an adaptation form of organisms to cyclically changing environmental conditions. At the same time, physiological rhythms interact with the rhythms of environment. Even Pythagoras asserted: "The world is united. Unity is created by rhythms and rhythms are determined by the number."

Cumulative frequency of human vibrations depends on many factors: the state of the body, the quality of life; bad habits due to the environment, climate, time of year; sensations and other factors. If a person feels comfortable – he is in equilibrium, the body and all endocrine glands work harmoniously together with subordinate organs, tissues and cells. Human negative feelings, such as fear, jealousy, anger, greed etc. lower the vibration frequency of human body.

Table 1

Frequency bands of vibrations depending on the human feelings

Negative feelings	Vibrations, Hz	Positive feelings	Vibrations, Hz
grief	0,1-2	joy	38
fear	0,2-2,2	generosity	95
resentment	0,6-3,3	appreciation	140 and above
irritability	0,9-3,8	unity	144 and above
regret	3	compassion	150 and above
anger	1,4	love	205 and above

The table shows that negative feelings have low vibration frequency, but positive feelings have high vibration frequency.

The most profitable form of harmonious vibrations interaction is resonance which is vibration frequencies coordination. Resonance connects all natural objects in a unified system where the only source of natural rhythms is electromagnetic radiation of stimulated atomic hydrogen with a frequency of 1420 MHz. Through successive division 1420 MHz to 2 n-th degree one can receive the system of resonance interconnected frequencies covering biological, geophysical and space periodic processes. In this system, there are series of harmonic frequencies: 43.33; 21.67; 10.83; 5.42; 2.71 and 1.36 Hz, which are equal to the middle of frequency ranges gamma-, beta-, alpha-, theta- and delta-rhythms.

Let's consider the lower limit of the range of delta-rhythm 1.763 Hz, which is in a resonance relationship with the radiation of atomic hydrogen. Applying the principle of multiplicity that is consistently dividing by 2 n times, we get the following frequency bands for the cardiovascular system, Table 2.

Table 2

The range for frequency of heart beats (FHB) in Hz.

Uncomfortable conditions, low FHB	Comfortable conditions, normal FHB	Uncomfortable conditions, high FHB
0,44-0,88 Гц	0,88-1,76 Гц	1,76-3,53 Гц

Transferring to the usual form of presentation for FHB per minute, we get the following ranges, Table 3.

Table 3

The range for frequency of heart beats (FHB) per minute.

Uncomfortable conditions, low FHB	Comfortable conditions, normal FHB	Uncomfortable conditions, high FHB
26,5-52,8	52,9-105,8	105,9-211,8

Life is impossible outside these boundary frequencies.

From this perspective, the authors explain the uncomfortable conditions by activities and states of a healthy person, such as heart palpitations occur during the running when heart rate approaching 158.9 beats per minute, due to the acceleration of heart rate frequency.

In return, these "uncomfortable conditions" can be explained by human disease and at low FHB bradycardia can be diagnosed, at high FHB tachycardia can be diagnosed, provided that the person is in a comfortable environment and rest.

Thereby the diagnostic value of the cardiovascular system frequency in Hz, using general resonant frequency of radiation from stimulated hydrogen atom was established.

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CASE STUDY OF THE EFFECT PRODUCED BY PHYSICAL EXERCISES ON BLOOD PRESSURE

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Prescription of regular physical exercises as a remedy for hypertension is considered to be common among cardiologists. The effectiveness of this therapy can be evaluated on the basis of the overall health condition of the patient, his ECG, as well as on the results of the laboratory tests of blood and urine. The purpose of this study was to quantitatively assess the effect obtained by the intensive physical exercises on the blood pressure of the 53-year old male. The preliminary diagnosis showed the stage I hypertension in our patient. The weight of the patient was 100 kg and the height was 187 cm. On the advice of a cardiologist, the patient exercised once a week within two months. The

duration of one session was approximately one hour and a half. Each session included a warming-up activity, a dumbbell lifting, push-ups, pull-ups, squats with a load, and the use of various training equipment. The average duration of each exercise was two or three minutes. The exercises followed each other in a continuous way. The premises for exercises were spacious and well–ventilated. The blood pressure of the patient was measured twice during each session, before and right after it. A stationary blood-pressure meter was used to perform the measurements.

The normal average systolic heart blood pressure of our patient was 154.0±7.3 mm Hg, the diastolic pressure was 104.7±2.4 mm Hg, and the heart rate was 83.3±7.1 beats per minute. All the results are displayed together with their standard deviations. The study shows that physical exercises have decreased blood pressure and increased heart rate. The average systolic blood pressure after physical activity was 139.4±7.3 mm Hg, the diastolic pressure was 87.6±6.6 mm Hg, and the pulse rate increased to 111.4±7.1 beats per minute. These results indicate the decrease in systolic pressure by 9%, the decrease in diastolic pressure by 16%, and the increase in the heart rate by 34%.

The analysis of the received results shows that there are two possible reasons which can cause changes in blood pressure and heart rate. Firstly, it is the increased body temperature, especially that of the muscles of the extremities. This resulted in the increased elasticity of blood vessels and their ability to expand. The greater elasticity leads to the increase in the effective radius of blood vessels. According to the Hagen–Poiseuille formula, this can significantly decrease blood pressure keeping blood volumetric rate unchanged. In addition, the increased temperature of a body lowers the viscosity of blood. Lower blood viscosity is also the factor contributing to lower blood pressure, and volumetric rate should remain unchanged.

In our further research, we will try to exclude all the factors contributing to the blood pressure decrease and trace their contribution separately.

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SERS-TECHNOLOGY AS A DIRECTION OF MEDICAL DIAGNOSTICS

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Surface enhanced Raman spectroscopy (Surface enhanced Raman spectroscopy (SERS)) is a new efficient and highly sentient method (from 4 to 14 orders that is more sensitive than magnitude of Raman spectroscopy), which over the last decade has found widespread usage in such fields of knowledge as Pharmacy, Chemistry, Ecology, Biosensorics and Biomedical Diagnostics, Nanosensorics and others.

The method is known as chemical «fingerprint» of individual molecule, because it gives the possibility for the molecular structure of substances of arbitrary physical state to be identified. Raman spectra consist of strips that correspond to the vibrational or rotational transitions that are characteristic of the molecular structure. They give the possibility to obtain information about the structure of macromolecules and their possible conformational changes, and may be used for definition and further identification of substances in small (even femtomolar) concentrations.

The differences in the SERS-spectra of biological fluids indicate the changes in the respective tissues and it is a powerful instrument in the diagnosis of diseases. A large number (amount) of research papers are dedicated to the possibility of technology using as the instrument of optical visualization. It is informed about the possibility of non-invasive formation of images using SERS - microscopy, histological analysis of biopsy material and *in vivo* detection of tumors.

Nowadays, significant efforts are directed on the synthesis of highly sensitive SERS - active nanostructures with a narrow distribution of enhancement factor of (EF) values. These nanostructures are effective for targeted delivery of medicine, photothermal therapy as tags in the preparation of sera for immunoassay etc.

So, SERS is a highly sensitive and multiplex technology. It is ideal for the development of diagnostic tests and visualization means.

СЕКЦІЯ 20
АКТУАЛЬНІ ПИТАННЯ КЛІНІЧНОЇ ІМУНОЛОГІЇ, АЛЕРГОЛОГІЇ ТА ЕНДОКРИНОЛОГІЇ

Каспрук Н.М.

НОЗОЛОГІЧНА СТРУКТУРА АЛЕРГОПАТОЛОГІЇ НА БУКОВИНІ

Кафедра клінічної імунології, алергології та ендокринології
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У роботі розглянута нозологічна структура алергічних захворювань (АЗ) в регіоні за даними звернення на кафедру клінічної імунології, алергології та ендокринології і пульмоно-алерологічне відділення ОКЛ.

На сучасному етапі розвитку суспільства особливостями алергічних захворювань є зростання полівалентної алергії, поліморфізм клінічних проявів. Ця проблема привертає пильну увагу вчених і лікарів протягом багатьох років, що пов'язано з гетерогенністю клінічних і патогенетичних форм даної патології. Слід розуміти, що реєстрація випадків звернення за медичною допомогою не відображає стану розповсюдженості АЗ. З одного боку, до лікарів самостійно звертаються, головним чином, пацієнти із вираженими проявами захворювання. З іншого – більшість хворих, зважаючи на наявність лікарів-алергологів тільки у містах,