



# Consistent Classification of Both Autonomous Nervous Functions and Acupoint Characters: Replacing the Theory of Meridian Classification

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## Abstract

**Introduction:** It is revealed by biomedical studies that the autonomous nervous system mediates most clinical effects of acupuncture/moxibustion. Whereas, it is advantageous for the classical meridian system to instruct acupuncture/moxibustion by classifying the various acupoints into related meridians. **Purpose:** It was aimed to replace the classical meridian system with the consistent classification of both autonomous nervous functions and acupoint characters. **Methods:** It was searched the relevant papers on autonomous nervous system and acupoints, then classified and summarized. **Results and Discussions:** It is classified the autonomous nervous functions into: a) Local sensory/vascular modulation, like pain, itch, local inflammation, acupuncture, etc.; b) Remote sensing coordination, including autonomous coordination to visual or acoustic attention, arousal, sleep induction and yawn, remote analgesia, and so on; c) Dynamic coordination, either contraction or stretch, including cardiovascular coordination to hand movement, and leg movement to change the intestine/urinary-bladder, consistent with the Chinese view on asymmetrical handedness advantageous in heart-arm coordination; d) Thoracic-abdominal-back coordination, including the sympathetic/parasympathetic regulation, with addition of enteric nervous system, cardiorenal interactions, gut blood-pressure interactions, etc.; e) Emotional coordination of sympathetic/parasympathetic system; f) Environmental coordination, including temperature regulation, day/night circadian coordination, etc. Correspondingly, with clinical supports and addition of anatomical location, it is consistently classified the characters of acupoints as: a) Anatomical location; b) Local sensory/vascular modulation; c) Remote sensing coordination; d) Dynamic coordination; e) Thoracic-abdominal-back coordination; f) Emotional coordination; g) Environmental coordination. **Conclusions:** It recommends Chinese medicine as joint using classification of both autonomous

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nervous functions and acupoint characters for diseases.

### Subject Areas

Neuroscience, Anatomy & Physiology, Clinical Medicine, Rehabilitation Medicine, Anaesthesiology & Pain Management

### Keywords

Pain, Acupuncture, Autonomic Nervous System, Attention, Muscle, Emotion

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## 1. Introduction

Progressions from many years of diverse biomedical studies have revealed that the various clinical effects of acupuncture and moxibustion result from autonomous nervous regulation [1]-[3]. Evidence accumulated over a long period of time has demonstrated that acupuncture can control various autonomic nervous functions including blood pressure, pupil size, skin conductance, skin temperature, muscle sympathetic nerve activities, heart rate and/or pulse rate, heart rate variability, and so on [1]-[3]. Acupuncture or moxibustion on some specific acupoints activates the sensory nerve fibers, spinal cord, and brain [2], while regulates the autonomous nervous system for anti-inflammation, gastrointestinal and cardiovascular functions, and so on [3]. Besides, research on autonomous nervous regulation by acupuncture and moxibustion has also been extended to animals [4].

Because of the diverse clinical effects of various acupoints and the diffuse nature of autonomous nervous system, it is difficult to depict the diverse mechanisms underlying acupuncture and moxibustion systematically with autonomous nervous system. Yuanhao Du classified the complex theoretical systems for acupuncture and moxibustion into traditional theory system (classical meridian system, classical non-meridian system and classical TCM system), and modern theory system (nervous or linear contact system and non-nervous or nonlinear contact system) [5]. Recently in 2024, Yuanhao Du further classified the mechanisms of acupuncture and moxibustion by their biomedical effects as either local or remote [6].

The classical meridian system is advantageous to instruct the practice of acupuncture and moxibustion in that it classifies the various acupoints into 14 linear chains on the body of humans as the 12 main meridians plus Ren and Du channels, with each linear chain of main meridian, Ren or Du channel connecting a group of acupoints of related clinical effects [7], convenient for diagnosis and treatment. Whereas, the 12 main meridians, functional classifying and connecting related acupoints, were created by ancient Chinese out of their philosophical compliance in classification of number to external world such as month [7], which was subjective and not scientific. In turn, it was further derived the classification of diseases from classification of 12 meridians, such as the 6 channel system in treatise on febrile disease [8].

It is obviously necessary to develop a systematical scientific theory to replace the unscientific classical meridian system. However, due to the diffuse nature of autonomous nervous system, it has not been classified the characters of acupoints to the corresponding autonomous nervous functions. In this article, in attempt to replace the classical theory of meridian classification, it is classified altogether both autonomous nervous functions and acupoint characters in consistence, so as to classify the acupoints scientifically.

## 2. Methods

In this article, it was adopted the method of reviewing all relevant fields of studies for integration and classification. It was cited the updated relevant reviews or, if not available, salient and repeated experimental results in subfields, and then integrated to classify and summarize. It is necessary to clarify that the presently widely utilized meta-analysis fits investigation of a specific topic in a well-studied subfield, but not for integration and classification from several fields of many diverse papers for this article.

Papers were searched out from Pubmed, CNKI and WanFang. The updated relevant reviews in subfields were given priority to cite. If not available, relevant reviews were cited. If still unavailable, the salient and repeated experimental results of original articles in subfields were cited.

The words and phrases utilized in the search of papers were as the followings: a) acupuncture, b) sympathetic, c) parasympathetic, d) enteric neural, e) pain, f) inflammation, g) the names of various acupoints, and so on. For every acupoint on the 12 main meridians plus Ren and Du channels, it was searched in attempt to find out their main clinical effects from CNKI and WanFang, even though some of them did not show any clinical paper.

## 3. Results and Discussions

### 3.1. Overview of Autonomous Nervous System

The autonomous nervous system is composed of the sympathetic, parasympathetic and enteric nervous system [9] [10]. The autonomic nervous system is diffuse and has widespread innervation to nearly every organ in the body [9] [10]. The peripheral sympathetic outputs are critical for maintenance of blood pressure, thermoregulation, and response to stress, while the parasympathetic reflexes control lacrimation, salivation, pupil response to light, beat-to-beat control of the heart rate, gastrointestinal motility, micturition, and erectile function [10]. The enteric system cooperates with the enteric glial cells, macrophages, interstitial cells, and enteroendocrine cells to regulate the intestinal digestion and homeostasis [11].

Some special peripheral sensations are mediated by the autonomous nervous system. Pain is often accompanied by intensive sympathetic activation [12] [13], while itch may be regulated by parasympathetic activities [14].

The central control of autonomous nervous system often manifests as the phys-

iological effects of various emotions, such as fear and anxiety by amygdala [15] and hypothalamus [16], as well as parasympathetic activation by pleasure [17], and so on. Besides, the hypothalamic suprachiasmatic nucleus regulates the circadian change of sympathetic/parasympathetic balance [18] [19].

In summary, the autonomous nervous system is diffuse in anatomy, composed of the widespread sympathetic, parasympathetic and enteric nervous system, while manifests diverse functions in various organs and reactions. In this regard, appropriate classification of autonomous nervous functions may help clearly elucidate the complicated effects and interactions of autonomous nervous system, especially in relation to the acupuncture and moxibustion highlighted in this article.

## **3.2. Classification of Autonomous Nervous Functions**

### **3.2.1. Local Sensory/Vascular Modulation**

As mentioned above, some peripheral sensations, such as pain and itch, are mediated by the autonomous nervous system, in which pain is related to sympathetic activation [12] [13], and itch to parasympathetic activities [14].

Even though the autonomous nervous system is diffuse in innervation, there is local autonomous modulation onto pain. Sympathetic activation usually potentiates pain [12] [13], whereas acupuncture is often adopted as local autonomous modulation against pain, often as analgesia [20] [21].

Similar to local pain, acupuncture is also utilized to exert autonomous modulation onto local inflammation, mainly via vasodilation [20] [21] and the release of adenosine [20].

In summary, local sensory/vascular modulation by autonomous nervous system is relatively localized in effects, as either activation, like sympathetic potentiation of pain, or inhibition, like acupunctural analgesia against pain and inflammation.

### **3.2.2. Remote Sensing Coordination**

The autonomous nervous system is diffuse, and can thus coordinate in distance for attentional cooperation of multiple sensations. The focus of this coordination lies in the bodily autonomous coordination to visual or acoustic attention, arousal, sleep induction and yawn, remote analgesia, and so on.

For eye, attention to emotional, cognitive or arousal inputs may result in pupillary constriction or dilation, so that pupil size is the indicators of pupillary coordination to internal autonomous state [22] [23], which can be modulated by other input like emotions [22] [23], pain, etc.

For ear, attention to acoustic inputs may change the autonomous nervous functions in skin conductance, heart rate variability and so on [24] [25]. It has further been demonstrated that the amygdala and auditory cortex play important functions in mediating acoustic influences [26] [27].

For the attentional coordination of eye and ear, the ear is sensitive as important sensing detector to the lateral or caudal blind field of eye. Indeed, it was demonstrated that, in deafness, compensatory changes occurred within the visual system

enhancing the attentional processing of the peripheral or lateral visual field [28] [29]. In this regard, the ear would supplement the lateral or caudal attention to the eye, while the eye movement along with head be additionally required for attention to peripheral, lateral or caudal visual field [28] [29]. These are important for the differentiation of visual and acoustic sensing associations with acupoints in limbs and head/neck.

For arousal, sympathetic system manifests more active in waking than in sleep [30], while insomnia, difficult to fall asleep, is characterized by sympathetic over-activation and parasympathetic reduction [30]. Pain usually results in sympathetic activation [12] [13], and causes arousal.

For sleep induction, it turns into the sleep state with eye and ear unresponsive to outside input. Autonomic dysfunction may cause some sleep disorders [30] [31], including insomnia. Yawning occurs when sleepy. Yawning is induced by warm head and is hypothesized to function to cool the head [32]. In contrary, the second phase of yawning as expiration may facilitate facial neurovascular regulation [33].

For remote analgesic effects, it has often been adopted in acupuncture. For instance, it was reported that acupuncture at acupoint Qunlun (BL60) on foot produced remote analgesic effect for painless labor [34].

In summary, remote sensing coordination includes the bodily sympathetic/parasympathetic coordination to visual or acoustic attention, the sensing detection of ear to the blind field of eye, the autonomous regulation for arousal, sleep induction, insomnia, yawn, the remote analgesic effects of acupuncture, and so on.

### 3.2.3. Dynamic Coordination

It is common knowledge that the autonomous nervous system would be adjusted to coordinate with dynamic muscular movement, either contraction or stretch. For cardiovascular system, some authors have recently reviewed the sympathetic and parasympathetic changes in mediating the specific cardiovascular and hemodynamic responses to exercise [35] [36]. Besides, it is worthy to mention that, in consistence, a Chinese Member of satellite group hypothesized that the advantage of asymmetrical handedness could correlate to its long-term cooperation with heartbeat during muscular contraction and hand movement [37], which was supported by the observations that the left-handers manifested higher frequencies of heart irregularities [38], while the non-right handedness was higher in risk for sudden death associated with coronary artery disease [39].

Besides hand movement, the movement of leg may mechanically change the shape of intestine and urinary bladder. It has recently been demonstrated that leg walking is effective to ameliorate constipation [40], while beneficial to reduce the risk of lower urinary tract symptoms [41] [42].

In summary, the autonomous nervous system must be adjusted to coordinate with the dynamic muscular movement, either contraction or stretch, including both hand and leg.

### 3.2.4. Thoracic-Abdominal-Back Coordination

It is deserved to specially highlight the thoracic-abdominal segments of body for autonomous nervous regulation, because, in addition to the sympathetic/parasympathetic cardiovascular, respiratory, digestive, urological and reproductive coordination, there it is present a third enteric nervous system [9] [11], as well as the complex interactions like cardiorenal regulations [43] [44] and gut blood-pressure regulations [45] [46].

The enteric neurons work together with other enteric cells such as the glial cells, macrophages, interstitial cells, and enteroendocrine cells to precisely regulate in space and time the digestion and intestinal homeostasis [11].

Both heart and kidneys are crucial in maintaining volume status [43] [44]. Proper kidney function is necessary to excrete regulated amount of water and solutes and adequate heart function is inevitable to sustain renal perfusion pressure, oxygen supply, and so on. As these two organs are bidirectionally interconnected, injury of one would lead to dysfunction of another, which is known as cardiorenal syndrome [43] [44].

Recent studies have indicated that the gut microbiome can regulate blood pressure [45] [46]. Several mechanisms and systems may be involved in the regulation, such as the renin-angiotensin-aldosterone system, autonomic nervous system, and immune system [45] [46].

It is necessary to further consider the back side of thoracic-abdominal segments of body. The sympathetic/parasympathetic neurons innervate the back side differently as compared to the thoracic-abdominal side of the same segments. In Chinese medicine, the acupoints on the thoracic, abdominal and back areas are different and sometimes even complementary in clinical effects [47], supporting the differentiation.

In summary, it is reasonable to classify the complex interactive thoracic-abdominal-back coordination into one separate category.

### 3.2.5. Emotional Coordination

Various emotions coordinate the autonomous nervous system. It has been reviewed that the amygdala regulates the behavioral and autonomic responses associated with a number of emotional responses including conditioned fear and anxiety [15], while the hypothalamic orexin neurons are activated by fearful stimuli to evoke a defense reaction through coupling to amygdala via noradrenergic neurons in the locus coeruleus [16]. In contrast, it has been reported that the parasympathetic-related heart rate variability increased by pleasure enhancement of dancing [17].

In summary, emotions coordinate the diverse autonomous nervous system to generate various physiological effects.

### 3.2.6. Environmental Coordination

Environment influences the whole body of a human, so that also affects the autonomous nervous system from the whole body. The environmental temperature

and circadian change exert the salient effects of environmental coordination onto autonomous nervous system.

For environmental effects of ambient temperature, the autonomous nervous system of mammals manages to maintain constant body temperature in response to any change of ambient temperature, called as thermoregulation. To deal with cold challenge, the primary sources of neurally regulated metabolic heat production are increase in heart rate, shivering in skeletal muscle and mitochondrial oxidation in brown adipose tissue [48]-[50]. In mammals, the thermogenesis-promoting neurons in dorsomedial hypothalamus can activate excitatory inputs to spinal sympathetic and somatic motor circuits to drive thermogenesis of muscular shivering [48] [49], while the uncoupling protein-1 in brown adipose tissue can directly uncouple phosphorylation in a controlled manner and release the energy of proton-motive force as heat, called as non-shivering facultative thermogenesis, which is also regulated synergistically by the sympathetic nervous system and thyroid hormone [48] [50]. To deal with hot challenge, sweat secretion is adopted, and is regulated by the sympathetic system [48] [51].

Another salient environmental change is the circadian alteration of day and night. It is the hypothalamic suprachiasmatic nucleus that regulates the biological circadian change of sympathetic/parasympathetic balance [18] [19].

In summary, environment influences the whole body of a human and the autonomous nervous system. Ambient temperature and circadian alteration are the salient examples.

### **3.2.7. Functional Classification of Autonomous Nervous System**

In all, according to the depictions and demonstrations in all of subsection 3.2. "Classification of Autonomous Nervous Functions", the autonomous nervous functions are classified into: a) Local sensory/vascular modulation; b) Remote sensing coordination; c) Dynamic coordination; d) Thoracic-abdominal-back coordination; e) Emotional coordination; f) Environmental coordination.

## **3.3. Classification of Characters of Acupoints**

### **3.3.1. Consistence of Autonomous Nervous Functions and Acupoint Characters**

Many years of clinical and biomedical studies have demonstrated that most effects of acupuncture and moxibustion are mediated via the autonomous nervous regulation [1]-[3]. For this article, it is attempted to replace the unscientific classical theory of meridian classification with consistent classification of both of autonomous nervous functions and acupoint characters. With the classification of autonomous nervous functions finished, it is feasible to consistently classify the characters of acupoints correspondingly with clinical supports.

However, the autonomous nervous system is diffuse in nature, so that the location and anatomy of an acupoint has not been included in the classification of autonomous nervous functions. In this regard, it is necessary to supplement the location and anatomy of acupoint to the consistent classification of characters of

acupoints.

### 3.3.2. Character of Anatomical Location of Acupoint

Anatomical location is an important character of acupoint, whereas not corresponding to the autonomous nervous functions classified above. The classical anatomical locations of 361 acupoints on the 12 main meridians plus Ren and Du channels on the body of humans have already been reviewed by Chapple in an open access paper for propagation to the world [52].

Moreover, recently many investigations have been performed to reveal the local detailed anatomy of some important acupoints. Based on these preliminary anatomical investigations, Lou and Jiang summarized the anatomical structures of acupoints as composed of: a) The acupoint kernel formed by neurovascular bundles or the tissue containing abundant nerves and blood vessels [53]; b) The acupoint shell formed by the cleft or tunnel of bones, muscles or fascia [53]. Based on the shape of acupoint, Lou and Jiang further classified the acupoints into three types as cleft, tunnel, and terminal [53], among which the terminal type possessing the exposed neurovascular bundles or nerves.

In summary, the character of anatomical location for acupoints has been well studied and reviewed, with detailed acupoint anatomy composed of acupoint kernel and shell.

### 3.3.3. Character of Local Sensory/Vascular Modulation

Corresponding to the local sensory/vascular modulation of autonomous nervous function, the acupoint characters on local sensory/vascular modulation have manifested in many clinical effects and biomedical studies, especially on local modulation of pain and inflammation.

For pain, acupuncture has often been utilized as local autonomous modulation against pain, usually as analgesia [20] [21]. Whereas, acupoint sensitization also occurs as the result from sympathetic-sensory coupling [54].

Acupuncture has often been adopted to modulate the autonomous nervous functions in local inflammation, usually via vasodilation [20] [21] or release of adenosine [20].

In summary, local sensory/vascular modulation is a character of acupoint.

### 3.3.4. Character of Remote Sensing Coordination

Corresponding to the remote sensing coordination of autonomous nervous function, the acupoint characters of remote sensing coordination belong to the bodily sympathetic/parasympathetic coordination to visual or acoustic attention, arousal, sleep induction and yawn, and remote analgesia.

For visual or acoustic attention, as mentioned above, the ear is sensitive as supplementary sensing detector to the lateral or caudal blind field of eye [28] [29], while eye movement along with head is further required for attention to peripheral, lateral or caudal visual field [28] [29]. These are important for the association of visual or acoustic attention with autonomous status of acupoints on limbs and

head/neck. Indeed, it has been demonstrated that acupuncture at acupoint Binao (LI14) on lateral arm [55], Lidui (ST45) on frontal foot toe [56] or Fengchi (GB20) at caudal neck [57] can treat various ophthalmic diseases, while acupuncture at Zhongzhu (TE3) on back of hand [58], Fengshi (GB31) on the lateral leg [59], or Tianyou (TE16) at caudal neck [60] can treat various otologic diseases.

For arousal, sympathetic system is more active in waking than in sleep [30]. In consistence, stimuli to some sensitive acupoints may cause arousal and sympathetic activation. Indeed, it has been reviewed that the acupoint Suliao (DU25) on nose is often adopted to treat coma and elevate blood pressure via sympathetic activation in humans [61]. Besides, it was reported that electroacupuncture of acupoint Shenmen (HT7) on wrist activated the cardiac sympathetic activities in acute myocardial ischemia rabbits [62].

For sleep induction, insomnia is characterized by sympathetic overactivation and parasympathetic reduction [30], while yawning is facilitated by warm head [32] with latter expiration by lung potentially facilitating facial neurovascular regulation [33]. In consistence, it has been demonstrated that insomnia can be treated by electroacupuncture at acupoint Shenmen (HT7) on wrist and Sanyinjiao (SP6) on lower leg to reduce sympathetic adrenal medullary system [63], or moxibustion to increase temperature at acupoint Baihui (DU20) on skull [64], or acupuncture at acupoint Dabao (SP21) in the lateral skin surface of lung [65].

For remote analgesia by acupuncture, there are many examples. It was reported that, for painless labor, acupuncture at acupoint Qunlun (BL60) on foot was adopted to exert analgesic effect in birth [34].

In summary, remote sensing coordination is an important character of acupoint, which has been widely studied.

### 3.3.5. Character of Dynamic Coordination

Corresponding to the dynamic coordination of autonomous nervous function, the acupoint characters of dynamic coordination manifest as the autonomous coordination of acupoint in dynamic muscular movement of hand or leg, as either contraction or stretch.

The most salient character of dynamic coordination of acupoint is the effects of forearm acupuncture on cardiovascular system. It was reported that acupuncture at both acupoint Neiguan (PC6) and Jianshi (PC5) on forearm regulated the cardiac autonomic nerve in healthy persons [66]. On the other hand, acupuncture on leg or foot is usually utilized to treat intestinal or urological/reproductive diseases. It has been demonstrated that acupuncture at acupoint Zusanli (ST36) on lower leg is adopted to treat gastrular or gut diseases [67], while acupuncture at acupoint Jiaoxin (KI8) on lower leg to treat urological diseases [68], and moxibustional acupuncture at Heyang (BL55) to treat reproductive disease dysmenorrhea [69].

In summary, dynamic coordination is a character of acupoint widely utilized to treat diseases.

### 3.3.6. Character of Thoracic-Abdominal-Back Coordination

Corresponding to the thoracic-abdominal-back coordination of autonomous nervous function, the acupoint characters of thoracic-abdominal-back coordination manifest not only the sympathetic/parasympathetic-related cardiovascular, digestive, urological and reproductive coordination, but also the participation of a third enteric nervous system [9] [11], and the complex interactions as cardiorenal regulations [43] [44] and gut blood-pressure regulations [45] [46].

For enteric nervous system, it has been demonstrated that, acupuncture adjusts the enteric nervous system to treat slow transit constipation, through various channels including ganglion cells, nerve plexus, neurotransmitter and TRPV1 [70].

For cardiorenal regulation, it has been reviewed that the acupoint YinLingQuan (SP9) on lower leg is adopted to treat both urological diseases and peri-arthritis of shoulder [71], implicating the cardiorenal coupling character of this acupoint.

For gut blood-pressure regulation, by meta-analysis, it has recently been reviewed that the risk of stroke(blood pressure) increases in constipation patients [72]. Fortunately, acupuncture has been reviewed as the very good method to treat post-stroke constipation [73], implicating the character of related acupoints for gut blood-pressure regulation.

In summary, the characters of thoracic-abdominal-back coordination for acupoints are complex and complicated, which are under wide investigations.

### 3.3.7. Character of Emotional Coordination

Corresponding to the emotional coordination of autonomous nervous function, the acupoint characters of emotional coordination mainly manifest as the effectiveness of acupuncture and moxibustion to treat the emotional unbalance in various psychiatric diseases, including depression, anxiety, schizophrenia, and so on.

For depression, it has been reviewed that acupuncture, when compared to conventional pharmacotherapy, exhibits significant efficacy as a standalone treatment after weeks of intervention, with fewer side effects and adverse reactions [74] [75]. In future, further investigation is needed to determine the most effective acupoints and appropriate types of acupuncture techniques for treating depression.

For anxiety, it has been reviewed that acupuncture therapy aimed at reducing anxiety in patients has certain beneficial effects as compared to controls [76] [77], even though rigorous clinical trials or systematic reviews on this topic are still in need for future.

For schizophrenia, it has been reviewed that acupuncture may have some anti-psychotic effects as measured on global and mental state with few adverse effects [78], or acupuncture be adopted as add-on therapy in the treatment of patients with schizophrenia [79]. More investigations are required in future.

In summary, the characters of emotional coordination for acupoints are successful in application to assist treating psychiatric diseases, including depression, anxiety, schizophrenia, and so on.

### 3.3.8. Character of Environmental Coordination

Corresponding to the environmental coordination of autonomous nervous function, the acupoint characters of environmental coordination manifest as acupoint detection of ambient temperature and acupunctural treatment of temperature disorder, and as circadian sensitivity of acupoints.

For ambient temperature, the mammals keep constant body temperature by autonomous thermoregulation. The acupoints detect the ambient temperature, which is the character of environmental coordination of acupoints. The acupoints are composed of acupoint kernel of neurovascular bundles or abundant nerves and blood vessels [53], and acupoint shell of cleft or tunnel of bones, muscles or fascia [53]. It is the neurovascular bundles or abundant nerves in acupoint kernel that can detect the ambient temperature.

Besides, acupuncture has also been adopted to treat temperature disorder such as fever, which is another manifestation of acupoint character on temperature. For example, it has been reviewed that acupuncture at Acupoint Quchi (LI11) on elbow can help treat fever [80].

For circadian alteration of day and night, the hypothalamic suprachiasmatic nucleus regulates the circadian change of sympathetic/parasympathetic balance [18] [19], which results in the circadian character of acupoints. It was reported that the action of acupuncture to prevent the formation of experimental gastric ulcer manifested circadian changes [81], indicating the circadian character of acupoint.

In summary, the characters of environmental coordination for acupoints manifest as detection by acupoints to ambient temperature and acupunctural treatment of temperature disorder, circadian change in sensitivity of acupoints, and so on.

### 3.3.9. Classification of Characters of Acupoints

In all, according to the depictions and demonstrations in all of subsection 3.3. “Classification of Characters of Acupoints”, corresponding to the classification of autonomous nervous functions, with clinical supports and addition of anatomical location, the characters of acupoints are consistently classified into: a) Anatomical location; b) Local sensory/vascular modulation; c) Remote sensing coordination; d) Dynamic coordination; e) Thoracic-abdominal-back coordination; f) Emotional coordination; g) Environmental coordination.

It is noted that any one acupoint has several characters, at least the characters of anatomical location and environmental coordination. On the other hand, some acupoints may not have all characters, because those acupoints on head may not have the character of dynamic coordination, while those on abdomen may not have the character of remote sensing coordination.

## 3.4. Joint Use of Classification of Both Autonomous Nervous Functions and Acupoint Characters for Diseases

In Chinese medicine, from classification of 12 meridians, it was derived the clas-

sification of diseases, especially the widely utilized 6 channel system in treatise on febrile disease [8]. The 6 channel system divided the diseases according to such manifestations of symptoms as fever, cold, sweat, thirsty, vomit, cough, urine, constipation, vascular pulsation, tongue coating, and so on, most of which were regulated by autonomous nervous system. Accordingly, the classification of autonomous nervous functions here can definitely replace the 6 channel system in Chinese medicine in related diseases.

Joint use of 12 meridians and 6 channel system is adopted for treating diseases in Chinese medicine, corresponding to joint use of classification of both acupoint characters and autonomous nervous functions respectively. Because the consistent classification of autonomous nervous functions and acupoint characters is more scientific, it is perspective to replace the classical classification of 6 channel system and 12 meridians in Chinese medicine for treating related diseases.

#### 4. Conclusions

In this article, it is attempted to replace the classical theory of meridian classification by consistent classifying both autonomous nervous functions and acupoint characters.

The autonomous nervous functions are classified into: a) Local sensory/vascular modulation, including pain, itch, local inflammation, acupuncture, and so on; b) Remote sensing coordination, including autonomous coordination to visual or acoustic attention, arousal, sleep induction and yawn, remote analgesia, and so on; c) Dynamic coordination as either contraction or stretch, including cardiovascular coordination to hand dynamic actions, leg movement to mechanically change the shape of intestine and urinary bladder, and so on; d) Thoracic-abdominal-back coordination, including the sympathetic/parasympathetic regulation of heartbeat, respiration, digestion, excretion, reproduction, the addition of enteric nervous system, as well as the cardiorenal interactions, gut blood-pressure interactions, and so on; e) Emotional coordination of sympathetic/parasympathetic system to cause related physiological effects; f) Environmental coordination, including response to change in ambient temperature, day/night circadian adaptation, and so on.

In consistence, corresponding to the classification of autonomous nervous functions, with clinical supports and addition of anatomical location, the characters of acupoints are consistently classified as: a) Anatomical location; b) Local sensory/vascular modulation; c) Remote sensing coordination; d) Dynamic coordination as either contraction or stretch; e) Thoracic-abdominal-back coordination; f) Emotional coordination; g) Environmental coordination.

Joint use of classification of both autonomous nervous functions and acupoint characters for diseases is perspective to replace the joint use of 6 channel system and 12 meridians in Chinese medicine to treat diseases.

**Table 1** summarizes the consistent classification of autonomous nervous functions and acupoint characters.

**Table 1.** Consistent classification of autonomous nervous functions and acupoint.

Classification	Autonomous Nervous Functions	Acupoint Characters
<b>Anatomical Location</b>	Diffuse to the whole body.	Bodily location and three structural types as cleft, tunnel, or terminal for acupoints
<b>Local Sensory/Vascular Modulation</b>	Including pain, itch, local inflammation, acupuncture, and so on.	Acupunctural analgesia, acupoint sensitization, etc.
<b>Remote Sensing Coordination</b>	Sympathetic/parasympathetic coordination to visual or acoustic attention, arousal, sleep induction and yawn, remote analgesia, and so on.	Limb/neck acupoints to treat eye and ear diseases. Acupoints to treat coma, insomnia and pain.
<b>Dynamic Coordination</b>	Sympathetic/parasympathetic coordination to hand movement, leg-mechanic change of shape of intestine and urinary bladder, etc., as either contraction or stretch in movement.	As either contraction or stretch. Forearm acupuncture to regulate cardiac autonomic nerve. Acupuncture on leg or foot to treat intestinal, urological/reproductive diseases.
<b>Thoracic-Abdominal-Back Coordination</b>	Sympathetic/parasympathetic regulation of heartbeat, respiration, digestion, excretion, reproduction, addition of enteric nervous system, and cardiorenal interactions, gut blood-pressure interactions, and so on.	Complicated dual effects of some acupoints able to treat dual cardiorenal diseases, or to treat dual gut blood-pressure diseases.
<b>Emotional Coordination</b>	Emotional coordination of sympathetic/parasympathetic system to generate physiological effects.	Acupoints to treat such psychiatric diseases as depression, anxiety, schizophrenia, etc.
<b>Environmental Coordination</b>	Including response to change in ambient temperature, day-night circadian adaptation, etc.	Acupoint detection of ambient temperature and acupunctural treatment of temperature disorder, circadian acupoint sensitivity, and so on.

## 5. Limitations

The limitations of this consistent classification of autonomous nervous functions and acupoint characters may include: a) Clinical data are deficient for some acupoints, which need more investigations. b) Biomedical studies on relation of autonomous nervous functions and acupoint characters are limited and focused on a portion of frequently utilized acupoints, and more investigations are required. c) There may be some acupoints beyond the 12 main meridians plus Ren and Du channels, which are not covered in this review.

## Conflicts of Interest

The author declares no conflict of interest for this work.

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