countries on the road to modernization. The need to form a cohesive state, combined with a set of practical needs, such as treating

a large population with the few means available, have led to the re-elaboration of an ad hoc medical system in which “some pieces of the past have been assembled with care, so as to no longer be able to clash with the new knowledge, with the reality of the new medicine of the West” (14). Therefore, the traditional Chinese medicine that we know and define as traditional would have been around seventy years old, given that its concepts were shaped and reorganized through a process of institutionalization and as part of a nationalistic project. Its institutionalization was carried out thanks to the construction of schools, hospitals and clinics and also with the drafting of new textbooks. It is thus configured as a particular form of medicine promoted by the Chinese Communist Party on a global scale (12). Thanks to the policy of openness encouraged in the 1980s by Deng Xiaoping, many Chinese doctors began to seek their fortune abroad, and those already practicing alternative medicines became interested in it. The spread of traditional Chinese medicine in the West was promoted by the People’s Republic of China and supported by the World Health Organization. In any case, traditional Chinese medicine remains a medicine rooted in empirical observations formulated over thousands of years, but it is enough to think of the standardization process just described to make the definition ‘traditional Chinese medicine’ appear in a different light. Only after reflecting on these issues relating to both medical systems, is it possible to deepen their interaction in the clinical field.

Traditional Chinese medicine and the immune system

In traditional Chinese medicine, the immune system is considered Man’s second intelligence, an integrated complex of organs and systems that has evolved over time, perfecting itself into an “intelligent automatism” that protects the organism from the aggression of antigens through the synthesis of specialized molecules and the action of specific cells.

Over time, the immune system has evolved in perfected faculties: by ‘recognizing’ in the sense of ‘seeing’ and specifically ‘identifying’ the antigen, but also ‘remembering’.

Participation in the growth of ‘specific cell groups’ is understood here as a surveillance and alarm function and therefore as the faculty to trigger rejection reactions against anything that is foreign to the original genetic design of each individual. Analyzing the different types of responses, we distinguish in traditional Chinese medicine reactions:

- Yang: rapid and immediate, operated by the ubiquitous and circulating Wei Qi (defensive energy). These are the responses against foreign antigens, bacteria and extracellular pathogens in general.
- Yin: delayed, slow, cell-mediated. These are the responses by T lymphocytes and other immune cells to virus-infected cells and intracellular pathogens in general, neoplastic cells and transplants.

The anti-inflammatory effect of acupuncture

Accumulating data from literature illustrates that acupuncture has the ability to alleviate several inflammatory conditions, such as allergic rhinitis and asthma, as well as various chronic autoimmune disorders (15). Researches conducted in rat and mouse models have brought some light on the possible mechanisms of action that may involve the hypothalamus-pituitary-adrenal axis (16) and sympathetic pathways (via both sympathetic postganglionic neurons and the sympathoadrenal medullary axis) (17), as well as the parasympathetic cholinergic pathways (18). Moreover, several other mechanisms from human studies have been described to explain the various anti-inflammatory effects, including the antihistamine effects (19, 20), the inhibition of pro-inflammatory cytokines, such as IL-1 β , IL-6 and TNF- α (21, 22), and the inhibition of pro-inflammatory neuropeptides, such as vasoactive intestinal peptide and substance P (23).

The immunomodulatory effect hypothesis of acupuncture

The immunomodulator hypothesis played by acupuncture or electro-acupuncture (EA) is more recent, and an interesting field of research, but further studied

are needed to confirm this assumption. An immunomodulator is a therapeutic agent that can be chemical or biological in nature that aims to regulate, attenuating or activating them, the alterations of the body's immune responses, interacting on the effector cells and on those that inhibit the production of antibodies. This hypothesis is supported by several pieces of evidence, showing that the direct stimulation of specific points was able of: a) modulating neural-immune network; b) correcting the Th1/Th2 or Th17/Treg balances, and c) fostering natural killer (NK) cells' functions.

Concerning neural-immune interactions triggered by acupuncture, it is generally accepted that acupuncture or EA favor the release of different types of neurotransmitters, especially opioids, in the central nervous system and activates either of sympathetic or parasympathetic nervous system. This phenomenon is related to the induction of a potent analgesia, together to regulation of visceral functions and as well as immune regulation (24, 25). Several animal and human studies using brain imaging showed that EA treatment activate the hypothalamus (26, 27). Moreover, it has been described an increase of production of β -endorphins, which is mainly released from the hypothalamus, but after EA treatment also in the spleen, and this coincided with increase of NK cell cytotoxicity and IFN- γ release (28, 29). Of note, opioid receptors are expressed on immune cells, such as monocytes/macrophages and NK cells (30). From these studies it has been proposed that acupuncture-induced neural-immune interaction can be related to the activation of hypothalamus and release of endogenous opioid peptides. However, other investigations suggested that other mechanisms beyond opioid-dependent ones could be present, such as catecholamine and serotonin related (31, 32). Finally, it has been reported that EA treatment in rats triggered up-regulation of gene expression of serotonin receptor 3a, suggesting that serotonergic system could also be involved in neural-immune crosstalk (33).

Concerning naïve CD4⁺ T helper (Th) lymphocytes, these cells can be distinguished into three subpopulations: Th1, Th2 and Th17 cells based on the type of cytokines released (34-36). Th1 cells produce IFN- γ , IL-2 and TNF- β which are mainly responsible for cell-mediated immunity, Th2 cells release IL-4, IL-5, IL-10 and IL-13 which are involved in humoral

immunity, whereas Th17 produce IL-17, IL-21 and other cytokines with a function in anti-fungal and anti-bacterial defence. These Th subtypes regulate each other through released cytokines; in addition, there are regulatory T cells (Treg) that are capable of inhibiting the different Th subtypes directly or indirectly. i.e. via another cell type such as macrophage or dendritic cell. In allergic disorders, an IL-4 polarized immune response instructed by Th2-type function is involved in the overproduction of class E antibody (Immunoglobulin E, IgE) by B cells (37). Various clinical studies have shown acupuncture or EA to be beneficial for allergic disorders such as asthma and allergic rhinitis (38). For example, Park et al. showed that sequential ST36 EA stimulation significantly reduced the high level of IgE specific for 2,4-dinitrophenylated keyhole limpet protein (DNP-KLH) in a mouse model of allergy, and this result was acupoint specific (39). In addition, there have been some clinical studies demonstrating the beneficial effect of acupuncture on rheumatoid arthritis, an autoimmune disorder related to expansion and deregulation of Th1 cells (40, 41). This phenomenon could be in relation to the ability of acupuncture or EA to inhibit TNF- α release, a Th1 specific cytokine (42). However, the exact mechanisms behind the action of acupuncture or EA on classical Th1/Th2 diseases such as asthma and rheumatoid arthritis are not completely understood. Moreover, it has been shown that several types of autoimmune diseases are closely related to another subtype of T lymphocytes, that is Th17 cell subset. These cells play an important role in the progression of autoimmune diseases. Interestingly, it has been shown that moxibustion and acupuncture can modulate the balance between Th17 and Treg cells, inducing a protective response in various diseases, especially gastrointestinal diseases, such as Crohn's disease (43, 44). However, further studies will be needed to elucidate the long-term efficacy of moxibustion and acupuncture.

About NK cells, these are key innate lymphocytes capable of interacting with and killing virus-infected or neoplastic cells in the early stages of immune surveillance in a non-antigen-specific manner (45, 46). Their action is fast in inducing apoptosis-related cell death, but is not only confined to the cytotoxic capacity against dangerous host cells, in fact these cells

can also exert a regulatory role through the killing activity (47, 48), the secretion of different types of cytokines such as IFN- γ , TNF- α , and IL-10 (49, 50), chemokines, e.g. CXCL8 (51), growth factors, e.g. vascular endothelial growth factor (VEGF) (52) or enzymes such as metalloproteinase 9 (53). Interestingly, NK cells have more recently been investigated for their involvement in autoimmune reactions such as multiple sclerosis (54) and Graves' disease (55). Several independent studies have shown that EA stimulation at ST36 acupoint (once a day for 3 days) is capable of increasing splenic NK cell cytotoxicity activity in rats and mice (29, 56, 57). Interestingly, Choi et al. showed that injuries directed to the lateral hypothalamic area interrupted the effect of EA on NK cell cytotoxicity, suggesting that this specific hypothalamic area might be an important site for the neural-immune interaction during EA. Further, evidence from a clinical study showed that acupuncture was able to regulate leukocyte numbers and functions in peripheral blood from healthy volunteers, including NK cells (58).

Conclusions

Traditional Chinese medicine remains a medicine rooted in empirical observations formulated over thousands of years, but one need only think of the standardization process just described to make the definition 'traditional Chinese medicine' appear in a different light. Following the previous quote, the concept of deconstructing and reconstructing this millennia-old practice vis-à-vis what is called biomedicine becomes fundamental.

Acupuncture is probably the most popular alternative therapy practiced in Europe in the United States of America and in many Asian countries. It has been applied for more than five thousand years according to ancient Eastern medical theory. There have been several major research studies on acupuncture, with special efforts toward understanding its pain control effects. In addition to the analgesic effect of acupuncture, an increasing number of studies have shown that acupuncture treatment can control the functions of the autonomic nervous system function and immune modulation. Although only a limited number of controlled

studies have evaluated the efficacy of acupuncture or EA, increasing clinical evidence supports its efficacy for various immunologic diseases including several types of allergic disorders, and autoimmune disorders.

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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