

The correspondences between the sound vibrations
and natural frequencies of acupuncture meridians

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Introduction

The purpose of this study is to establish a resonant association between acupuncture meridians and vibrations of the sound range. The work is aimed at the practical implementation of therapeutic methods based on pulse spectral analysis (version of Pulse Metabolic Analysis (PMA)).

About 12 Lu (the system of the twelve pitch pipes)

In the musical theory of ancient China, an important place was taken by the doctrine of the 12 Lu system, where there is a scale of 12 tones within an octave. It is impossible to form a complete picture of the ancient Chinese musical theory without an understanding of the structure of this system. On the basis of it all traditional systems are built. However, the 12 Lu system is more than a collection of musical tones. It had a general cultural value as a theoretical basis for social regulation in the country and the achievement of human mental harmony. Its mathematical laws were laid in the basis of the system of measures and weights, were taken into account when drawing up calendars.

Many legends have been created about the amazing qualities of 12 Lu. To the point to say, in all ancient civilizations, they looked at music as something capable of exerting a transforming influence on nature. It was the same in China. Legends report that famous musicians with their playing pacified the winds and curbed the heat of the Sun, under the influence of their music, grains germinated in a short time, living organisms developed at a fantastic pace [1], p. 92.

In the theory of building a system of 12 Lu, it was assumed that after establishing of the main note, Huangzhong (“Yellow Bell”), the remaining notes are determined by purely mathematical relationships, fixed by the quint stroke method with periodic octave transposition of the steps.

The drawing (fig. 1 below) of a set of tubes of 12 flutes of different lengths calculated by a special algorithm is presented in [2] (p. 174, fig.316).

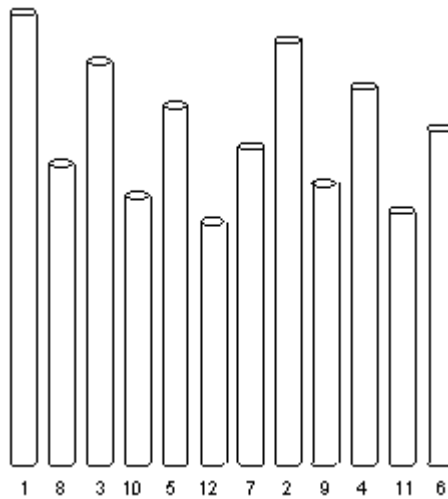


Fig. 1

The interrelation between the Doppler model of meridian's origin and the system 12 Lu

On the other hand, in [3], the Doppler model of the physical origin of the meridians and elements is given. If it will be taken into account the hierarchy of natural frequencies of meridians based on the frequencies of the visible spectrum starting with the lowest frequency of Urinary bladder meridian and if we assign the numbers to each meridian in accordance with characteristics of vibrations the scheme of the meridians fully coincides with the numbering in Fig. 1:

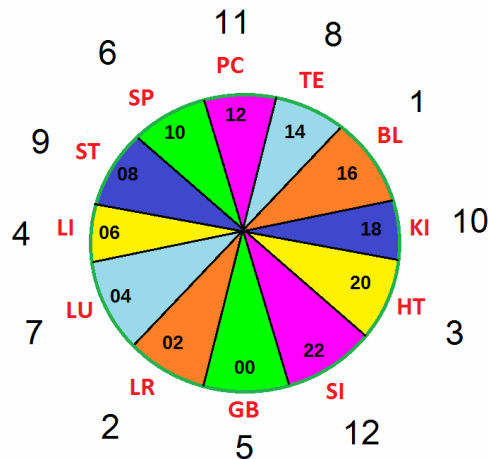


Fig. 2

The only point in the divergence of the Doppler model diagram in Fig. 2 and the system 12 Lu in Fig. 1 is the order of the meridians of the Yang (odd) and Yin (even) systems of meridians. The flute set should start with the instrument number eight.

Making a permutation, we obtain the order of the flutes, built in according with the daily circulation of meridians in the context of correspondence with the colors of the visible spectrum. Then the system of 12 Lu will take the following structure:

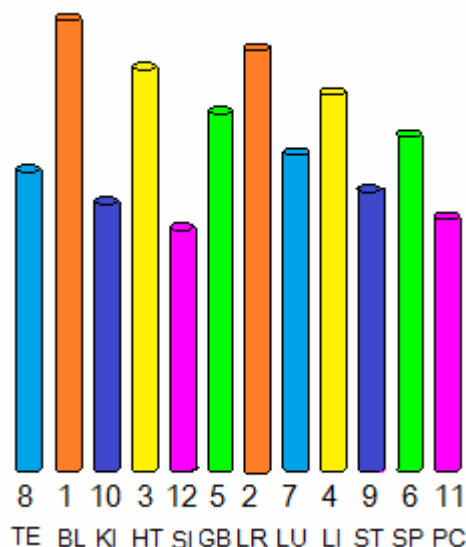


Fig. 3

If we build a hierarchy in order of increasing the natural frequencies of the flutes, we will get the following sequence of meridians (Fig.4), where the frequencies increase from left to right.

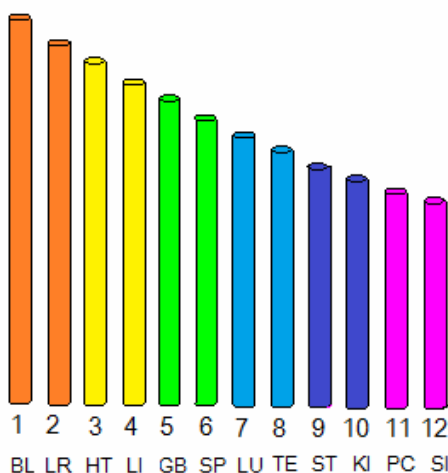


Fig. 4

It is easy to notice that in Figure 4 the meridians are numbered by even and odd figures and again we can see two systems inside the order where the meridians follow in the daily circulation sequence.

The odd system (assumed as Yang one, centrifugal and expanding) is formed by the vector of the Aether flow from the Sun towards space. It starts from the Pericardium Meridian (PC), and then follows via Urinary Bladder (BL) - Heart (HT) - Gall bladder (GB) - Lungs (LU) - Stomach (ST).

The even system (assumed to be Yin, centripetal and compressing) is formed by the vector of the Aether flow from the space. It starts at the Small Intestine meridian (SI) and further follows via Liver (LR) - Large intestine (LI) - Spleen (SP) - Triple energizer (TE) - Kidneys (KI).

It is supposed that such a sequence in Fig. 4 will set the structure in the natural sound octave. The only question is what position in the octave will be taken by the resonant frequency of each meridian in relation to the traditional initial “Do” note.

Setting the reference frequency of the acoustic interval

Based on the conditions developed by the Doppler model of the origin of meridians, the Small Intestine (SI) meridian has the densest, high-frequency characteristic, through which the cosmic energy impulse is transmitted to the structure of 12 meridians (see Fig. 2). For all creatures on the planet Earth, the vibrations of this impulse will be the basis, the root cause and the reference resonator of any oscillating processes in an organism - just like for a computer, the CPU clock speed plays the same role.

Therefore, the question arises regarding the natural frequency of the impulse generated by the Cosmos. And here we make the assumption that the Earth has the main resonance, which is determined by the diameter of the planet. It is the diameter of the Earth that is formed by the general vibrational field of the Universe. The waves of the Aether, washing the planets, forms their diameters like sea waters make round pebbles at the seashore.

The Earth has a diameter of 12,742,000 meters in an environment where the elastic waves of the Aether propagate at the speed of light - 299,792,458 meters per second.

Dividing the distance traveled by the waves of the Aether in one second by the diameter of the Earth, we obtain the resonant frequency of our planet - 23.528 Hertz.

If we divide this frequency by 3, then we get the frequency of the first harmonic of Schumann resonance - 7.84 Hertz. This fact indirectly shows the correctness of the objective of this study.

The cosmic impulse frequency is the reference frequency of the Small Intestine meridian and it makes possible to build the octaves of the vibrations of the meridians - just like it is done in the Pythagorean system and Chinese music theory using the quint stroke (multiplication by 3/2) and the inverse octave transposition (dividing by 2).

Our reference frequency of 23.528 Hertz in some approximation corresponds to the officially recognized (calculated from 440 Hertz) note Fa-diese - 23.12465 Hertz.

Calculation of the resonant interval of the acoustic range

Using the quint stroke (multiplication by step 2/3), we get the following main frequencies of other meridians (starting from the reference frequency, the next frequency falls on the seventh interval inside the octave):

Sol	G	1	BL						401.996		
Sol-diese	G#	2	LR			52.938					
La	A	3	HT							904.491	
La-diese	A#	4	LI				119.110				
Si	H	5	GB	15.899							2035.106
Do	C	6	SP					267.997			
Do-diese	C#	7	LU		35.292						
Re	D	8	TE						602.994		
Re-diese	D#	9	ST			79.407					
Mi	E	10	KI							1356.737	
Fa	F	11	PC								
Fa-diese	F#	12	SI	23.528							3052.658

Fig. 5

Fig. 5 shows the full set of main frequencies of all meridians at the scale of seven octaves. All basic frequencies are interconnected by integer resonant ratios, which form the vibrational holism of the entire system.

By the way, in Fig. 5 you also see the order of the meridians, which reflects the true structure of the Solfeggio musical order (from the note of Sol to the note of Fa-diese), which, in our opinion, was relatively recently replaced by the order starting from the Do tone. In this light, an attempt to mnemonize notes by music theorist Giovanni Doni (conditionally born at 1593, Florence, Italy) looks rather interesting (it's very likely that he was one of the inquisitors of the ancient musical system):

- “Do - Dominus, Lord, i.e. God;
- Si - Sider, star, i.e. all galaxies;
- La - Lactae, milk, our Milky Way galaxy;
- So - Sol, Sun;

Fa - Fata, fate. Fate is ruled by the planets; hence Fa is the planets;
Mi - Microcosmos, the small universe, the Earth;
Re - Regina Coeli, Queen of the Heavens, the Moon;
Do - Dominus [4].

Please note the symbol of Fa music tone is presented as the manifestation a planet - it is a very magic coincidence with our suggestion regarding the source of all vibration on the Earth.

And if we try to translate Solfeggio into literature language the following image will arise before our inner sight:

"The Sun in the Milky Way galaxy is shining like a star. There are Lord with his Queen on the Moon are creating their own universe on the Earth". Interesting. Isn't it?

But let's return to the main aim of this article.

In the quint structure, traditional theorists of music, see the problem in the so-called Pythagorean comma - the interval arising from the difference in the quint course and in the formation of an octave. The Comma was destroyed by creating a uniformly tempered musical order (Marin Mersennus or le Père Mersenne, "Universal Harmony"). However, we must understand that it is this interval of the Pythagorean Comma that allows maintaining the resonant excitation of only that part of the quint circuit and only of the organ whose vibrations correspond to the vibrations of the external environment at a given time. Such an order establishes normal metabolic rhythms, excluding the simultaneous occurrence of opposite biochemical reactions in the same space of an organism at the same time.

The quint resonance excitation is a natural process. It can be seen on the structure of vibrations of the visible solar spectrum. The middle of the spectrum (green area) must determine the width of the octave. On the other hand, it must correspond to the Planck wavelength through the quint stroke - the Planck length is considered to be the limiting value of distance; this is Tao and the original unit of our Universe.

Let's check these 2 assumptions.

a. At Fig. 5 the main frequency of the Gallbladder (GB) meridian is 2035.106 Hertz. Let us find the length of the electromagnetic wave corresponding to this frequency - we should divide the speed of light by the frequency of the Gallbladder meridian: Wavelength: $299,792,458 \text{ m/s} / 2035.106 \text{ Hertz} = 147310.488 \text{ meters}$. Then we divide this wavelength by the quint coefficient (1.5 or 3/2) until the number close to the Planck wavelength is reached ($1.616255 * 10^{-35} \text{ meters}$).

This number will be $1.5686204139164193945195446700644 * 10^{-35}$ meters. The error of the discrepancy is at 2.94% and we can consider it as acceptable value taking into account the very wide numerical range of calculations we have made.

b. Let us return to the main frequency of the Gallbladder meridian 2035.106 Hertz, the electromagnetic wavelength of which was found above = 147310.488 meters. We transpose this wavelength towards the optical range with the help of division by 2 as it is made to build the order of octaves. The result is a wavelength of 536 nanometers. It is supposed as the middle of the optical range of waves - the middle of the green part of the spectrum. With a quint stroke (dividing by 1.5 or 3/2) down we will get the lower limit of the optical range - 357 nanometers, and by doubling the nominal of the lower range - we get the upper limit - 714 nanometers. At a bandwidth of 357 (from 357 nm to 714 nm) nanometers, each of the 12 meridians takes approximately 30 nanometers. As it was mentioned above, the highest in frequency (or the lowest in wavelength) is Small intestine meridian and it starts the optic octave at 357 nanometers), then Pericardium wavelengths begin at $357\text{nm} + 30\text{nm} = 387$ nanometers, and so on towards lower frequencies and longer waves. These data can be used to select the correction of the vibrational balance of organism using techniques that use the spectra of visible light. The lower limit of the optical range should also resonate with the Planck wavelength through a sequence of quint transformations (division by 1.5). Let's check this assumption: $357\text{ nm} / 1.5\text{ nm}$. The nearest result will be equal to $1.6646437184808039552007793437985 * 10^{-35}$ meters. It has a with the official Planck wavelength of $1.616255 * 10^{-35}$ at the accuracy of about the same - 2.99%, as it was calculated here earlier.

The above-mentioned conclusions provide a complete, coherent picture of the world and it is suggested the correctness of the research results.

Filling in the empty cells in Fig. 5 with the help of octave transposition, starting from the main values for each meridian (three cells towards each direction horizontally), we obtain the following table of frequencies (in Hertz) in correlation with notes of octaves:

G	1	BL	12.562	25.125	50.250	100.499	200.998	401.996	803.992	1607.984	3215.968
G#	2	LR	13.235	26.469	52.938	105.876	211.752	423.504	847.008	1694.016	3388.032
A	3	HT	14.133	28.265	56.531	113.061	226.123	452.246	904.491	1808.982	3617.964
A#	4	LI	14.889	29.778	59.555	119.110	238.220	476.440	952.880	1905.760	3811.520
H	5	GB	15.899	31.799	63.597	127.194	254.388	508.777	1017.553	2035.106	4070.212
C	6	SP	16.750	33.500	66.999	133.999	267.997	535.994	1071.988	2143.976	4287.952
C#	7	LU	17.646	35.292	70.584	141.168	282.336	572.373	1144.745	2289.490	4578.98
D	8	TE	18.844	37.687	75.374	150.749	301.497	602.994	1205.988	2411.976	4823.952
D#	9	ST	19.852	39.704	79.407	158.814	317.628	635.256	1270.512	2541.024	5082.048
E	10	KI	21.199	42.398	84.796	169.592	339.184	678.369	1356.737	2713.474	5426.948
F	11	PC	22.333	44.666	89.333	178.665	357.330	714.660	1429.320	2858.640	5717.280
F#	12	SI	23.528	47.056	94.112	188.224	376.448	752.896	1505.792	3011.584	6023.168

Fig. 6

There are obvious facts that say that such a music system was used in the 17th century (in accordance with the calendar of our time). So, for example, at present, for calculating of the equally tempered musical system, the note A (A) is used with a frequency of 440 Hertz.

However, in 1711, John Shore invented a tuning fork vibrated at 422.5 Hz. This frequency was quite widely used as a reference during the XVIII century[5].

Near this frequency there were built many other systems:

1751 Handel's own fork A422.5;

1780 Stines, for Mozart, A421;

1780 Organ builder Schulz A421.3;

1780 Stein's tuning fork A422.6;

1813 George Smart adopted for the Philharmonic Society the pitch of A423.3;

1820 Westminster Abbey organ and possibly Paris Comic Opera used a pitch of A422.5;

Do you still think this is an accidentally?

And in our calculations, we have the G-diese note with a value of 423.504 Hertz (red arrow in Fig. 6).

It can be assumed that people of the 18th century knew a little more about the nature of things than in our time and relied on the physical parameters of our planet Earth when calculating the music tones order.

The correlation of the music order with the daily circulation of meridians

Our research has found that daily circulation of meridians contains two octaves. We suppose that in accordance with the traditions of Chinese philosophy to divide everything into Yin and Yang, the octaves are also subjected to this manipulation. Thus, the octave series are divided into even (Yin) and odd (Yang). The beginning of the daily cycle coincides with the vibrations of red diapason (in the Doppler model [3] the vibrations of meridians of the Heart (yellow color) and Small Intestine (purple color) create the red vibrations of the Wood element - the element of the beginning of any cycle).

	odd	even	odd	even	odd	even	odd	even	odd	odd	even
BL	12.562	25.125	50.250	100.499	200.998	401.996	803.992	1607.984	3215.968	HT	ST
LR	13.235	26.469	52.938	105.876	211.752	423.504	847.008	1694.016	3388.032		
HT	14.133	28.265	56.531	113.061	226.123	452.246	904.491	1808.982	3617.964	SI	SP
LI	14.889	29.778	59.555	119.110	238.220	476.440	952.880	1905.760	3811.520		
GB	15.899	31.799	63.597	127.194	254.388	508.777	1017.553	2035.106	4070.212	GB	PC
SP	16.750	33.500	66.999	133.999	267.997	535.994	1071.988	2143.976	4287.952		
LU	17.646	35.292	70.584	141.168	282.336	572.373	1144.745	2289.490	4578.98	LR	TE
TE	18.844	37.687	75.374	150.749	301.497	602.994	1205.988	2411.976	4823.952		
ST	19.852	39.704	79.407	158.814	317.628	635.256	1270.512	2541.024	5082.048	LU	BL
KI	21.199	42.398	84.796	169.592	339.184	678.369	1356.737	2713.474	5426.948		
PC	22.333	44.666	89.333	178.665	357.330	714.660	1429.320	2858.640	5717.280		
SI	23.528	47.056	94.112	187.224	374.448	748.896	1497.792	2995.584	5991.168	LI	KI

Fig. 7

Thus, it can be assumed that the structure of the octave also contains two sub octaves. Such a structure forms a fractal, where at every level of the hierarchy there is a structural similarity (Hermes Trismegist principle - “That which is below is like that which is above that which is above is like that which is below to do the miracles of one only thing.”), which is known in physics as scale invariance (scaling). [6].

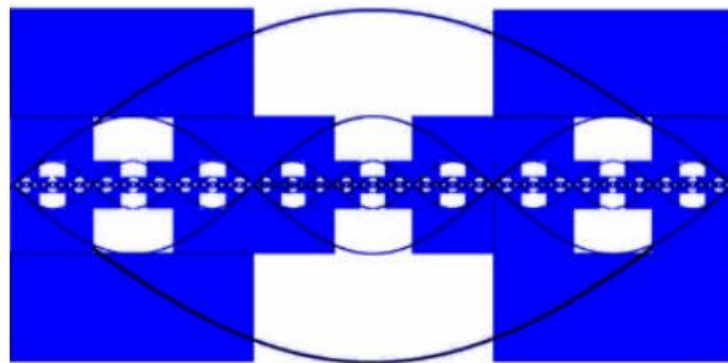


Fig. 8

About the names of 12 Lu

In the context of the above-mentioned facts, it will be interesting to evaluate the names of 12 Lu (pipes):

Nº	Meridian	Name of Pipe
1	<i>HT</i>	<i>Huáng Zhōng</i> 黃鐘 («Yellow Bell»)
2	<i>SI</i>	<i>Dà Lǚ</i> 大呂 («Great Pipe»)
3	<i>GB</i>	<i>Tài Cù</i> 太簇 («Great Iron of Arrow»)
4	<i>LR</i>	<i>Jiá Zhōng</i> 夾鐘 («Pressed Bell»)
5	<i>LU</i>	<i>Gū Xiǎn</i> 姑洗 («Easy Ablution»)
6	<i>LI</i>	<i>Zhòng Lǚ</i> 仲呂 («Middle Pipe»)
7	<i>ST</i>	<i>Ruí Bīn</i> 蕤賓 («Luxuriant Vegetation»)
8	<i>SP</i>	<i>Lín Zhōn</i> 林鐘 («Forest Bell»)
9	<i>PC</i>	<i>Yí Zé</i> 夷則 («Equalising Rule»)
10	<i>TE</i>	<i>Nán Lǚ</i> 南呂 («South Pipe»)
11	<i>BL</i>	<i>Wú Yì</i> 無射 («Tireless»)
12	<i>KI</i>	<i>Yìng Zhōng</i> 應鐘 («Responsive Bell»)

Fig. 9

As defined above in Fig. 7, the Heart (HT) meridian in the daily circulation coincides with the frequency range of the Bladder (BL) and Liver (LR) meridians of the octaves at the lower level of the hierarchy. At the same time, the vibrations of the Heart meridian in the Doppler model begin the daily cycle, forming, along with the vibrations of the Small intestine meridian, the red vibrations of the Wood element. And the Wood element in Chinese philosophy is known as the beginning of any cycle. Thus, the Heart meridian has vibrations, resonating with yellow color, and at the same time takes part in the formation of red vibrations of the Wood element. This state of affairs meets the characteristics that are awarded by Chinese sources to the first Lü (pipe) - “Yellow Bell”. Additionally, the division of Lü into "bells" and "pipes" suggests that the "bell" is a characteristic of the Yin meridians and the "pipe" as the Yang meridians. Let's check this assumption further.

The next meridian has the name "Great Pipe". In the Doppler model, this is the meridian of the small intestine. Firstly, this corresponds to the Yang meridian (pipe), and secondly, during the period of activity of the Small Intestine meridian, an external cosmic impact impulse is transmitted that activates the entire system of meridians. “The Great Pipe” is quite a suitable name for this meridian.

The third meridian in our system is the Gallbladder. Its unique location, as a point of reference for daily time (in opposition to the Pericardium time - the point of Aether's vector of impact from the Sun), can be explained by the name “Great Iron of Arrow” given to it.

The fourth Liver meridian, having the name “Pressed Bell”, firstly indicates that we are dealing with the Yin meridian, and secondly - the geometric representation indicates at the Wood element to which the Liver meridian belongs. In accordance with Chinese postulates, the Wood has the shape of an upwardly extending rectangle, like a log, which can be perceived as something compressed from the sides.

The fifth Lung meridian "Easy ablution" - in the Doppler model together with the Large intestine meridian forms the Earth element, which has properties of humidity.

The sixth meridian of the Large Intestine in the title "Middle Pipe" indicates that it is the Yang meridian and his location in the cycle is exactly in between the beginning and the end at equal distance.

The seventh meridian of the Stomach is “Luxuriant Vegetation” - its name correlates well with the ability of the Stomach to nourish the body.

The eighth Spleen meridian - “Forest Bell” indicates Yin meridian and its green color. Spleen in the Doppler model has vibrations of green color.

The ninth meridian is Pericardium in the Doppler model with a middle time at noon. It has the name “Equalizing Rule” and divides the day into two equal parts. It is interesting, isn't it?

The tenth meridian Triple Energizer in the Doppler model has the name "Southern Pipe”. On the one hand it is the Yang meridian, and on the other hand - it has a relationship with the Fire element Fire. And the pair of Pericardium and Triple Energizer are associated with Fire in Chinese Medicine. Although in the Doppler model, the Pericardium and the Triple Energizer form the vibrations of the Water element, but here is an excerpt declared in Chinese source [7]: "The practice of the "small circle of Qi" is called taking Kan to fill Li, the intercourse between Yin and Yang, or the coordination of Water and Fire." (p.72);

In our research, Fire is associated with the potassium ion, and the turquoise vibrations of the Triple Energizer meridian (Metal element in Doppler model) are associated with - with magnesium ion. Potassium and Magnesium are two friendly macronutrients of cellular promoting anabolic reactions.

All the given suggestions may be considered as the proof proper correlation of the Triple Energizer meridian with the name "South Pipe".

The eleventh meridian of the Urinary Bladder - is translated as “Tireless”, which does not seem to be entirely true. The hieroglyphs 無射 most likely carry the meaning of a close ending, but the high probability of further continuation of

events further is quite appropriate for the phase of the end of a particular cycle in the series of an infinite sequence of similar cycles.

The twelfth Kidneys meridian "Responding Bell" indicates the Yin meridian on the one hand, and on the other hand - being the closing in the daily cycle - adjacent to the Heart meridian, from which the daily circulation of the meridians began. Thus, activation of the Kidneys meridian looks at the end of the cycle really as a response to the activation of the Heart meridian at the beginning of the cycle.

So, at Fig. 9 you can see that order of 12 Lu has a complete semantic correspondence with the Doppler model of meridians origin.

Confirmation of the interaction of Elements in the Wu-Xing law

At the level of vibration interactions, the frequency distribution in Fig. 6 confirms the scheme of interaction of meridians in accordance with the Wu-Xing law, where we consider in the context of the daily circulation there are two separate systems of even and odd meridians.

Let's at this interaction on the example of the Small intestine meridian:

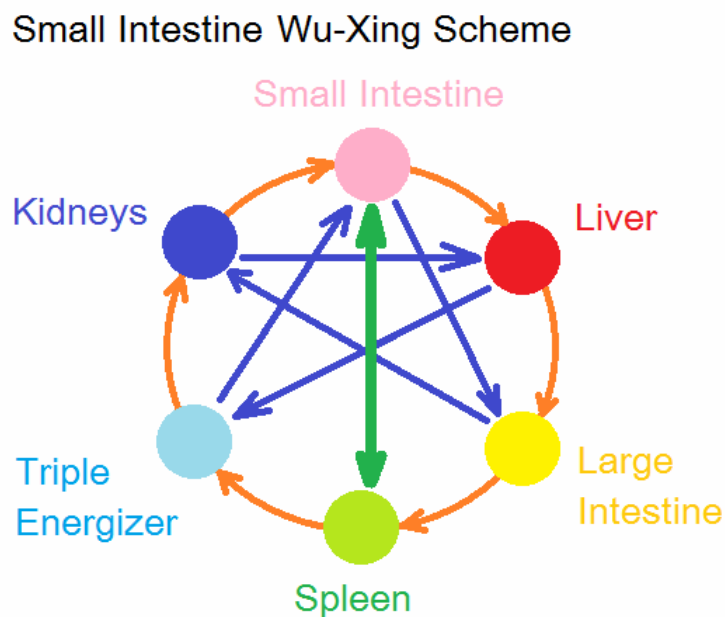


Fig. 10

In Fig. 10 the relative interaction of meridians is determined by the following order:

- a. harmonics 2, 4, 8, -2, -4, -8 - belong directly to the frequencies of the meridian on the other octaves;
- b. harmonics 3, 6, 13 purely resonate with the Lungs meridian (this meridian belongs to a different system of meridians, is the Son for the Gall bladder meridian and exhausts it);
- c. the harmonics -3, -6, -12 resonate purely with the meridian of the Gall bladder, which follows the Small Intestine, belongs to another system of meridians. There is compensation of the action of Lungs meridian and thus, the Small Intestine does not affect the other meridian system;
- d. 5, -10, 13 and 14 harmonics do not have a pure resonance with the Large intestine and, due to the proximity of frequencies, destroy its resonant frequency causing an effect of suppression, as it is stipulated by the Wu-Xing law;
- e. 7 harmonic does not have a pure resonance with the Kidneys meridian and for account of proximity destroys the resonant frequency. Kidneys meridian is the Mother of the Small intestine, makes the Small intestine meridian stronger and suffer from the exhaust (the Son (SI) depletes the Mother (KI));
- f. 9 and 18 harmonics have pure resonance with the Liver, which is the Son of the Small Intestine;
- g. 11 harmonic destroys the resonance of the Fire-Minister for the Small Intestine - Spleen. This is not a partner time due to the opposition in a daily cycle;
- h. -5, 10 and -13 harmonic destroys the resonance of the Triple Energizer - the Enemy, which suppresses the Small Intestine;
- i. Other harmonics do not have close values with the table of the main frequencies of the meridians and they not produce any effect at interrelation.

The reader can independently train in finding the frequencies of relationships and be convinced of the reality of the Wu-Xing interaction scheme in all its details.

Conclusion

The presented scheme of correspondence of frequencies and meridians can be used for the correction of the body state at any frequency range through the calculation of the quint stroke method and the octave transposition taking into account the even and odd quality of each octave, as it is indicated at Fig. 7

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