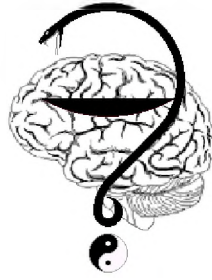# Neuroscience for Medicine and Psychology
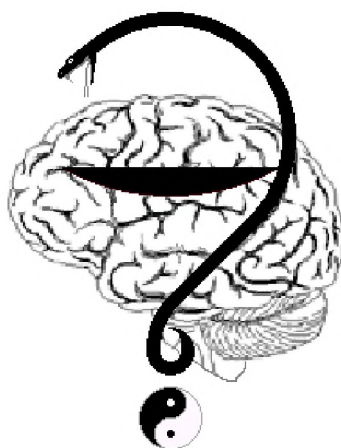
XVI Международный Междисциплинарный Конгресс
НЕЙРОНАУКА ДЛЯ МЕДИЦИНЫ И ПСИХОЛОГИИ

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РОССИЙСКОЕ ФИЗИОЛОГИЧЕСКОЕ ОБЩЕСТВО ИМ. И.П. ПАВЛОВА
ФГБУН ИНСТИТУТ ВЫСШЕЙ НЕРВНОЙ ДЕЯТЕЛЬНОСТИ
И НЕЙРОФИЗИОЛОГИИ РАН
ФГБУН ИНСТИТУТ ПСИХОЛОГИИ РАН
МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ ИМЕНИ М.В. ЛОМОНОСОВА
ФГБНУ НИ ИНСТИТУТ НОРМАЛЬНОЙ ФИЗИОЛОГИИ ИМЕНИ П.К. АНОХИНА
ФГБУН ИНСТИТУТ ТЕОРЕТИЧЕСКОЙ И ЭКСПЕРИМЕНТАЛЬНОЙ БИОФИЗИКИ РАН
ИНСТИТУТ ФИЗИОЛОГИИ И САНОКРЕАТОЛОГИИ АН МОЛДОВЫ
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

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Школа

ДОСТИЖЕНИЯ МЕЖДИСЦИПЛИНАРНОЙ НЕЙРОНАУКИ В XXI ВЕКЕ

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Objective. The aim of the study was to examine the prevalence of mixed anxiety-depressive disorder and specificities of the course of acute coronary syndrome in elderly patients.

Methods. The study included 28 patients older than 60 years of age hospitalized with acute coronary syndrome (ACS) to NWSMU n.a. I.I. Mechnikov Hospital. The Geriatric Depression Scale (GDS) was used to identify mixed anxiety-depressive disorder (MADD) for all patients, and Zung Self-Rating Depression Scale (SDS) was used for 20 patients. Mini Nutritional Assessment-Short Form was used to assess nutritional status in all patients. Data was analyzed by using Statistica 10,0.

Results. MADD was found among 11 (39%) patients (4 men and 7 women) with ACS by using GDS (the 1st group). The 2nd group consisted of 17 patients (61%) without MADD. Mean age of the 1st group was 70,9 years, mean age of the 2nd group was 72,6 years. 64% of cases in the 1st group presented ST-elevation ACS. 47% of cases in the 2nd group presented non-ST-elevation ACS (p>0,05). In the 1st group 7 patients (64%) were diagnosed with myocardial infarction, in the 2nd group 12 patients (71%) (p>0,05) were diagnose with myocardial infarction, other patients were diagnosed with unstable angina. 8 patients (73%) in the 1st group had comorbidities (3 and more diseases), 9 patients (53%) in the 2nd group had comorbidities (p>0,05). Oncological disease was observed in 3 patients (27%) from the 1st group and 3 patients (18%) from the 2nd group (p>0,05). 4 patients (36%) from the 1st group and 3 patients (18%) from the 2nd group were at risk of malnutrition. Complications during hospital stay occurred in 3 patients (27%) from the 1st group and 6 patients (35%) from the 2nd group (p>0,05). Mean length of hospital stay in the 1st group was 10,8 days, in the 2nd group it was 12,8 days (p>0,05). Using SDS 3 patients (15%) were diagnosed with MADD, all of them were at risk of malnutrition. 2 patients were diagnosed with MADD using GDS as well as SDS.

Conclusions. Based on GDS MADD was diagnosed in 39% of cases of elderly patients with ACS, and based on SDS – in 15% of cases. MADD was more frequently associated with risk of malnutrition. Significant difference of the course of illness was not demonstrated due to a small sample size and polymorbidity of patients.

ФИЗИЧЕСКИЕ НАГРУЗКИ КАК ФАКТОР КОРРЕКЦИИ МЕТАБОЛИЧЕСКИХ РАССТРОЙСТВ: БИОРИТМОЛОГИЧЕСКИЕ И ВОЗРАСТНЫЕ АСПЕКТЫ

Капилевич Л.В., Захарова А.Н., Дьякова Е.Ю., Кироненко Т.А., Милованова К.Г., Негоденко Е.С., Калинникова Ю.Г., Орлова А.А., Чибалин А.В.
Томский государственный университет (Томск, Россия); *kapil@yandex.ru*

Исследовалось влияние беговой нагрузки на массу тела, толерантность к глюкозе и концентрацию инсулина в крови у мышей с метаболическими расстройствами. В качестве объекта исследования использовались мыши-самцы линии C57bl/6. Было сформировано две группы – 1) мыши, питающиеся обычным кормом (n=96); 2) мыши, находящиеся на жировой диете (n=96). Половина мышей включались в эксперимент в возрасте 2 месяцев, половина животных – в возрасте 8 месяцев. Нами была разработана специальная диета, в которой не менее 55% калоража приходится на жиры, в том числе 2/3 от указанного количества – на животные жиры.

В каждой группе животных было выделено четыре подгруппы, по 12 мышей. 1 подгруппа - контроль - мыши, которые 16 недель находились на соответствующей диете и не подвергались физическим нагрузкам; 2 подгруппа - после 12 недель диеты мыши тренировались утром (через два часа после включения света в виварии) по 1 часу в день 6 раз в неделю в течение 4 недель, продолжая питаться по той же диете; 3 подгруппа - после 12 недель диеты мыши тренировались вечером (через час после выключения света в виварии); 4 подгруппа – у мышей чередовались тренировки в утреннее и вечернее время.

Для нормирования нагрузки была использована беговая дорожка для мышей BMELAB SID-TM10. Принуждение к бегу осуществляется электрическим раздражением, напряжение подается на металлическую сетку, расположенную на задней стенке камеры. Тренировка проводилась в течении 4 недель с постепенным увеличением интенсивности. К 4-й неделе максимальная интенсивность составляла: 60 минут в день, скорость 18 м/мин, подъем 10 градусов.

Было показано, что применяемая жировая диета приводила к формированию избыточной массы тела (45% в сравнении с контролем у животных в возрасте 2 месяца и 35% - у животных в возрасте 8 месяцев), формирования толерантности к глюкозе (период максимального уровня глюкозы увеличивался с 30 до 60 минут), при этом концентрация инсулина увеличивалась втрое. Физические нагрузки приводили к снижению массы тела на 15%, снижению толерантности к глюкозе и сопровождались снижением выброса инсулина вдвое. Эффективность тренировок зависела от времени суток. У мышей возраста 8-12 месяцев эффект тренировок был выражен в большей степени.

PHYSICAL ACTIVITY AS A FACTOR IN THE CORRECTION OF METABOLIC DISORDERS: BIORHYTHMOLOGICAL AND AGE-RELATED ASPECTS

Kapilevich Leonid V., Zakharova Anna V., Dyakova Elena Yu., Kironenko Tatiana A., Milovanova Ksenya V., Negodenko Elena S., Kalinnikova Yulia G., Orlova Anna A., Chibalin Alexandr V.
National Research Tomsk State University; *kapil@yandex.ru*

The effect of running load on body weight, glucose tolerance and blood insulin concentration in mice with metabolic disorders was studied. As the object of study, male mice of the C57bl / 6 line were used. Two groups were formed - 1) mice that fed on normal food (n = 96); 2) mice on a fat diet (n = 96). Half of the mice were included in the experiment at the age of 2 months, half of the animals at the age of 8 months. We have developed a special diet in which at least 55% of calories are in fats, including 2/3 of the specified amount - in animal fats.

In each group of animals, four subgroups of 12 mice were allocated. 1 subgroup - control - mice that were 16 weeks on an appropriate diet and were not subjected to physical exertion; Subgroup 2 - after 12 weeks of diet, the

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mice trained in the morning (two hours after turning on the light in the vivarium) 1 hour a day 6 times a week for 4 weeks, continuing to eat on the same diet; Subgroup 3 - after 12 weeks of diet, the mice trained in the evening (one hour after turning off the light in the vivarium); Subgroup 4 - mice alternated workouts in the morning and evening.

To standardize the load, the BMELAB SID-TM10 treadmill was used. Forcing to run is carried out by electric irritation, the voltage is applied to a metal grid located on the rear wall of the camera. Training was carried out for 4 weeks with a gradual increase in intensity. By week 4, the maximum intensity was: 60 minutes per day, speed 18 m / min, climb 10 degrees.

It was shown that the applied fat diet led to the formation of excess body weight (45% compared with the control in animals aged 2 months and 35% in animals aged 8 months), the formation of glucose tolerance (the period of maximum glucose increased from 30 up to 60 minutes), while the concentration of insulin tripled. Physical activity led to a decrease in body weight by 15%, a decrease in glucose tolerance and was accompanied by a decrease in insulin release by half. The effectiveness of training depended on the time of day. In mice aged 8-12 months, the effect of training was more pronounced.

НАИБОЛЕЕ РАСПРОСТРАНЕННЫЕ ЗАБОЛЕВАНИЕ У ПОЖИЛЫХ И СТАРЫХ ЛЮДЕЙ ПРОЖИВАЮЩИХ В АЗЕРБАЙДЖАНЕ

Карамова Н.Я., Касумов Ч.Ю., Касумова З.А.
Национальная Академия Наук Азербайджана, Институт Физиологии им. А.И. Караева, Баку, Азербайджан. phd_karamova@mail.ru

THE MOST COMMON DISEASES AMONG THE OLD AND ELDERLY IN AZERBAIJAN

Karamova Natavan Y., Gasimov Chingiz Y., Gasimova Zarnigar A.
İnstitute of Physiology named after Abdulla Garayev, Azerbaijan National Academy of Sciences, Baku, Azerbaijan, phd_karamova@mail.ru

Azerbaijan is known as a land of long living people with favorable climatic conditions for longevity. However, the economic and political crisis of recent years, being in war conditions, numerous refugees and internally displaced persons, increasing frequency of diseases in physiological age periods, environmental degradation and so on had influences on the longevity index.

Considering the above-mentioned, we studied psycho-physiological and health indicators, as well as the frequency of diseases among the old and elderly living in Sumgait and Baku. The studies were carried out in City Polyclinic # 3 in Sumgait and in the Health Zone clinic named after Sh. Hasanov in Baku.

By comparing the results of the analysis, it was found that the results obtained in the study of elderly and old people differed significantly from norm. First and foremost, it should be noted that high blood pressure and heart rate was higher than norm. High blood pressure is an indicator of possible *ischemic heart disease*, arrhythmias, and so on. Also, it is remarkable that hemodynamic indicators had big differences.

Thus, moderate and severe anemia in the old and elderly is characterized by very low levels of hemoglobin, erythrocytes, and color index. The duration of blood clotting also differs from the norm, indicating a high blood coagulation. The erythrocyte sedimentation rate was above normal and indicated the presence of chronic inflammatory diseases among the studied people. Sugar levels were high in both groups and indicated the presence of secondary type diabetes among the mostly studied people. Although moderate levels of situational and individual anxiety were observed, the general anxiety was found to be high.

Concerning depression indicators, no depression was found in studied people. Interesting results were obtained during the comparative analysis of cognitive indicators.

Thus, the results of short-term memory, auditory memory and attention indicators were below normal while the results of visual memory were satisfactory. Obtained results showed that only the visual memory indicators among elderly and old aged people is within the norm.

Based on the analysis of ECG results, the following results were obtained:

Normal and age-related ECGs were found in only 12 people, while the diagnoses such as myocardia single atrium extra systole, atrial fibrillation, atrioventricular bundle block, sinus arrhythmia, atrioventricular block, traces of a heart attack, sinus tachycardia, hypertrophy of the right or left ventricles (sometimes both) prevailed in other studied people.

In summary, the results obtained showed that the old and elderly mostly suffer from cardiovascular diabetes, arthritis and anemia.

ЗЕРКАЛЬНАЯ СИСТЕМА МОЗГА И СОЦИАЛЬНЫЙ КОНТЕКСТ

Каримова Е.Д.[1], Буркитбаев С.Е.[1], Катермин Н.С.[2]
[1]ФГБУН ИВНД и НФ РАН, г. Москва, Россия; [2]МГУ им. М.В.Ломоносова, Россия; e.d.karimova@gmail.com

Зеркальные нейроны обладают важным свойством активироваться и при наблюдении и повторении какого-либо социального движения или жеста. Исследования зеркальной системы мозга (ЗСМ) выявили важные принципы работы при восприятии и повторении движений: их узнаваемость, значимость понимания цели, социальный контекст. Непосредственная регистрация единичных ответов нейронов с помощью инвазивных электродов у пациентов с эпилепсией подтвердила существование зеркальных нейронов у людей, а также обнаружила нейроны с «антизеркальными» свойствами, которые тормозят свою активность при наблюдении движений. Также было выявлено, что активность ЗСМ значительно снижена у людей,