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USSR Space Life Sciences Digest

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USSR Space Life Sciences Digest

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*Management and Technical Services Company
Washington, D.C.*

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USSR Space Life Sciences Digest: Number 1 Reader Feedback Form

To our readers: We are working in a large number of highly technical, specialized areas for which adequate Russian-English glossaries have yet to be compiled. We ask your help in improving the accuracy and specificity of our English terminology. Please fill out the form below whenever you encounter an incomprehensible, incongruous, awkward or otherwise inappropriate term. While we solicit all suggestions for improved renderings, the statement that a term is inappropriate provides us with useful information, even when no better alternative can be suggested. A copy of this form will appear in all future issues of the digest. Thank you for your help.

Abstract #	Incorrect or contextually inappropriate word or phrase:	Suggested rendering: ("???" is an acceptable entry)
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PLEASE RETURN TO: Dr. Lydia Hooke
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FROM THE EDITORS

This is the first issue of the 1985 USSR Space Life Sciences Digest. This publication provides abstracts of Soviet scientific journal articles and books relevant to the life science concerns of NASA, many of which have previously been available only in Russian. Initially, this digest will be issued once every two months, with monthly publication our eventual goal.

The current version of the USSR Space Life Sciences Digest is published under the sponsorship of the Life Sciences Division at NASA Headquarters. Material has been and will be selected for inclusion on the basis of relevance to the discipline areas of the Division's research program. The primary audience for the Digest consists of the principal investigators currently funded by the Life Sciences Division, the NASA centers and other supporting institutions, as well as scientists within NASA Headquarters itself. Although the current issue of the digest is primarily devoted to Space Medicine, future issues will also cover such areas as Exobiology and Global Biology as appropriate Soviet material becomes available.

When last published in December 1981, the USSR Space Life Sciences Digest provided a quarterly review of Soviet scientific literature relevant to Space Medicine and Biology. Material for the Digest was derived from English abstracts of Russian journal articles gathered from a number of sources. The new version differs from its predecessor in that abstracts are derived directly from the Russian originals. Not only does this improve the accuracy and relevance of information included in the digest, but also, since there is no need to wait for translations or English abstracts to be prepared, ensures the timeliness of the contents.

The largest section of the Digest is to be devoted to abstracts of articles from scientific periodicals. We anticipate that virtually the entire contents of Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina [Space Biology and Aerospace Medicine], which is published every other month, will be abstracted. (Abstracts from this journal are marked with a *.) In addition, for each issue, approximately 30 Soviet scientific periodicals will be reviewed and the papers most relevant to NASA life science concerns selected for abstraction. In format, each abstract contains three parts: a bibliographic citation, an abstract proper and a translation of the titles of tables and figures. Table and figure titles provide one of the quickest and most direct ways for scientists to decide whether particular articles are relevant to their research. Article abstracts are to be classified as belonging to one (or more) of a number of categories we have identified as being most relevant to the Life Sciences Research Program, (e.g., Neurophysiology, Life Support Systems, Group Dynamics), and grouped together on the basis of this primary classifier. All classifiers and the auxiliary keywords given for each article are contained in the NASA Thesaurus and are compatible with the NASA RECON bibliographic search system. The classifiers used in this issue by no means represent

the complete set for the digest; but are merely a subset describing the most relevant material available this month.

A somewhat shorter section of the Digest is to be dedicated to current Soviet monographs. Monographs will be selected according to the same relevance criteria used for periodical articles. Aside from the bibliographic citation, each monograph abstract contains an "annotation" section, which is a translation of the brief introductory material included in the front of virtually all Soviet books and a translation of the table of contents. From time to time when a short section and only this section of a monograph is particularly relevant, a complete translation will be provided.

An additional section of this issue, which we anticipate continuing regularly, lists current English translations of Soviet Space Life Sciences material available from the Joint Publications Research Service and outlines ordering procedures. As we become aware of them, we will also provide information about other Soviet material published in English which may be ordered by our readers.

Future issues of the Digest will contain, aside from abstracts, translations of the titles of current Soviet periodical articles and monographs which appear relevant to Space Life Sciences, but were not selected for abstraction.

Everyone who receives a copy of the Digest will also receive a reader survey. Results of this survey will help us to focus more accurately on reader concerns and interests and to expand our distribution list. We would greatly appreciate readers' cooperation in completing and returning this survey.

Finally, we would like to thank Dr. Paul Rambaut of the Office of Space Station at NASA Headquarters, whose expertise and commitment have made the publication of this digest possible.

PERIODICAL SECTION

BOTANY

P24(6/85)* Safonkin AF. The effect of substrate moisture content on growth and leaf structure of corn. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 1985; 19(2): 94-96. (11 references; 2 in English)

Botany
Higher Plants, Corn
Moisture

Abstract: The negative results from a number of experiments growing higher plants on space stations may be explained by non-optimum water balance conditions, rather by than adverse effects of weightlessness. To investigate this possibility, the effect of varying substrate moisture content on the growth and leaf structure of hydroponically grown corn was investigated. It was found that the maximum weight increase of corn was observed with substrate moisture content of 85%. Leaf structure was also found to vary with humidity.

Table and Figure Titles: Table 1: The effect of the moisture content of the substrate on the number and dimensions of stomata on a 1 mm² leaf of corn

Table 2. The effect of moisture content of the substrate on the dimensions of epidermal cells of corn leaves (in mm)

Figure 1. Diagram of the plant container for experiments with substrates varying in moisture content

Figure 2. Water saturation of substrate as a function of height of the water column

Figure 3. Effect of moisture content of the substrate on seed germination, and wet and dry weight of corn plants.

CARDIOVASCULAR AND RESPIRATORY SYSTEMS

(See also Habitability and Environmental Effects: P31; Morphology and Cytology: P20)

P6(6/85)* Dartsmeliya VA, Belkaniya GS. Typology of hemodynamic state of healthy individuals during tilt tests. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 26-32; 1985. (17 references; 3 in English)

Cardiovascular and Respiratory Systems, Hemodynamics
Humans, Typology
Orthostatic Tolerance, Tilt Tests

Abstract: Central hemodynamics and respiratory function of 90 healthy individuals, aged 24 - 45, was investigated during passive and active tilt tests. Results indicated that the effect of tilt on hemodynamics can be divided into three stages: early effects; an intermediate stage; and stabilized hemodynamic state. Stabilization appeared to be complete within 10 minutes. With respect to cardiac output, three stable types of reaction to orthostatic position (as compared to horizontal position) were identified: I) hypokinetic (61% of cases) with stroke and cardiac indices lower in orthostatic position than in tilt; II) intermediate or mixed type (21% of cases); and III) hyperkinetic with cardiac index elevated in orthostatic position relative to tilt (18% of cases). Types determined on the basis of an active orthostatic position were reproduced under passive orthostasis and were argued to represent different mechanisms for the maintenance of arterial pressure in an upright position. A reciprocal relationship was found between values of hemodynamic parameters in orthostatic and horizontal positions.

Table and Figure Titles: Table 1: Comparison of hemodynamic states for healthy individuals in active and passive orthostatic positions

Table 2: External respiration functions of healthy individuals belonging to three hemodynamic types in active and passive orthostatic positions

Figure 1: Types of hemodynamic states in active and passive orthostatic positions

Figure 2: Manifestation of the orthostatic circulation factor on Stroke Index, Cardiac Index and Specific Peripheral Vascular Resistance for Hemodynamic Types I, II, and III in active orthostatic position

P8(6/85)* Kabesheva TA, Kopanev SV, Panferova NYe, Zavadovskiy AF.
Mechanisms underlying vascular adaptation to head-down tilt,
Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 1985; 19(2):
35-39. (12 references; none in English).

Cardiovascular System, Peripheral Circulation
Humans, Men
Head-down Tilt and Hypokinesia, Adaptation Training

Abstract: Nine healthy men underwent 25 periods of bedrest with head-down tilt (-12°), each lasting 2 hours. A similar group underwent adaptation training for an identical period of time, actively assuming a head-down position at 90° tilt. For both groups, peripheral circulation parameters were measured in the horizontal position using plethysmography and rheography, before, during, and after the adaptation training cycle. Both types of training facilitated the development of vascular mechanisms for adaptation to head-down tilt. Specifically, the tone of the resistance vessels of the arms and legs and capacitance vessels of the legs were decreased. The tone of cerebral vessels, both resistance and capacitance, increased. Passive and active training had opposite effects on the tone of arm capacitance vessels; passive training decreased tone, while active training increased tone.

Figure titles: Figure 1. Changes in the index of volume circulation rate in the area of the forearm and the shin in subjects in a horizontal position after active and passive training with head-down tilt juxtaposed with data taken before training began.

Figure 2. Changes in the increase in volume of the forearm and shin under incremental occlusion of the shoulder and femur measured in subjects in horizontal position after passive and active training with head-down tilt.

Figure 3. Occlusion indexes of orbital plethysmogram in subjects in horizontal position after active training in head-down position.

Figure 4. Occlusion indexes in plethysmograms of the shin and arm during 2 hour sessions in head-down tilt (-12°) and after passive adaptation training.

P9(6/85)* Sokolov VI. Cerebral hemodynamics and ventricular function during head-down tilt of -15° , Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 39-42; 1985. (8 references; 1 in English)

Cardiovascular and Respiratory System, Cerebral Hemodynamics and Ventricular Function
Humans, Men, Typology
Head-down Tilt

Abstract: Sixteen men, from 27 to 34 years old, were subjected to head-down tilt of -15° for 6 hours. Cerebral hemodynamics were examined using bipolar rheoencephalography, ventricular function using one-dimensional echoventriculometry, and blood pressure using Korotkov's method. Subjects fell into two groups on the basis of their reactions to the experimental conditions. The first group (10 men), tolerated the head-down position well, with only moderate facial puffiness and the sensation of blood rushing to the head. These subjects exhibited stable cerebral circulation parameters, such as ventricle size, and mean blood pressure. Six men manifested polymorphous clinical symptoms including, (aside from rush of blood to the head and facial puffiness and cyanosis), acrohyperhidrosis, and chilling of the hands and feet. After 15 minutes in head-down position, members of the second group developed the clinically identified "liquor hypertension syndrome," including pressure headache, autonomic dysfunction, etc. These clinical symptoms were accompanied by hemodynamic shifts in the circulatory system of the brain, involving decreased pulse pressure of the cerebral vessels, primarily in the area of the basilar vertebra, instability of vessel tone, and simultaneous dilation of capacitance vessels and brain ventricles.

Figure titles: Figure 1. Changes over time of rheographic index during head-down tilt of -15°

Figure 2. Changes over time of dicrotic index during head-down tilt of -15°

Figure 3. Changes over time of diastolic index during head-down tilt of -15°

Figure 4. Changes over time of ventricular index III and index of medial wall of the lateral ventricle during head-down tilt of -15°

P10(6/85)* Genin AM, Baranov VM, Shabel'nikov VG, Acyamolova NM, Kotov AN, Volkov MYu, Yurova KS, Poleshchuk AT. The influence of short-term hypokinesia with head-down tilt on the dynamics of cardiorespiratory indices during an incremental exercise test, Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 43-46; 1985. (9 references; 4 in English)

Cardiovascular and Respiratory Systems, Physical Work Capacity
 Humans, Males
 Hypokinesia, Head-down Tilt, Physical Exercise

Abstract: Seven healthy males, aged 27 to 30, were subjected to hypokinesia with head-down tilt of -15° for a five-hour period. Before and after this, they exercised on a bicycle ergometer in supine and seated positions. The increments used for the exercise test were 10, 30, 10 [sic], and 60% of the required value of physical work capacity. Physical work capacity was evaluated through measurement of the maximum heart rate and oxygen consumption at the highest level of physical loading, and also on the basis of true physical work capacity. Changes in expiration, gas exchange and heart rate were monitored continuously using a "Jaeger" apparatus connected to a computer. Blood gasses and acidity were also analysed and arterial pressure was measured. Results showed that exposure to head-down tilt had an adverse effect on physical aerobic performance. Observed changes suggest that lowered exercise tolerance after hypokinesia can result not only from decreased circulating blood volume, but also from increases in energy expended by the cardiorespiratory system itself.

Table and Figure Titles: Table 1 (changes in physical work capacity as a result of changes in posture and after 5 hours of head-down tilt

Table 2: Changes in gas exchange indices during performance of exercise test in various postures and after 5 hours of head-down tilt (-15°)

Figure 1: Changes over time (in minutes) of expiratory volume and respiratory coefficient during incremental physical exercise test

P25(6/85) Meyerson FZ, Katkova LS, Malyshev VV. Comparison of the effects of preliminary adaptation to moderate exercise and of short-term stress on disruption of cardiac contractile functions in reponse to long-term stress. *Kardiologiya*. XXV(2): 74-77; 1985. (6 references; 2 in English)

Cardiovascular and Respiratory Systems, Myocardium
Rats
Stress, Exercise

Abstract: This study compared the influence of preliminary short-term stress and moderate physical activity on the contractility of the myocardia and its resistance to long-term stress. One group of white rats was exposed to 35 sessions of less than an hour, in which a stressor was introduced. (Stress is described as "emotional-painful" and a reference is made to a procedure developed by Desiderato for experimental induction of anxiety neuroses, but no further specification of the nature of the stressor is given.) Another group of rats was exposed to a program of 30 sessions of swimming, described as moderate exercise. Subsequent to this, both groups of rats were subjected to a 6 hour stress situation (again only Desiderato's procedure is referred to). Two hours after the session's completion, the animals were sacrificed, the right atrium extracted, and a number of indices of its contractility computed. Reactions of these indices when the atrium was subjected to hypoxia and excess calcium were also determined. The exercise program significantly increased the maximum tension the atrium showed in an isometric contraction test, as well as myocardial resistance to hypoxia and excessive calcium. However, when rats were exercised prior to long-term stress, the swimming did not prevent the stress-induced depression of myocardial contractility. Adaptation to short-term stress did not significantly affect myocardial tension or resistance to hypoxia or calcium, but it served to eliminate depression of contractile functions attributable to the long-term stress session. Preadaptation also reduced the influence of stress on resistance to calcium excess and hypoxia. It is concluded that adaptation to stress itself, rather than an exercise program, is the most appropriate means of building up heart resistance to stress damage.

Table Title: The influence of preliminary adaptation of the organism to repeated exposure to stress and of a program of moderate exercise on the disruption of contractility and resistance of the myocardia and excess of calcium and hypoxia under long-term stress

P26(6/85) Nepomnyashchikh LM, Kolesnikova LV, Nepomnyashchikh GI. Myocardial tissue organization in rats under hypokinesia (a stereological investigation). *Arkhiv Anatomii, Gistologii i Embriologii*. 88(1): 57-62; 1985. (26 references; 2 in English)

Cardiovascular and Respiratory Systems, Myocardium; Also
Morphology and Cytology
Rats
Immobilization

Abstract: Forty-eight male rats were confined for 30 days in cages allowing virtually no movement. Stereological methods were used to determine volume and surface density of muscle fibers, microcirculatory bed and connective tissue components, and volumetric and surface-volume ratios of parenchymal and stomal structures. The intracellular parameters of cardiac myocytes were also identified. Stereological analysis indicated that the ratio between muscle and connective tissue in the rats' myocardia decreased under hypokinesia. At the same time, increase in the relative volume of the intracellular matter and alteration of the microcirculatory bed led to degradation in metabolic processes. Morphological and stereologic analysis also indicated the development of myocardial atrophy, accompanied by disproportionate alterations of the intracellular structure of cardiac myocytes. Evidently albuminolysis, which occurs when synthetic processes are degraded and reproduction of the basic organelles in cardiac muscle cells is inhibited, gives priority to the structures with greatest functional importance for the tissue.

Table Title: Results of morphometric examination of the hearts of Wistar rats after 30 days of hypokinesia.

P29(6/85) Palets BL, Popov AA, Tikhonov MA, Arkhangel'skiy DYu. Hemodynamics under gravitational loading (mathematical model). Fiziologiya Cheloveka. 11(2): 185-191; 1985. (11 references; 2 in English)

Cardiovascular and Respiratory Systems, Hemodynamics
Mathematical Models
High-Gravity Environments; Head-down Tilt

Abstract: A mathematical model of the regulation of human blood circulation under increasing gravitational loading in the "head - pelvis" direction was developed. In this model, the cardiovascular system is represented as a network of segments with fixed parameters representing the pumping function of the right and left ventricles of the heart and the resistance-capacitance properties of the vessel beds, including the ascending and descending aortas, arteries and veins of the brain, kidneys, sex organs, muscles and skin of the head, arms, trunk, hips, shins, inferior and superior venae cavae, and pulmonary veins and arteries. The model reflects the interrelationship between mean values of blood volume, pressure, and blood flow. Computer tests of the model demonstrated its adequacy for experimental data on indices of the hemodynamic system for the entire range of gravitational loads up to the limit of tolerance. The regulatory processes that determine changes in the central volume of blood are important in the dynamics of blood circulation under various gravitational loads.

Figure Titles: Figure 1: Hemodynamic reactions of a person in a passive tilt test (mathematical model)

Figure 2: Changes in hemodynamic indicators for a person subjected to linearly increasing gravitation load in the "head-pelvis" direction with an angle between the longitudinal axis of the body and the horizontal of 60° Figure 3: Same as 2 with angle = 35°

P49(6/85) Desova AA, Korotkiy VF, Belova II, and Zhuravel' AA. Identification of additional features in the peripheral pulse signal providing information about the functional state of a human operator. Fiziologiya Cheloveka. 11(2): 192-200; 1985. (14 references; none in English)

Cardiovascular and Respiratory Systems, Pulse; Also Health and Medicine, Diagnosis
Humans, Operators
Mental Complexity, Stress

Abstract: This study explored the possibility of increasing the amount of information extractable from peripheral pulse signals. These signals were analyzed with respect to human subjects (operators) performing mental tasks of varying degrees of complexity. Certain features of the peripheral pulse that correlated with the functional state of the human operator were identified through statistical analysis of temporal and amplitude parameters associated with the diastolic and dichrotic wave components of pulse fluctuations. These features were: maximum amplitude of the fundamental and dichrotic waves; minimum amplitude of the fundamental, dichrotic and diastolic waves; period of the fundamental wave; time between the beginning of the fundamental wave and the beginning of the dichrotic wave; time between the beginning of the fundamental wave and the peak of the dichrotic wave; and time between the beginning of the fundamental wave and the beginning of the diastolic wave. Use of these features to supplement traditionally utilized peripheral pulse parameters made it possible to distinguish with improved sensitivity and accuracy among the mental demands associated with tasks of varying difficulty.

Table and Figure Titles: Table 1: Numerical statistical characteristics of temporal parameters at significant points for groups of 17 people

Table 2: Numerical statistical characteristics of relative values of temporal parameters at significant points

Figure 1. Contour of single fluctuations in peripheral pulse

Figure 2. Schematic of optoelectric pulse sensor

Figure 3. Typical contours of peripheral pulse of the radial artery

ENDOCRINOLOGY

P14(6/85)* Tigranyan RA, Kalita NF, Makho L, Kvetnyanski R. (USSR, Czechoslovakia). Hormone content of blood plasma in rats after flight in the "Cosmos-1129" biosatellite. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 60-61; 1985. (18 references; 2 in English)

Endocrinology, Stress; Also Hematology

Rats

Space Flight, Cosmos-1129 Biosatellite; Immobilization

Abstract: The blood plasma of male rats which had undergone an 18.5-day flight in the "Cosmos-1129" biosatellite was analysed for hormone content, 6-8 hours after landing, 6 days after landing, and 6 days after landing when the intervening period had involved repeated exposure to immobilization stress. The flight group of rats showed increased concentration of insulin, thyreotropinum and triiodothyroninum relative to control animals, while concentration of thyroxine decreased. Repeated immobilization was associated with increased levels of ACTH in both experimental and control groups. The authors conclude that the experiment suggests that flight animals undergo some change in their hormonal balance. The tests with repeated immobilization suggest that the rats were affected by acute stress, most likely associated with the reentry and landing of the biosatellite.

Table title: Hormone content and glucose in the blood of rats in an experiment on the "Cosmos 1129" biosatellite

P21(6/85)* Shirinyan EA, Avakyan OM. Regulation of physical activity in head-down tilt by means of the sympathoadrenal and pituitary-adrenocortical systems. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 1985; 19(2): 87-89. (10 references; 6 in English)

Endocrinology; Endurance

Rats

Head-down Tilt, Tail Suspension; Hypothermia

Abstract: The goal of this research was investigation of work capacity and endurance during head-down tilt and exposure to cold as a function of the initial state of the various components of the sympathoadrenal and pituitary-adrenocortical systems. Male white rats were placed in a tail suspension apparatus above the surface of water at 18°C, with their front paws and snouts touching it. This compelled them to make continuous swimming motions. These conditions were considered to simulate weightlessness, both by increasing blood in the fore part of the body and by creating an absence of weight loading on the rear and, partially, the fore quarters. Rats were either left intact, underwent peripheral or central sympathectomy, adrenalectomy or adrenaldemedullation, or were hypophysectomized. The experimental treatment involved sessions of 30 minutes a day for seven weeks. Concentration of catecholamines and corticosterones in the rats' organs and blood was determined through fluorometry. Results were interpreted as demonstrating complex and close interrelationships among the states of the various components of the sympathoadrenal and pituitary-adrenocortical systems and the resistance of organisms in complex stressful situations. In particular, the endurance of the animals with various types of damage to the pituitary-adrenal system depends on the initial level of corticosterone, but not of catecholamine, in the blood and adrenal glands. In addition, the higher the initial level of norepinephrine in the central nervous system (but not in the heart) and the less it decreases under stress, the greater the endurance of the animal.

Table and Figure Titles: Table 1: Changes in the level of catecholamines and corticosterones in the blood and also muscular endurance under head-down tilt in experimental groups of rats (in % relative to corresponding control)

Figure 1: Endurance as a function of norepinephrine level in the brain (A) and heart (B)

P39(6/85) Goncharov NP, Katsia GB, Shexova, AN. Circadian rhythms of corticosteroids in female hamadryas baboons after long-term hypokinesia. Problemy Endokrinologii. XXXI(1): 70-73; 1985. (20 references; 6 in English)

Endocrinology, Circadian Rhythms; Also Reproductive Systems
 Primates, Baboons, Females
 Hypokinesia

Abstract: The effect of weightlessness on female hormonal cycles was investigated in sexually mature female hamadryas baboons that were immobilized in a horizontal position. Blood samples were taken every 6 hours on the 14th and 15th days, when five of the animals were in the follicular and five in the luteal phase of the menstrual cycle. Diurnal variations in the concentration of corticosteroids in the blood of the immobilized animals were compared with normal blood concentrations measured in the same animals at the same points in the menstrual cycle. Under normal conditions, clear circadian rhythms of hydrocortisone, 11-deoxycortisol, corticosterone and aldosterone were found in both phases of the menstrual cycle. After immobilization, the general pattern of these rhythms did not change for glucocorticoids, but there was a decrease in the mean daily concentration (statistically significant for 11-deoxycortisol and corticosterone in the luteal phase). For immobilized animals, there was a leveling of the normal circadian rhythm of aldosterone and the mean concentration in the blood decreased significantly. These results point to a change in the mineralocorticoid function of the adrenal gland under prolonged hypokinesia. It is suggested that the inhibition of aldosterone secretion results from the strong stress reaction observed in the first stages of hypokinesia. Complex changes in fluid-electrolyte exchange suggests that the observed changes in aldosterone levels may be adaptive in nature.

Table and Figure Titles: Table: Amplitudes of diurnal fluctuation in the level of corticosteroids under conditions of free and restricted motion

Figure 1: Diurnal variations in the content of corticosteroids in the blood plasma of female hamadryas baboons under conditions of free and restricted movement

Figure 2: Mean daily concentrations of corticosteroids in the blood plasma of female hamadryas baboons in the follicular and luteal phases of their cycles under conditions of free and restricted movement

GASTROINTESTINAL SYSTEM

P7(6/85)* Zhiznevskaya OV, Medkova IL. Investigation of the bile acid spectra in humans subjected to a 120 day period of hypokinesia with head-down tilt. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 33-35; 1985. (5 references; none in English)

Gastrointestinal System, Liver
Humans, Males
Hypokinesia, Bedrest and Head-down Tilt

Abstract: Six healthy individuals from 30-40 years were subjected to a 120-day period of bedrest with head-down tilt of 4.5°. Samples of duodenal juice were extracted at a number of points during this period and chromatography was performed to obtain bile acid spectra. As length of confinement increased, the percentage of taurodeoxycholine and taurodeoxycholic acid in the bile acid increased, while the percentage of glycocholine and glycocholic acid decreased. This suggests that the metabolic pathway of bile acid synthesis was modified.

Table title: Percentage of bile acids in B and C portions of duodenal contents in individuals undergoing a 120-day period of bedrest with head-down tilt

GENETICS

P30(6/85) Bobkova NN. Investigation of the effect of hypokinesia and acceleration on human chromosomes. Fiziologiya Cheloveka. 11(2): 300-301; 1985. (26 references; 7 in English)

Genetics, Chromosomes
Humans, Patients
Hypokinesia, Acceleration

Abstract: Seven middle-aged men suffering from arteriosclerosis and autonomic-vascular dystonia were subjected to a 30 day period of head-down (-8°) bedrest followed by 8-g acceleration applied transversely and lasting 40 seconds. This treatment did not elicit chromosomal changes in lymphocytes of the peripheral blood.

Table Title: Cytogenic analysis of blood of subjects before and after hypokinesia and acceleration

HABITABILITY AND ENVIRONMENTAL EFFECTS
(See also Metabolism: P11, P31)

P15(6/85) Zaloguyev SN, Viktorov AN, Shilov VM, Gorshkov VP, Zarubina MM, Shinkareva MM, Norkina TYu. Results of microbiological investigations performed during the flight of the "Salyut-6" orbital station. *Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina*. 19(2): 64-69; 1985. (5 references; 1 in English)

Habitability and Environmental Effects, Hygiene
Microbiology, Plants
Space Flight, Salyut-6

Abstract: Pre- and postflight investigations were made of the microflora on the mucous membranes of the nose, mouth, pharynx, and skin of cosmonauts, as well as in the station living quarters. There was some evidence for the development of staphylococci and other microflora on the mucous membranes of crew members during flight. However, in no case was this associated with infection. This tends to confirm the adequacy of the personal and general hygiene and antiepidemic measures taken before and during the "Salyut-6" missions.

Table title: Changes in the composition of the automicroflora growing on primary crew members and of the microflora in the living quarters of the "Salyut-6" orbital station

P16(6/85)* Viktorov AN, Novikova ND. Characteristics of the formation of microflora on construction materials used in hermetically sealed living quarters. *Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina*. 19(2): 66-69; 1985. (7 references; 1 in English)

Habitability and Environmental Effects
Microbiology, Plants
Spacecraft Cabins, Hermetic Seals

Abstract: This study investigated the nature of microbe and fungal associations on non-metallic materials in hermetically-sealed living quarters. Microorganisms were grown on various agar. Results indicated much variability in the concentration of microbes on different sections of the surface of hermetically sealed areas. The most microorganisms were found in areas where human contact was most likely. Microclimate was also important. Many of the microflora found were indigenous to human breathing passages and skin; others, like *Staphylococcus*, were potentially pathogenic. Potentially pathogenic fungi were also found. The majority of fungi identified were characteristic of fermentation and associated with organic acids. This study is interpreted as useful for developing recommendations concerning sanitary and prophylactic measures for hermetically sealed living quarters.

Table title: Table 1: The composition of microflora forming on various types of polymers used in hermetically sealed quarters.

HABITABILITY AND ENVIRONMENTAL EFFECTS

P18(6/85)* Kondratyuk VA. Experimental determination of acceptable concentrations of sodium and calcium in reclaimed drinking water. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 1985; 19(2): 69-74. (12 references; 1 in English)

Habitability and Environmental Effects, Potable Water; Also Life Support Systems

Rats

Life Support Systems, Water Reclamation; Minerals

Abstract: One hundred and ninety rats, divided into groups differing only in the composition of drinking water they were given, were studied for 6 months. The control animals were given tap water with a 24-33 mg/l concentration of sodium and a 3.2-4 mg/l concentration of potassium. Six experimental groups were given reclaimed water with varying concentrations of sodium and potassium ranging from 25-100 mg/l and 2.5-10 mg/l respectively. After 1, 3, and 6 months, measurements were made of the animals' peripheral blood, peroxidatic and catalase activity, and of the levels of chlorides and creatinine in the urine. After sacrifice, the weights of the animals' internal organs and the concentration of ascorbic acid, sodium and potassium within these organs was measured. Results were interpreted as indicating that consumption of water containing as much or more than 50 mg/l sodium and/or 5 mg/l potassium creates an imbalance of these minerals in the body. It is recommended that drinking water contain a maximum of 35 mg/l sodium and 4.0 mg/l potassium and a minimum of 5.7 mg/l sodium and 0.6 mg/l potassium.

Table Title: Table 1: Physical-chemical properties of reclaimed drinking water

HABITABILITY AND ENVIRONMENTAL EFFECTS

P19(6/85)* Galaktionova GV, Mastryukova VM, Strizhovskiy AD. Sensitivity of mammalian tissues to the prolonged effects of constant high-voltage magnetic fields. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 78-81; 1985. (6 references; 2 in English)

Habitability and Environmental Effects; Also Morphology and Cytology
Mice
Magnetic Fields

Abstract: The retinal epithelium, bone marrow and spermatogenic epithelium of mice exposed to constant magnetic fields of 1.6 T for 30 days were examined for cytological changes. During and after exposure, neither bone marrow nor retinal epithelium showed biologically significant deviations from normal. Mitotic changes observed were small and not sufficient to cause cell imbalance. No chromosome abnormalities nor degenerative changes in the cells were observed. In the spermatogenic epithelium, mature cells were destroyed, causing significant reduction (-93%) in the total number of spermatogenic cells during and immediately following exposure.

Table and Figure Titles: Table 1: Changes in mitotic index and quantity of retinal and bone marrow epithelium cells in mice during prolonged exposure to a constant magnetic field

Table 2: Changes in mitotic index and quantity of retinal and bone marrow epithelium cells in mice after 15- and 30-day exposure to a constant magnetic field

Figure 1: Changes in the cellular composition of spermatogenic epithelium in mice during prolonged exposure to constant magnetic field

Figure 2: Changes in the cellular composition of the spermatogenic epithelium in mice after 15- and 30-day exposure to constant magnetic field

HABITABILITY AND ENVIRONMENTAL EFFECTS

P31(6/85) Bushov YuV, Yershov AF, Os'minin FB, Pisanko AP, Nibush VA. The effect of moderate hypoxia on the work capacity of a human operator as a function of individual differences. Fiziologiya Cheloveka. 11(2): 258-261; 1985. (10 references; none in English)

Habitability and Environmental Effects, Hypoxia; Also
Cardiovascular and Respiratory Systems
Humans, Typology
Operator Performance

Abstract: Fifty adult male subjects participated in this study. Tests of psychological and physical capacity to work under hypoxia characteristic of high altitudes (3500 meters, 60-minute exposure) enabled classification of subjects into stable and unstable groups based on their reactions to these conditions. Moderate high-altitude hypoxia of one hour's duration gave rise to tachycardia, decrease of oxygen levels in the blood, and in some individuals, decrease in physical and psychological capacity for work. Before exposure to hypoxia, individuals who were stable under conditions of hypoxia differed reliably from those who were unstable. The former group had longer cardiac cycles, higher concentration of oxygen in the blood, and lower arterial pressure, evidently associated with lower basal metabolism. A negative correlation was found between emotional lability and capacity to work under hypoxia.

Figure title: Relationship between duration of cardiac cycles and level of oxygen in the blood at various periods of the experiment for experimental and control subjects

HABITABILITY AND ENVIRONMENTAL EFFECTS

P45(6/85) Il'nitskaya AV, Kalina OV. Evaluation of the combined effects of noise and ozone. Gigiyena Truda i Professional'nyye Zabolevaniya. 1985(3): 19-22. (11 references; 2 in English)

Habitability and Environmental Effects, Noise and Ozone
Rats
Medical Effects

Abstract: The goal of this research was to study the combined effect of high-frequency high-intensity noise and electric-arc gasses and to identify the role of each factor in the development of biological effects. Three groups of 20 rats each were subjected to the effects of noise (at a level of 112 decibels) alone, gas alone (mixture containing 0.5 mg/m ozone and 1 mg/m nitrogen dioxide), or noise and gas combined for 4 hours a day for three periods lasting 13 days each. A fourth group of rats served as a control. Effects on the rats were evaluated by computation of weight, summary threshold index, and participation of enzymes in 1)oxidation-reduction reactions, 2) chemical transmission of neural stimulation, and 3) neural-humoral regulation of tone of blood vessels. The morphology and mytotic activity of thymus, bone marrow and spleen were also measured. All three experimental groups manifested nonspecific effects, including decreases in the threshold of central nervous system excitability, increases in levels of histamine, changes in levels of acetylcholine and decreases in the cellularity of hematogenic organs. However, no effects attributable to the combination of the two factors could be identified. The authors attribute this to the short duration of the experiment.

Table Titles: Table 1: Indices characterizing the physiological state of experimental animals

Table 2: The state of the hematogenic organs after 40 days exposure to the factors studied, alone and in combination

HEALTH AND MEDICINE

(See also Cardiovascular and Respiratory Systems: P49;
Immunology: P27)

P28(6/85) Agadzhanyan NA, Krasnikov NP. Evaluation of the functional state of athletes breathing atmospheres with altered gas compositions. *Teoriya i Praktika Fizicheskoy Kul'tury*. 1985(3): 19-20. (No references)

Health and Medicine, Fitness
Humans, Athletes
Atmosphere, Gas Mixtures

Abstract: Sixteen master bicyclists participated in this study. Lying on their backs, they breathed either ordinary air (20.9% O₂), hypoxic (14% O₂), or hypoxic-hypercarbic (14% O₂ and 5% CO₂) gas mixtures. After 10 minutes, a number of indices of external respiration and circulation were computed for each group, using the Douglas-Holden method and rheography respectively. Subjects' physical capacity for work was gauged using an ergometric bicycle. Experimental sessions took place while the athletes were in the transitional, training and competitive periods of a 10 month training cycle. While the physical work capacity of the athletes increased as the training cycle progressed, this was not reflected in the respiratory and circulatory data when normal atmosphere was breathed. However, changes in circulation and respiration were more pronounced when hypoxic and particularly hypoxic-hypercarbic gas mixtures were used. The authors conclude that these results suggest that altered gas mixtures may be appropriate and sensitive tests of the functional states of athletes.

Figure Titles: Figure 1: Indices of external respiration and circulation in athletes at various stages in the training cycle during breathing of atmospheric air

Figure 2: Indices of external respiration and circulation in athletes at various stages in the training cycle while breathing a hypoxic gas mixture (14% O₂)

Figure 3: Indices of external respiration and circulation in athletes at various stages in the training cycle while breathing a hypoxic-hypercarbic gas mixture (14%O₂ + 5% CO₂)

P32(6/85) Lushchitskiy MA, Myasnikov AP, Shumskiy YuP. The effect of severe trauma on decompression sickness. Voenno-meditsinskiy Zhurnal. 1985(1): 35-37. (6 references; none in English)

Health and Medicine, Decompression Sickness

Cats

Injuries

Abstract: Opinions conflict concerning the suitability of using a decompression schedule intended for a healthy individual for a person who has suffered severe trauma. To investigate this issue further, the susceptibility to decompression sickness of cats with their legs amputated was compared to the susceptibility of intact controls. On the 3rd, 9th and 15th days after amputation, the experimental cats and their control counterparts were subjected to a 2-minute period of compression to 0.8MPa, a 35-minute period under this maximum pressure, followed by two minutes of decompression. During the experimental period, behavior of the animals was observed, their heartbeat and respiration rate monitored, and the generation of gas bubbles in their blood determined ultrasonically. Results indicated that animals which had undergone trauma were less likely to develop symptoms of decompression sickness 3 and 9 days after the traumatic event. At all time periods, 3, 9 and 15 days, the traumatized cats showed significantly longer latency periods before developing sickness than did their intact counterparts. Ultrasound results showed that, while symptomology differed, gas bubble formation was identical for experimental and control animals. Traumatized animals which had undergone the compression-decompression treatment healed substantially more slowly and developed more serious complications than did animals suffering amputation alone.

Table 1: The effect of severe trauma on susceptibility to decompression sickness and duration of latent period for decompression sickness as a function of time elapsed since trauma

P47(6/85) Kislyakov YuYa, Kopyl'tsov AV. Formation of gas bubbles in biological tissues during decompression (mathematical modeling). Biofizika 30(2): 337-340; 1985. (8 references; 7 in English)

Health and Medicine, Decompression Sickness
Tissues
Mathematical Models

Abstract: A mathematical model is presented which simulates transfer of gases between a bubble resulting from decompression and surrounding tissue. The model is used to investigate the effect of gas mixture composition and the density of the bubble-forming centers on rate of bubble growth. The importance of the role of CO_2 in the formation of bubbles is revealed. It is demonstrated that bubbles grow more rapidly in He than in N_2 , but nitrogen bubbles reach a greater size. When external pressure decreases by a factor of 5 to 10, bubbles can reach a size capable of leading to breakdowns of the microcirculation system in 1 or 2 seconds.

Figure Titles: Figure 1. Change over time of standardized partial pressure of gases N_2 , O_2 , CO_2 and water vapor in a bubble and surrounding tissue in a radial direction in a cell with a radius 20 μm with discontinuous fivefold decrease of external pressure

Figure 2. Change in radius of a bubble during sharp decrease in external pressure by a factor of 5, and 10 in a medium of N_2 and He in a cell with radius of 20 μm

Figure 3. Increase in the gas volume in a bubble when external pressure decreases by a factor of 10 in a cell with radius of 20 μm for a mixture of N_2 , O_2 , CO_2 , and He.

Figure 4. Change in standardized partial pressures of gases in a bubble when external pressure decreases sharply by a factor of 5 in a cell with radius of 20 μm

P46(6/85) Lozinskiy VS. Trends in the work of the flight surgeon. Voenno-meditsinskiy Zhurnal. 1985(3): 47-48. (No references)

Health and Medicine, Medical Trends

Flight Crew

Flight Surgeon

Abstract: Increasing complexity and demands of the flight crew's mission are cited as increasing both the importance and the difficulty of the flight surgeon's job. The efficacy of the "Fiziolog-M" device for measuring neuropsychological reactions of flight crews during training is praised. In the future a so-called "physiological passport" will be issued to crew members attesting to their fitness for flight missions. The most progressive flight surgeons are described as being concerned with the psychophysiological training of pilots. Training would include such areas as: biofeedback methods and use of idle intervals during a flight to anticipate situations and decisions which might occur in an upcoming mission.

HEMATOLOGY

(See also Endocrinology: P14; Radiobiology: P33)

P35(6/85) Mishchenko VP, Yeremina YeL, Sorokina SI, Gritsay NN, Goncharenko LL, Loban' GA, and Gubka PI. The effect of therapeutic running on lipid peroxidation, blood coagulation, and the antiaggregation properties of vessel walls. *Voprosy Meditsinskoy Khimii*. XXXI(1): 99-101; 1985. (20 references; 5 in English)

Hematology, Coagulation; Also Metabolism, Lipids
Humans
Physical Exercise, Fitness

Abstract: This paper investigates mechanisms underlying the beneficial effects of a program of running on prevention of cardiovascular disease. The hypothesis is advanced that regular running influences the processes of lipid peroxidation and blood coagulation. Two groups of 120 people each were compared: members of one group engaged in a regular program of running; while members of the other group did not. Groups were matched for age and other variables. A number of indices showed that runners had lower lipid peroxidation levels than non-runners. In addition, runners' blood had significantly increased levels of antithrombine, and higher fibrin and fibrinogen content than that of non-runners, and the time required for the euglobulin fraction to dissolve was decreased by 128% in runners. It is concluded that the increase of anticoagulant and fibrinolytic substances in the blood of runners maintains it in a liquid state, averts thrombosis, and improves blood flow and microcirculatory processes. After venous occlusion, it was found that the antiaggregation reaction was substantially stronger in runners than in non-runners. The authors conclude that a running program improves flow of blood and nourishment of cells, tissues, and organs.

Table titles: Table 1. The influence of running on certain indicators of thrombocyte aggregation and lipid peroxidation

Table 2. The effect of therapeutic running on certain indices of thrombocyte aggregation and content of glutation before and after venous occlusion

IMMUNOLOGY

(See also Radiobiology: P38)

P27(6/85) Petrov VR, Cheredeyev AN, Koval'chuk LV. Principles of immunology research. Sovetskaya Meditsina. 1985(3): 66-69. (23 references; 12 in English)

Immunology; Also Health and Medicine
Humans
Research Principles

Abstract: Evaluation of the human immunological system should be a two-stage process, moving from relatively simple tests (e.g., determination of the relative and absolute number of lymphocytes and tests on phagocytosis) to those that are more complex (e.g., production of immunoglobulins with B-cells in vitro, direct test of inhibition of the migration of leukocytes by phytohemagglutinin). Because the immunological examination of a patient is so labor intensive, it must be based strictly on medical indications. The two-stage principle may also be applied to evaluation of the efficacy of the immunological therapy prescribed, and for predicting the benefits of a medication.

LIFE SUPPORT SYSTEMS

(See also Habitability and Environmental Effects: P18)

P17(6/85)* Kondrat'yeva YeM. The composition and growth dynamics bacteria associated with algae in human biological LSS. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2)69-74; 1985. (16 references; 2 in English)

Life Support Systems
Microbiology, Bacteria; Algae
Waste Utilization

Abstract: When a continuous non-circulating algae culture is used as the photosynthesis link in models of human biological life support system (LSS), the possible contamination of microflora between the links of the system sharing an atmosphere becomes a problem. The present work studied the concentration and stability of growth of bacteria associated with algae under continuous cultivation in a mineral medium in a biological life support system that served to regenerate the atmosphere and water. The model studied included man, a link of one-celled alga based on *Chlorella*, a link involving biological mineralization of urine, as well as units for the vaporization of urine, and drying of biomasses and solid human wastes. The major components of urine were passed to the alga reactor only after preliminary mineralization in a special unit. The concentration and composition of microflora was analyzed both while the algae were growing independently and when they were part of a system including humans. Data was obtained for two periods lasting 37 and 50 days. Generation of new bacteriological groups was facilitated by the sharing of a gas and water line between the reactor and the manned module, which also contained the urine mineralization unit. These bacteria, however, could not develop in actively growing algae cultures and therefore disappeared rapidly. This suggests that the growth of algal bacteria within a biological LSS is a self-regulating system.

Table and Figure Titles: Table 1. The concentration of bacteria associated with algae under continuous cultivation independently and in a human biological LSS

Table 2. Changes in concentration of bacteria entering a continuously cultivated algae culture from other links in a system, under various conditions,

Figure 1. Concentration of bacteria as a function of time during long-term cultivation of algae

Figure 2. Proportion of individual bacterial genera (in %) and their concentration in meat peptone agar and in a medium with a *Chlorella* mixture under continuous cultivation of algae

P23(6/85)* Golubeva YeG, Gur'yeva TS, Tikhobayeva OI. Chemical composition of the biomass of Musca domestica L. larvae and pupae which develop in organic wastes in biological human life support systems. Kosmicheskaya Biologiyai Aviakosmicheskaya Meditsina. 19(2): 91-93; 1985. (11 references; 3 in English)

Life Support Systems, Closed Ecological Systems
Insects, Flies
Chemical Composition

Abstract: Houseflies have been suggested for use as food for additional non-human heterotrophic links in biological life support systems to improve the efficiency of mass transfer and the completeness of system closure. This study investigated the chemical composition of the biomass of house fly prepupae and pupae grown on different combinations of wastes, including human excrement, dung from Japanese quail, and mineralized wheat straw. The results show that the chemical composition of the biomass of prepupae and pupae of the housefly does not depend on the combination of waste sources within the range of experimental conditions. This is taken to indicate that a biomass of larvae and pupae of the housefly, utilizing the organic wastes of a biological life support system, would be a suitable food for animals serving as heterotrophic links of this system.

Table and figure titles: Table 1: Composition of the substrates studied

Table 2: Fat content of pupae and prepupae of Musca domestica L., developed on organic wastes of a biological life support system with varying densities of larval population on the substrate

Figure 1. Mean weight of house fly prepupae and pupae developed on the organic wastes of a biological life support system with varying densities of larval population on the substrate

Figure 2. Protein content of house fly prepupae and pupae developed on wastes of a biological life support system with varying densities of larval population on the substrate

METABOLISM

(See also Hematology: P35)

P11(6/85)* Ushakov AS, Vlasova TF, Miroshnikova YeB, Panferova NYe, Murugova TP. Investigation of certain aspects of aminoacid metabolism in humans subjected to the combined effects of short-term head-down tilt and ultraviolet irradiation. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 46-49; 1985. (9 references; 2 in English)

Metabolism, Amino Acids; Also Habitability and Environmental Effects

Humans

Head-down Tilt and Ultraviolet Radiation

Abstract: Three groups of humans were subjected to 20 two hour periods of head-down (-12°) tilt. For the first group (N=6) this was the entire experimental treatment; for the second and third groups (each N=3) this treatment was accompanied by two different doses of ultraviolet irradiation. Blood was taken from the veins on the 10th and 20th sessions while subjects had empty stomachs, and analyzed for content of free amino acids. Blood was also taken at the end of a 13-day recovery period. Subjects in the first group showed a reliable decrease in seven of the 17 amino acids studied. At the end of the recovery period only five of these had returned to their initial value, while the remaining two had dropped still further. In both ultraviolet groups, total blood amino acid content had dropped after the tenth experimental session and did not differ from that of the first group. For both irradiation groups, significant drops were found for nine of the acids studied. Such drops are stated to be characteristic of stress situations. After 20 sessions of exposure to combined head-down hypokinesia and ultraviolet radiation, amino acid level had risen to exceed the baseline value. Such effects are characteristic of prolonged head-down hypokinesia, explained as a result of inhibition of anabolic and stimulation of catabolic processes. At the end of the recovery period the initial level had not been restored for either group. No reliable differences attributable to dosage were found.

Table Title: Content of free amino acids in blood plasma (mg%)

P36(6/85) Temur'yants NA, Yevstaf'yeva YeV, Makeyev VB.
Adaptation of lipid metabolism in rats with restricted mobility
as a result of exposure to a variable infra-low frequency
magnetic field. Biofizika. 1985: 30(2): 313-316. (10 references;
none in English)

Metabolism, Lipid

Rats

Magnetic Field and Immobilization

Abstract: Two groups of rats were exposed for 3 hours per day to a variable infra-low frequency magnetic field with frequency of 8 Hz and intensity of 4.1 amp/m. One of these groups lived under normal laboratory conditions while the other was held in individual cages designed to restrict mobility. Two control groups were held in analogous living conditions, but were not exposed to the field. Blood was collected from sacrificed animals in all groups on days 3, 8, 28 and 45, and quantity of lipids in the blood serum determined colorimetrically. Hyperlipemia was found only in the rats subjected to restricted motion. Those subjected to both restricted mobility and the magnetic field also developed increased levels of lipids in their blood relative to the control group, but to a lesser extent than those restricted in movement alone. By the 45th day, rats subjected to both treatments had blood serum lipid levels virtually identical to freely moving animals, indicating that metabolic adaptation had occurred.

Figure Title: Changes in indices of lipid metabolism in blood serum of rats at various stages in the observation period

MORPHOLOGY AND CYTOLOGY

(See also Cardiovascular and Respiratory Systems: P26;
Habitability and Environmental Effects: P19)

P13(6/85)* Kaplanskiy AS, Savina YeA, Kazakova PB, Khoroshilova-Maslova IP, Kharin GM, Yakovleva VI, Plakhuta-Plakutina GI, Durnova GN, Il'ina-Kakuyeva YeI, Alekseyev YeI, Pankova AS, Shvets VN, Burkovskaya TYe. Head-down tilt in monkeys: A morphological investigation. *Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina*. 19(2): 53-60; 1985. (25 references; 8 in English)

Morphology and Cytology
Primates, Rhesus Monkeys
Hypokinesia, Head-down Tilt

Abstract: Six Macaca mulata rhesus monkeys were subjected to 19 days of hypokinesia with head-down (-6°) tilt, two monkeys to seven days of the treatment and four were used as controls. The animals were sacrificed and necropsies performed. Morphological changes were observed in a number of organs and tissues, including the heart, lungs, liver, kidneys, spleen, thymus, inguinal lymph nodes, adrenal glands, brain, and muscles. The authors conclude that the changes noted are of different origins, caused by blood redistribution, hypokinesia itself and associated stress.

Table and Figure Titles: Table 1: Changes in weights of internal organs and muscles of monkeys after head-down tilt

Figure 1. Perivascular edema of the brain of a monkey after 19 days of hypokinesia with head-down tilt

Figure 2. Degenerative changes in brain neurons of a monkey after 19 days of hypokinesia with head-down tilt

Figure 3. Intracellular edema and clustering of micropinocytotic vesicles in an endothelial cell of a capillary in the retina of a monkey after 19 days of hypokinesia with head-down tilt

Figure 4. Degenerative changes of the mitochondrion (formation of myelin bodies) in the muscle cells of a choroid arteriole of a monkey after 19 days of hypokinesia with head-down tilt

P20(6/85)* Yakovleva VI, Belkaniya GS. Morphological manifestations of hemodynamic shifts in the lungs of monkeys during hypokinesia with head-down tilt. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina 19(2): 85-87; 1985. (14 references; none in English)

Morphology and Cytology, Lungs; Also Cardiovascular and Respiratory
 Primates, Rhesus Monkeys
 Hypokinesia, Head-down Tilt

Abstract: Three sexually immature rhesus monkeys spent 7 days in horizontal hypokinesia, followed by 12 days of head-down tilt at -6° . An additional two monkeys were subjected to 7 days of hypokinesia with head-down tilt. Three controls were also used. The animals were sacrificed and 12 samples taken from the lungs of each. The following parameters were measured or computed from measurements: artery diameter within the boundaries of the external elastic membrane, magnitude of lumen, width of the muscle layer between two elastic membranes, cross section area of the muscular layer, and Kernogen's index, which makes it possible to differentiate dynamic changes in tone from structural changes. The lung tissue of the experimental monkeys was heavier than that of the controls. The small arteries (at the level of terminal and respiratory bronchioles) and veins of the experimental animals were enlarged and showed hypervolemia. In spite of this, no morphological signs of congestive phenomena were evident; however, there was some indication of coarsening of the elastic tissues of the lungs. Effects were more pronounced in monkeys which had spent more time in the experimental position. The presence of venous and capillary blood profusion in lung tissues, in the absence of congestive phenomena, is considered by the authors to be a clear morphological confirmation of the pooling of blood in the lungs of monkeys subjected to hypokinesia with head-down tilt.

Table Title: Table 1: Morphometric characteristics of small muscular arteries during head-down tilt

MUSCULOSKELETAL SYSTEM

P34(6/85) Kasatkina LF. Density of muscle fibers in motor units in different stages of denervation-reinnervation in humans, Patologicheskaya Fiziologiya i Eksperimental'naya Terapiya. 1985(1): 42-46. (14 references; 10 in English)

Musculoskeletal System; Also Neurophysiology
Humans, Patients
Diseases

Abstract: Subjects for this experiment were 106 healthy individuals and 1065 individuals with various types of neuromuscular disease. Using an electromyograph, the action potential of muscle motor units was recorded and average duration and percent deviation from the norm was calculated. A histogram was constructed and the stage of denervation-reinnervation of the muscle was determined on the basis of a classification scheme developed by the author. In addition, density of muscle fibers in the motor unit was determined. Results suggest that increase of muscle fiber density in the initial stage of the denervation-reinnervation process is due to a reorganization of the motor unit structure. This reorganization includes two parallel processes: 1) loss of the motorneural branching of axions and elimination of the muscle fibers furthest from the center of the motor unit and 2) increase in the density of innervation in the center of the motor unit by means of terminal branching.

Table and Figure Titles: Table 1: Stages of the denervation-reinnervation process in clinically affected muscles in patients with various neuromuscular diseases

Table 2: Density of muscle fibers in motor units of muscles in various stages in the development of the denervation-reinnervation process

Figure 1: Distribution of duration and number of spikes in action potential of motor units in the muscle of a subject with polymyositis

Figure 2: Distribution of duration and number of spikes in action potential of motor units in the muscle of a subject with spinal amyotrophy

NEUROPHYSIOLOGY

(See also Musculoskeletal System: P34; Perception: P21;
Psychology: P2, P3, P43, P48)

P1(6/85)* Yegorov AD, Yuganov YeM. Labyrinthine and extralabyrinthine mechanisms underlying the development of motion sickness during weightlessness. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 1985; 19(2): 4-9. (35 references; 11 in English)

Neurophysiology, Motion Sickness
Humans, Cosmonauts
Weightlessness, Adaptation

Abstract: This paper reviews Soviet and Western publications concerning space motion sickness. With reference to this literature, as well as data from their own experiments (dealing with very short periods of weightlessness), the authors discuss possible mechanisms underlying the development of space adaptation syndrome. The authors conclude that the most well-substantiated current hypothesis about the origin of this syndrome is one which involves the disruption of the interactions within the afferent system supporting perception of body orientation in space. They also discuss potential applications of the hypothesized mechanism to the development of countermeasures to combat space motion sickness. Repeated preliminary exposure to weightlessness and training to facilitate adaptation to fluid shifts are considered the most promising of these.

Table titles: Table 1: Frequency of occurrence of space motion sickness during flights

Table 2: Some sensory conflicts arising under weightlessness

Table 3: The functional system giving rise to statokinesis and spatial orientation on earth and under weightlessness (hypothesized)

P41(6/85) Popugayev AI. Potential for directed development of the vestibular function. Teoriya i Praktika Fizicheskoy Kultury. 1985(1); 22-23. (5 references; none in English)

Neurophysiology, Motion sickness, Vestibular Nystagmus
Human, Children, Typology
Adaptation, Training

Abstract: Ten- and 11-year old pupils of a school for future pilots served as subjects in this study (N=134). Subjects were placed in one of two groups based on vestibular sensitivity to Coriolus acceleration: the stable group (less sensitive) or the unstable group. Following classification, both groups underwent 2.5 months of passive training for adaptation to rotation. Two types of training sessions were held, the first with threshold acceleration, and the second with accelerations of 90 degrees/sec. Tests showed that threshold training had beneficial effects on children of both groups. Children in the more stable group had not returned to their previous level even after 15 days. Training with acceleration of 90 degrees/second also led to a decrease in vestibular sensitivity, particularly in children who were originally shown to be unstable.

Table and Figure Titles: Table: Parameters of vestibular reactions in subjects with different levels of susceptibility to motion sickness

Figure: Changes in excitability and duration of nystagmic reaction, and excitability and duration of sensory reactions as a result of training

P37(6/85) Bragin YeO. Neurochemical mechanisms regulating the sensitivity to pain. Uspekhi Fiziologicheskikh Nauk. 16(1): 21-42; 1985. (122 references; 94 in English)

Neurophysiology, Brain
Rats
Pain Sensitivity

Abstract: This article addresses the neurochemical mechanisms for regulating sensitivity to pain. Particular emphasis is given to the role of opiate and monoaminergic systems of the brain in the functioning of analgesic mechanisms. On the basis of the author's own work and a review of Soviet and English literature, he concludes that regulation of sensitivity to pain is provided by a number of analgesic systems that differ qualitatively in their neurochemical composition. The processes leading to the formation of a specific analgesic system in response to a particular stimulus have discrete activation thresholds. Data suggesting that a single organism has a number of neurochemical and neurophysiological analgesic mechanisms implies that the most promising analgesic techniques for combatting pain are those using reflex therapy (e.g., acupuncture).

Figure Titles: Figure 1: Amount and nature of active opiate material in various areas of the brains of rats being exposed to various kinds of stimulation

Figure 2: Changes over time of pain reactions (tail flick and paw licking) in control rats, and rats undergoing electrolytic inhibition of the lateral periaqueductal grey matter after either auricular electrical stimulation or unavoidable stress

Figure 3: Amount and nature of active opiates in blood plasma in response to various nociceptive stimuli

Figure 4: Changes over time of pain reactions in control rats and rats that have undergone inhibition of catecholaminergic neurons of the lateral reticular nuclei (caused by stereotaxic introduction of 6-oxidopamine) after either electroacupuncture, stress, cold stress or stimulation of visceral organs

Figure 5. Schematic of the neurochemical mechanisms supporting analgesic systems

PERCEPTION

(See also Personnel Selection: P42)

P5(6/85)* Solodovnik FA, Chapayev AB. The influence of position of the human body and its restraint on magnitude of spatial illusions during weightlessness. *Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina*. 19(2): 23-26; 1985. (8 references; 2 in English)

Perception, Spatial Illusion

Humans

Weightlessness, Body Position, Immobilization

Abstract: Ten subjects were tested for susceptibility to spatial illusion during weightlessness induced by parabolic flight. Subjects were tested in a number of different body and head positions and two body restraint conditions. Magnitude of illusion was gauged by eliciting verbal reports of body position with eyes closed, and by setting a special "Birtok" orienting device. Individual differences in susceptibility were pronounced, but 80 percent showed some illusion, primarily of the body tumbling backward. None of the manipulated variables appeared to affect magnitude of illusion.

Figure titles: Figure 1. Magnitude of illusion during short-term weightlessness with body and head in various positions

Figure 2 Magnitude of illusion during short-term weightlessness supine in cosmonauts' chair under two conditions of restraint

P21(6/85)* Ayzikov GS, Klyushnikova ON. The influence of experimentally induced motion sickness on postrotatory nystagmus and counter-rotation illusion. *Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina*. 19(2): 89-91; 1985. (11 references; 4 in English)

Perception, Illusion; Also Neurophysiology, Nystagmus

Humans, Males

Motion Sickness; Drugs

Abstract: Motion sickness at levels II and III was induced in nine healthy male volunteers. Rotation tests with eyes closed were used to investigate postrotation nystagmus and counter-rotation illusion. Postrotation nystagmus was recorded on an electrographic device and the subject pushed a button to indicate the beginning and cessation of counter-rotation illusion. The effects of various doses of scopolamine mixed with cavinton on the phenomena under study were also investigated. Since the use of motion sickness drugs did not affect nystagmus, results were interpreted as suggesting that there is no relationship between the extent of vestibular-autonomic reactions and nystagmic reactions of the eye.

Table title: Changes in post-rotation nystagmus in various series

of experimental sessions

P44(6/85) Gurfinkel' VS, Debreva YeYe, Levik YuS. On the relationship between perception of the parts of the body and movement. Fiziologiya Cheloveka. 1985; 11(1): 7-11. (9 references; 4 in English)

Perception, Orientation
Human
Motion

Abstract: This study investigated how preliminary movement of a part of the body affects perception of its position. A blindfolded subject was required to touch a stick held in the left hand to a finger of the right hand verbally designated by the experimenter. Four series of tests were made: 1) with fingers motionless without additional stimulation; 2) with preliminary tactile stimulation of the finger to be touched; 3) with electrical stimulation which caused involuntary bending of the fingers; 4) with the subject called upon to make a voluntary motion of the designated finger. Twenty-two subjects were tested under all four conditions and their accuracy measured over 25 trials. All three experimental manipulations increased accuracy over the motionless finger condition. Voluntary motion led to the highest accuracy, with the two other conditions (tactile and electric stimulation) not differing significantly from each other. The authors conclude that preparation for movement of a part of the body "activates" the appropriate portion of the internal image of the body, which then increases the accuracy of localization of this part. Such increased accuracy is associated not so much with additional afferent signals as with increased efficiency in utilizing both "external" afferent information and information about the relative positions of the parts of the body available at various levels of the central nervous system.

Table Titles: Table 1: Number of accurate movements in a series of 25 tests under various experimental conditions (palm down)

Table 2: Number of accurate movements in a series of 25 tests under various experimental conditions (palm up)

PERSONNEL SELECTION

P4(6/85)* Yevdokimov, V.I. Use of projective tests as a rapid technique for predicting self-discipline of pilot trainees. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 20-23; 1985. (10 references; none English)

Personnel Selection, Self-discipline; Also Psychology
Humans, Pilots
Psychological Tests

Abstract: Three Western projective tests (a variant of the Thematic Apperception Test(TAT), the Rosenzweig test of picture frustration and the Szondi test) were administered to 53 certified pilots and 415 cadets. Test protocols were scored for a number of factors believed to be related to cadets' level of self-discipline and their attitudes toward discipline. Test scores were correlated with commanders' rating of how self-disciplined the subjects were, results of interviews, results of a selection battery, and with performance in practical and theoretical training courses. Results of the Rosenzweig test did not correlate significantly with the other measures. TAT results interpreted as indicating an individual's attitude toward discipline correlated significantly with the other indicators in the predicted directions. Correlations ranged between .29 and .42. Factor analysis appeared to indicate that successful (well-disciplined) pilot trainees had different factor loadings than unsuccessful ones on the Szondi selection test. These results are interpreted as indicating that projective tests may be useful for predicting presence of occupationally significant psychological personality traits in cadets, while requiring relatively little time to administer and interpret.

Table titles: Table 1: Evaluation of the self-discipline of pilot trainees (description of anchor points of rating scale)

Table 2. Mean scored value of attitude toward discipline of figures in TAT pictures

Table 3. Correlation between TAT discipline score and values of other indicators

P42(6/85) Lapin YeA. Spatial representations and job performance in air traffic controllers. Vestnik Moskovskogo Universiteta: Seriya: 14 Psikhologiya. 1985(1): 68-70. (4 references; 2 in English)

Personnel Selection, Operator Performance; Also Perception
Humans, Air Traffic Controller
Space Perception

Abstract: The purpose of this study was: 1)to confirm the hypothesis that the dimensions of subjective space may be an important parameter of the air dispatcher's internal representation of his/her job environment, and 2)to establish the relationships between the characteristics of the dispatcher's cognitive map and the quality of his/her job performance. Professional air dispatchers were divided into two groups varying in rated expertise. Indirect reconstruction of the subjects' internal representation of the air space they were working with indicated that the more expert had quite accurate three-dimensional representations, while the less expert made do with two dimensions. The more expert group was also superior with regard to speed and accuracy of mental rotation in three-dimensional space. Indirect reconstruction of cognitive maps combined with multidimensional scaling is the most accurate predictor of job performance level for air traffic controllers. However, because of the ease with which data can be obtained and processed, the use of a mental rotation task is highly recommended for selection and evaluation of air controllers.

PSYCHOLOGY

(See also Perception: P4, P42)

P2(6/85)* Litsov AN, Shevchenko VF. Psychophysiological characteristics of the organization and scheduling of daily activity cycles of crews on long-term space flights. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 12-16; 1985. (17 references; 1 in English)

Psychology, Circadian Rhythms; Also Neurophysiology

Humans, Cosmonauts

Activity cycles, Work and Rest; Also Space Flight, Salyut-6 and -7

Abstract: This paper presents the results of a study of the work-rest cycles of members of the primary crews of the Salyut-6 and Salyut-7 stations. The authors examine the scheduling of crew work-rest cycles by the day, week, month and for the flight overall and the relationship of these to other aspects of the flight schedule. The effects of various parameters of these cycles on the crewmembers' well-being are discussed. An index reflecting the portions of crew's waking time devoted to work was computed and found to be relatively low (0.35-0.42) for the missions and intervals considered. The authors conclude that the specified work-rest cycles should be rigidly adhered to, and that, at all stages of the flight, the working day should be scheduled to accord with the cosmonauts' psychophysiological biorhythms.

Table and Figure Titles: Table 1. Organization of work-rest cycles as a function of the magnitude and direction of shifts in sleep-waking cycles of primary crews of the Salyut-7 station

Table 2: Duration of working week, proportion of waking period devoted to work and ratio of time devoted to work in the first and second periods of the working day as a function of duration of space flight (months 1-7)

Figure 1: Planned crew workload over the course of a 211-day space flight

Figure 2: Planned duration of sleep period as a function of duration of flight

P3(6/85)* Myasnikov VI, Ryzhov BN, Sal'nitskiy VP. Zone of functional comfort for an operator in control of a moving object. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 17-19; 1986. (8 references; none English)

Psychology, Stress; Also Neurophysiology
Humans, Operators
Task Complexity, Performance

Abstract: This experiment measured the psychological stress of six operators performing a compensatory tracking task of a simulated object the motion of which varied along a number of manipulable dimensions. A psychological stress indicator was computed on the basis of measurements of heart rate, electrical brain activity corresponding to theta and beta two EEG rhythms, and activity of the involuntary muscles. Level of stress was computed as a function of the operator's level of success at the tracking task. In general, the lowest level of stress (called the zone of functional comfort) was associated with a probability of failure of .4-.6. Increases in the probability of failure were associated with significant increases in the value of the stress indicator. Certain more experienced operators manifested relatively high stress levels at lower failure probabilities, which is interpreted by the authors to result from attempts to achieve virtual perfection. Stress levels that were either substantially above or substantially below those associated with the functional comfort zone were accompanied by poorer performance. Results of this study are interpreted as suggesting that identification of zones of functional comfort may be useful in designing data display devices.

Figure title: Level of psychological stress as a function of failure probability for task performance by six different operators

P43(6/85) Aladzhhalova NA, Kvasovets SV. Spontaneous mood changes under conditions of monotony and decasecond rhythms in brain potentials. Problemy Psikhofiziki. 6(2): 105-113; 1985. (17 references; 3 in English)

Psychology, Mood; Also Neurophysiology
 Humans, Adults
 Monotony, Electroencephalography

Abstract: This study developed a methodology for investigating spontaneous mood changes and their association with decasecond brain rhythms during the performance of a monotonous experimental task. Two stimuli, drawings of happy and sad faces, were projected on a screen. Changes in length of presentation could be controlled independently for each face. Presentation lengths for one of the faces were changed incrementally and the subjects (10 healthy adults) were to report appearance and disappearance of each of the faces and to make judgments about which one appeared larger. This was the monotonous task. The entire experimental session apparently lasted 72 minutes. Thresholds (in terms of presentation time) were computed for each of 15 trials for the appearance and disappearance of each of the stimuli, and for shifts in perception of a stimulus as smaller or larger. For each trial, the sum of all six thresholds was computed as an indicator of a subject's performance level. In addition, fluctuations in decasecond rhythms in brain potential were monitored for both hemispheres. Spontaneous mood shifts were identified with changes in threshold of stimuli of one mood type relative to the other. Results indicated that an initial bias in favor of the positive stimulus shifted after approximately 20 minutes in favor of the negative stimulus. At the same time the mood shift occurred, a change was observed in overall level of task performance, accompanied by the appearance of decasecond brain potential rhythms. The patterns of decasecond rhythms make it possible to identify partial temporary reorganizations of functional connections in the brain characteristic of monotony ("closed circle" types of neuron impulse circulation). The appearance of decasecond rhythms in the left hemisphere is correlated with a tendency to negative mood shift, while such rhythms in the right hemisphere are associated with positive mood shifts.

Table and Figure Titles: Table 1: Appearance of decasecond rhythms in brain potential and threshold changes associated with mood change across groups of experimental trials

Table 2: Time from beginning of presentation series to appearance of positive or negative mood change indicator

Table 3: Juxtaposition of the appearance of a positive or negative mood change with the distribution of decasecond rhythms in both hemispheres of the brain

Figure 1: The relationship between shifts in recognition threshold of an emotionally charged stimulus and the appearance of decasecond rhythms in various areas of the brain

Figure 2: Examples of second oscillations in potential during calm wakefulness and decasecond oscillations at the moment of spontaneous mood change

P40(6/85) Bokovikov AK, Krylova NV, Kurashvili VA. Problems in aerospace psychology: Papers presented at the XIVth Gagarin lectures. *Psikhologicheskiy Zhurnal*. 6(1): 151-152; 1985. (No references)

Psychology, Aerospace
Humans, Cosmonauts, Pilots
Conferences

Abstract: For the first time a separate section of these lectures was devoted to "Problems in Aerospace Psychology." More than 150 people participated in the sessions. Topics included: a)selection and training of students in flight schools and identification of factors associated with success in training; b)methods for prolonging the working life of pilots c)development of methods for monitoring and managing the psychophysiological state of pilots at all stages of training and flight performance; d)teaching of biofeedback methods to pilots; e)recommendations for standardizing the formats of verbal communication in air traffic control; f)definition of the scope of space psychology; g)methods for modeling the activity of cosmonauts; h)a model of psychological work capacity designed for use in selection and training of cosmonauts; i)aesthetic means of optimizing cosmonauts' emotional and psychological states; j)comparison of cosmonaut training simulators and actual conditions of work; k)appropriate psychological methodologies relevant to situations making heavy demands on adaptation mechanisms on the job;and l) effects of working for prolonged periods on tasks requiring visual observation of instrument panels. An associated section of the lectures was devoted to "Psychological and Physiological Factors in the Activity of Flight Crews." Topics and authors of papers in these sections were also reviewed.

P48(6/85) Kulikovskiy VV. Influence of performance of demanding mental tasks demands on sleep. Fiziologiya Cheloveka. 11(2): 247-250; 1985. (23 references; 13 in English)

Psychology, Sleep, Electroencephalogy; Also Neurophysiology
Humans, Adults
Mental Performance

Abstract: Thirteen healthy males were asked to perform demanding verbal tasks for about 5 hours after completion of their working days. After task performance, subjects' sleep was monitored simultaneously through electroencephalography, electro-oculography, electromyography of the oral diaphragm muscles, electrocardiography, and measurement of GSR. (Sleep monitoring had occurred the previous two nights for purposes of subject adaptation and determination of baseline levels.) Significant changes in sleep parameters attributable to the cognitive tasks were observed. The following changes in EEG were observed: 1)the proportion of delta sleep increased and the delta-index dropped; 2)the relative time spent in second stage sleep increased; 3)the number of movements with activations in second cycle sleep decreased; 4) the length of the REM latent period was curtailed; 5)the duration of the second cycle increased. Pulse and GSR were lower than they had been throughout the night.

Table Titles: Table 1. Stage structure of nocturnal sleep: at baseline and following performance of demanding mental tasks

Table 2. Latent periods for the stages of sleep: at baseline and following performance of demanding mental tasks

Table 3. Dynamics of delta sleep following performance of demanding mental tasks

Table 4. Mean values of pulse and GSR in the stages of nocturnal sleep at baseline and following performance of demanding mental tasks

RADIOBIOLOGY

P33(6/85) Neyman OV, Gorlov VG. Specific and non-specific reactions of bone marrow to prolonged gamma-radiation. *Seriya Biologicheskaya*. 1985(1): 137-140. (18 references; none in English)

Radiobiology; Also Hematology
Rats
Gamma Rays

Abstract: White rats were subjected to 23 hours a day of gamma radiation at a strength of 50 Roentgen per day ($1.5 \cdot 10^{-7}$ A/kg) for 54 days. Bone marrow of the rats was examined during the process of radiation up to an accumulated dose of 50 to 2700 rad. At a number of points in time, the marrow of seven animals was examined and the total number of myelokaryocytes in a volume of the femur bone as well as the absolute number of various bone marrow components was determined with a myelogram. The effects of radiation on bone marrow of the experimental animals included all the symptoms characteristic of generalized stress-syndrome, with its three stages of mobilization, resistance, and breakdown. Specific effects included: the absence of repeated "lymphoid peaks," in spite of the fact that of hemopoiesis was occurring, and increase in the quantity of erythroid elements in the hypoplastic marrow during the breakdown stage.

Figure Title: Dynamics of changes in bone marrow components in rats during prolonged irradiation

P38(6/85) Shubik VM, Kvasova MD, Mal'chenkova OA, Nevash LD, Zykova IA. An immunological characterization of cataracts in individuals having occupational contact with sources of ionizing radiation. *Gigiyena Truda i Professional'nyye Zabolevaniya*. 1985(2): 48-50. (10 references; 5 in English)

Radiobiology; Also Immunology, Cataracts
Humans, Patients
Ionizing Radiation, Occupational Exposure

Abstract: Various indicators (e.g., presence of autoantibodies to tissue antigens) characteristic of humoral and cellular immunopathological shifts were determined for 17 cataract patients who had been exposed to ionizing radiation in their jobs, and for 17 cataract patients with no such occupational contact. Cataracts in individuals whose occupations compelled contact with sources of ionizing radiation exhibited no clinical peculiarities distinguishing them from individuals with no such contact. Cataracts in both groups showed clear humoral changes in the absence of cellular shifts.

REPRODUCTIVE SYSTEM
(See also Endocrinology: P39)

P12(6/85) Serova LV, Denisova LA, Apanasenko ZI, Bryantseva LA, Chel'naya NA. General description of an experiment on rat ontogenesis on the "Cosmos-1514" biosatellite. Kosmicheskaya Biologiya i Aviakosmicheskaya Meditsina. 19(2): 49-53; 1985. (13 references; 2 in English)

Reproductive System, Pregnancy, Ontogeny
Rats, Mothers, Neonates
Space Flight, Cosmos-1514 Biosatellite

Abstract: Ten female Wistar rats were impregnated on earth and launched in the biosatellite on the 13th day of pregnancy; return to earth occurred on the 18th day. Three control groups of pregnant rats were used. At the completion of the flight, five of the experimental rats were sacrificed and counts made of the number of corpus lutea, loci of implantation, resorptions, and dead, living and anomalous fetuses. The weight and hydration of the fetuses and mothers were determined. The litters born to the remaining five experimental rats were equalized at eight per litter, and the development of each litter was monitored and compared to controls. After recovery from weightlessness, experimental animals showed significant delay in weight gain, thymus involution, and depressed liver weight and hemoglobin concentration. Nevertheless, the sacrificed rats showed no difference from the controls in measurements of reproduction success, with the exception of slight decreases in fetal weight and hydration. Litter size was identical for experimental and control animals, but mortality in the first seven days after birth was higher for the former. The authors conclude that their experiment indicates that mammalian fetuses exposed to weightlessness during the last term of pregnancy can grow and develop normally. However, additional experimentation is needed to determine if results would be identical if pregnant animals were exposed to zero-g in an earlier, more sensitive portion of pregnancy.

Table and Figure Titles: Table 1: Indicators of reproductive function of female rats

Table 2: Certain characteristics of fetuses and placentas in the 18th day of pregnancy

Figure 1: Changes in body weight of neonate rats in the postnatal period

MONOGRAPH SECTION

CYBERNETICS AND BIOMEDICAL DATA PROCESSING

M8(6/85) Aleksandrov VV, Shneyderov VS. Obrabotka mediko-biologicheskikh dannyykh na EVM [Processing of biomedical data on the computer]. Leningrad: Meditsina; 1984. [160 pp; 48 figures; 11 diagrams; 4 tables; 158 references; 28 in English]

Cybernetics and Biomedical Data Processing
Biomedical Statistics
Medical Diagnosis

Affiliation: Leningrad Scientific Research Computer Center of the USSR Academy of Sciences.

Annotation: This monograph presents modern methods for processing biomedical data, discusses methodological issues involved in the automated computer processing of statistical data, and compares the efficiency of the interactive and batch processing modes. Two solutions to the problem of identifying diagnostic indices are presented: the creation of programs to perform automated retrieval of the indices and the development of methods for graphic representation of biomedical data. Issues related to the incorporation of data in information systems for on-line monitoring by physicians are considered.

The monograph is intended for scientific workers, medical personnel, biologists and specialists in medical cybernetics.

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GROUP DYNAMICS

M2(6/85) Krylov VYu, Morozov YuI. Kiberneticheskiye modeli i psikhologiya, [Cybernetic models and psychology]. Moscow: Nauka; 1984. [7 tables; 149 references; 10 in English]

Group Dynamics, Occupational
Artificial Intelligence
Psychology
Computer Systems Simulation

Affiliation: Not available.

Annotation: This monograph is devoted to the application of the fundamental tenets and methods of cybernetics [artificial intelligence] and psychology. A wide range of questions related to the investigation and modeling of complex goal-directed systems are considered. A model of a goal-directed system in the form of a hierarchical self-teaching automaton is presented. Collectives (groups) formed through contact and occupational proximity are characterized from the common perspective of a goal-directed, evolving system, and the results of specific investigations are cited.

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LIFE SUPPORT SYSTEMS

M4(6/85) Serebryakov VN. Osnovy proyektirovaniya sistem zhizneobecpecheniye ekipazha kosmicheskikh letatel'nykh apparatov [Principles for designing life support systems for crews of space flight vehicles]. Moscow: Mashinostroyeniye; 1983. [160 pp.; 69 figures; 34 references; 7 in English] Described as a textbook for students of technical secondary educational institutions specializing in mechanical engineering.

Life Support Systems
Closed Ecological Systems
Environmental Factors
Air Purification
Recovery; Recycling
Reliability
Spacecrew Supplies
Temperature Control

Affiliation: Not available.

Abstract: This book covers the fundamental problems and methods of technical (engineering) design of life support systems for space flight. It covers the theoretical principles underlying the operation of system components, the technical specifications and the engineering design principles for the systems which supply essential elements, the compound systems, and the closed recovery systems of the near future. It casts light on the design features and methods of mass-energy optimization for onboard equipment and systems. It gives principles for constructing and selecting optimal life support systems.

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MAN-MACHINE SYSTEMS

M3(6/85) Popov YeP, Yushchenko AS. Roboty i chelovek [Robots and the human] (In series: Nauka i tekhnicheskii progress [Science and technological progress], editor, Makarov IM) Moscow: Nauka; 1984. [112 pp.; no illustrations; 99 references; 6 in English]

Man-Machine Systems

Robotics

Human Factors

Performance

Affiliation: USSR Academy of Sciences [Editor and senior author].

Annotation: The extensive adoption of robots has provided freedom from tedious and heavy operations in manufacturing, and has increased labor productivity and product quality. At the same time, it has given rise to problems, not merely in the realm of technology, but in the psychological/philosophical and social/economic realms as well. Questions arise concerning the completeness of the analogy between the job performance activities of humans and the functioning of robots, and between thinking and artificial intelligence, as well as questions relating to the nature of human-robot "interactions," etc. The examination of these and certain other issues relating to robotics comprises the content of this book.

Corresponding Member of the USSR Academy of Sciences, Ye. P. Popov and Candidate of Technological Sciences, A.S. Yushchenko are specialists in the field of automated control and robotics. They are the authors of a number of books on these issues and are working on the development of robotic systems controlled by computer and also of man-machine systems.

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MUSCULOSKELETAL SYSTEM

M9(6/85) Prokhonchukov AA, Zhizhina NA, Tigranyan RA. Gomeostas kostnoy tkani v norme i pre eksternal'nom vosdeystvii [Homeostasis of bone tissue under normal and extreme conditions]. (In series, Problemy kosmicheskoy biologii [Problems in space biology]; vol. 49; editor, Gorizontov PD.) Moscow: Nauka; 1984. [200 pp.; 60 tables; 42 illustrations; 278 references; 87 in English]

Affiliation: USSR Academy of Medical Sciences (volume editor)

Bone Physiology

Space flight, Cosmos biosatellites and Salyut-1 orbital stations

Weightlessness

Radiobiology

Annotation: This book summarizes and classifies the results of complex investigations of the homeostasis of bone tissue in animals and humans in the normal state as well as under the influence of extreme factors (such as, hypokinesia, weightlessness, ionizing radiation, laser irradiation). The major sections of the book are devoted to investigations on the "Cosmos-605, 690, 782, 936 and 1129" biosatellites and on the "Salyut-1" space orbital station. An original hypothesis is presented concerning the role of the organic matrix in maintaining bone tissue homeostasis under extreme conditions.

This book is intended for biologists, physiologists, pathophysiologists, biochemists, specialists in the area of space biology and aerospace medicine, traumatologists and surgeons.

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NEUROPHYSIOLOGY

M10(6/85) Levashov MM. Nistagmometriya v otsenke sostoyaniya vestibulyarnoy funktsiy [The use of nystagmometry to evaluate the vestibular function]. (In series, Problemy kosmicheskoy biologii [Problems in space biology]; volume 50; editor, AM Ugoleva.) Moscow: Nauka; 1984. [22 pp.; 22 tables; 55 illustrations; 593 references; 302 in English]

Neurophysiology, Nystagmus
Motion Sickness, Vestibular Function

Annotation: This book is devoted to the various aspects of nystagmometry, concentrating on studies targeted at obtaining information on the vestibular function and at objectively evaluating the state of the vestibular apparatus. In addition to reference to an extensive bibliography, the monograph cites data from research performed by the author over many years. This research is directed at the physiological mechanisms of nystagmus, the characteristics of nystagmus when vestibular stimulation is combined with optokinetic stimulation, the role that asymmetry in vestibular afferentation plays in asymmetrical reactions to an optokinetic stimulus, a nystagmometric approach to the study of hydrodynamic interactions between the semicircular canals, and at a number of other issues. A substantial amount of attention is devoted to techniques for recording nystagmus, calibrating the nystagmograms, quantitative evaluation of nystagmographic material, and new nystagmometric characteristics and diagnostic techniques. A diagnostic model is proposed, which makes it possible to obtain important information about the state of the vestibular system from the results of a vestibular test.

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PERSONNEL SELECTION

M1(6/85) Bodrov VA, Malkin VB, Pokrovskiy BL, Shpachenko DI.
Psikhologicheskiy otbor letchikov i kosmonavtov [Psychological
selection of pilots and cosmonauts]. (In series, Problemy
kosmicheskoy biologii [Problems in space biology]; vol. 48;
editor, Lomov BF.) Moscow: Nauka, 1984.) (264 pp.; 16 tables; 44
figures; 284 references; 54 in English)

Affiliation: USSR Academy of Sciences, [only editor specified]

Personnel Selection, Cosmonauts
Psychological Tests
Pilot and Cosmonaut Performance
Electroencephalography
Mathematical Models

Annotation: This collective monograph summarizes material covering more than 20 years of the authors' work on problems relating to the psychological selection of pilots and cosmonauts. This work contains a short historical review and a description of the status of current problems. A classification scheme is given, requirements are justified and the techniques used to perform psychological selection in the USSR, as well as abroad, are described. A great deal of material concerning the study of the psychological and psychophysiological characteristics of pilots and cosmonauts is presented. This book is of interest to specialists in psychological selection and also to psychologists and physiologists working in the area of aviation and space medicine.

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RADIOBIOLOGY

M7(6/85) Miroshnichenko LI, Petrov VM. Dinamika radiatsionnykh usloviy v kosmos [The dynamics of the radiation environment in space]. Moscow: Energoatomizdat; 1985. [152 pp.; 20 tables; 84 illustrations; 153 references]

Radiobiology, Radiation

Affiliation: Institute of Medical-Biological Problems

Annotation: This book classifies observational data and results of theoretical investigations of galactic and solar cosmic rays and radiation belts of the Earth, as applied to the problem of the dynamics of radiation characteristics of cosmic rays. Within the framework of a dynamic (space physics) approach, it briefly describes the properties of irradiation sources. It analyzes in detail the physical parameters determining the distribution of particles in the Sun's corona in the interplanetary environment and near-Earth space, and describes methods for predicting the flow of solar cosmic irradiation.

This book is intended for scientific workers.

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SPACE BIOLOGY

M5(6/85) Dubinin NP (editor). Biologicheskiye issledovaniye na orbital'nykh stantsiyakh "Salyut" [Biological investigations on the Salyut orbital stations]. Moscow: Nauka; 1984. [248 pp.; 66 illustrations; 71 tables; 391 references; 138 in English]

Affiliation: Institute of General Genetics of the USSR Academy of Sciences

Space Biology
Space Flight, Salyut
Genetics, Embryology
Botany, Higher Plants, Lower Plants
Zoology, Insects, Vertebrates
Radiobiology

Annotation: This monograph summarizes results of investigations of the "Salyut" orbital stations on the effect of flight factors, considered individually and together, on developing and dormant systems. An attempt is made to identify the separate contribution each individual factor makes to the effects observed, as well as the interaction of these factors.

For biologists with a broad range of interests.

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Changes in biopolymers under the influence of space flight factors. M.A. Khenokh, et al. (25)

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CURRENT TRANSLATED SOVIET LIFE SCIENCE MATERIALS AVAILABLE TO OUR
READERS

Translations of recent Soviet publication, including those of interest to specialists in space life sciences, are published by Joint Publications Research Service (JPRS). JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. When ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Two JPRS USSR Report Series appear of particular interest to NASA life scientists. These are: 1) Space and 2) Life Sciences: Biomedical and Behavioral Sciences. In addition, JPRS translates the entire issue of the bimonthly Space Biology and Aerospace Medicine. As a service to our readers we will regularly provide publication information for these reports and cite the titles of a sample of articles selected as potentially of particular relevance to NASA biomedical concerns. Translations of article titles are those of JPRS.

USSR REPORT ON SPACE BIOLOGY AND AEROSPACE MEDICINE

[Vol.19, No. 1, January-February 1985]
JPRS-USB-85-003, 18 April 1985

Note: since we will be abstracting this entire journal on a regular basis, in the future it will not be necessary to specify its contents here. However, since we have started with issue 2 for this year and JPRS has recently published the translation of issue 1, we are listing its contents in their entirety.

Factor Analysis of Reaction to Lower Body Negative Pressure Test
on the Ground and During Spaceflight

Effect of Spaceflight Factors on Hormonal Regulation of Fluid-
Electrolyte Metabolism

Effect of Space Diet on Blood Valine Content

Operator's Mental Adaptation and Work Capacity in Simulated
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Effect of Rotation and Vibration on Human Orientation Relative to
Gravity Vertical

Rheological Parameters of Blood at Different Levels of Motor
Activity

Comparative Characteristics of Central Hemodynamics and
Circulatory Redistribution Reactions to Active and Passive
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Amino Acid Composition of Human Blood Serum During Immersion

Hypokinesia

- Effect of Long-Term Hypokinesia on Blood Serum Lipid Spectrum
- Distinctive Changes in Regional Hemodynamics and Gas Exchange in Healthy Man in Response to Moderate Phlebotomy and Reinfusion of Blood After Submitting to Antiorthostatic Hypokinesia
- Activation of Lipid Peroxidation in the Liver Under Hypokinetic Conditions and Its Prevention With Antioxidants
- Specificity of Ultrastructural Changes in Rat Myocardium Submitted to Hypokinesia and Radiation Damage
- Lenticular Opacities in Mice Exposed to Helium Ions With Energy of 4 GeV/Nucleon and ^{60}Co Gamma Radiation
- Skin Lesions After Exposure to High-Energy Protons and Helium Ions
- Effect of Flight Aboard Cosmos-1129 Biosatellite on Thyroid Hormone Levels in Rat Blood and Thyroid Tissue
- Prospects of Using Unicellular Algae Protein in Biological Life-Support Systems
- Investigation of Toxic Properties of Preservations to be Used in Water Recycling Systems
- Relevance of Water Structure to Assessment of Quality of Recycled of Quality of Recycled Water
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- Prediction of Classes M and X X-Ray Phenomena
- New Book of Selected Lectures on Aviation Medicine
- Synopses of Articles Filed with the All-Union Scientific Research Institute of Medical and Medicotechnical Information and All-Union Institute of Scientific and Technical Information
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USSR REPORT: LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES

JPRS-UBB-85-001, 7 January 1985

Selected Articles:

Influence of Geomagnetic Disturbances on Cardiovascular Function of Athletes (G. V. Ryzhikov, T. D. Dzhebrailova; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 84)

Functional Inter-Hemisphere Asymmetry in Recognition of Visual Stimuli of Various Classes (G. P. Udalova, I. A. Kashina; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 84)

Factors Determining Effectiveness of Voluntary Decrease in Ventilation During Muscular Work Using Instrumented Feedback (S. N. Kuchkin; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 84)

Hyperbaric Physiology (Status and Prospects) (G. L. Zal'tsman; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 84)

Influence of Activation of ASFS-2 on Human Emotional Status (A. V. Mirolyubov, I. L. Solomin, et al.; FIZIOLOGIYA CHELOVEKA No 4, Jul-Aug 84)

Effects of Prolonged Hypokinesia on Nervous System (T. N. Krupina, Kh. Kh. Yarullin, et al.; SOVETSKAYA MEDITSINA No 8, Aug 84)

JPRS-UBB-85-002, 23 January 1985

Selected Articles:

Growth of Soil Bacteria in Presence of Martian Soil Analog, Carbon Dioxide and Hydrogen Peroxide (A. A. Imshenetskiy, B. G. Murzakov, et al.; MIKROBIOLOGIYA, No 4, Jul-Aug 84)

Recommendations for Medical Care Under Antarctic Conditions (V. Dneprov; SOVETSKAYA KIRGIZIYA, 14 Oct 84)

JPRS-UBB-85-003, 28 January 1985

Selected Articles:

Hygienic Characteristics of Special Clothing and Human Thermal Homeostasis in Relation to Impaired Body Heat Loss (S. P. Raykhman, L. M. Rimskaya; GIGYENA I SANITARIYA, No 5, May 84)

Prevention of Vitamin C Deficiency Among Seamen (V. S. Novikov, et al.; GIGIYENA I SANITARIYA, No 6, Jun 84)

- Correlations Between Acute Impairments of Cerebral Blood Circulation and Changes of Earth's Magnetic Field (A. V. Zav'yalov, V. K. Dyachenko; ZHURNAL NEVROPATOLOGII I PSIKHIATRII, No 8, Aug 84)
- Hyperbaric Oxygenation in Prevention of Disturbances of Cerebral Blood Circulation in Acute Stage of Stroke (S. V. Pravdenkova, et al.; ZHURNAL NEVROPATOLOGII I PSIKHIATRII, No 8, Aug 84)
- Individual Variations in Behavior, Learning and Adaptation to Extreme Factors in Rats (Zh. G. Aleksandrova, et al.; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOV, No 9, Sep 84)
- Appearance of Signs of Stress in Mice Under Influence of Lymphoid Cells From Syngenetic Hypokinetic Animals (S. Ye. Li, et al.; BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY, No 8, Aug 84)
- Influence of Hyperoxia on Curve of Dissociation of Oxyhemoglobin at Different Ages (L. A. Ivanov, N. D. Chebotarev; BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY, No 8, Aug 84)
- Work on Radiation Effects of Lymphocytes Endorsed for State Prize (L. Il'in; MEDITSINSKAYA GAZETA, 10 Oct 84)

JPRS-UBB-85-005-L, 6 February 1985

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- Nystagmometry in Evaluation of Vestibular Function (Mikhayl Mikhaylovich Levashov; PROBLEMY KOSMICHESKOY BIOLOGII, NISTAGMOMETRIYA V OTSENKE SOSTOYANIYA VESTIBULYARNOY FUNKTSII, 1984)
- Human Adaptation in Antarctica (N. N. Vasilevskiy, Svyatoslav Iosifovich Soroko; NEYROFIZIOLOGICHESKIYE MEKHAZIMY INDIVIDUAL'NOY ADAPTATSII CHELOVEKA V ANTARKTIKE, 1984)
- Human Defense Systems and Adaptation to Cold (Ivan Akimovich Sapov, Vasiliy Semenovich Novikos; NESPETSIFICHESKIYE MEKHAZIMY ADAPTATSII CHELOVEKA, 1984)

JPRS-UBB-85-007, 5 February 1985

Selected Articles:

- Effects of Temperature on Hepatic Tyrosine Aminotransferase in Albino Rats (Kh. Kurbanov, G. Kh. Charyyeva; ZDRAVOOKHRANENIYE TURKMENISTANA, No 2, Feb 84)
- Influence of Riboxin on Myocardial Metabolism Under Altitude Hypoxia (V. A. Konova, G. M. Popova; BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY, No 4, Apr 84)

- Coronary Blood Flow in Cats Breathing Altered Gas Medium
(N. V. Sanotskaya, D. D. Matsiyevskiy; BYULLETIN'
EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY, No 3, Mar 84)
- Antidromic Electrical Activity of Motor Terminations of Nerve-Muscle
Synapses of Rats With Acetylcholinesterase Inhibition
(I. Ya. Serdyuchenko; FIZIOLOGICHESKIY ZHURNAL IMENI I. M.
SECHENOVA, No 2, Feb 84)
- Effects of Hyperthemia on Neuronal Uptake of ^3H -Norepinephrine in
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- Myocardial Protein Metabolism During Various Periods of
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- Appearance of Genotypic Dependence of Evoked Potentials in Man
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- Analysis of Components in Reaction of Neuronal Populations in the
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- Lateralization of Emotional Functions (E. A. Kostandov;
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- Influence of Vasopressin on Long-Term Memory (Psychophysiological
and Clinical Aspects) (G. V. Morozov, A. M. Ivanitskiy, et
al.; FIZIOLOGICHESKIY ZHURNAL IMENI I. M. SECHENOVA, No 7,
Jul 84)
- Influence of Interaural Differences in Sound Stimulation on
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- Isopotential Levels of Sound Pressure for Microphone Potential of
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IMENI I. M. SECHENOVA, No 3, Mar 84)
- Sensitivity of Skin Cold Receptors to Noradrenaline in Cold
Adapted and Control Rats (T. V. Kozyreva, M. A. Yakimenko;
FIZIOLOGICHESKIY ZHURNAL IMENI I. M. SECHENOVA, No 3, Mar 84)
- Biochemical Estimation of Individual Sensitivity to Oxygen
Intoxication in Rabbits (A. I. Lukash, V. V. Vnukov, et al.;
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Oxygen Effect and Cell Glutathione (M. M. Konstantinova, A. A. Minin, et al.; RADIOBIOLOGIYA, No 4, Jul-Aug 84)

Dynamics of Chromosome Aberrations in Bone Marrow Cells of Monkeys Following Prolonged Irradiation (L. P. Kosichenko, V. S. Barkaya, et al; RADIOBIOLOGIYA, No 4, Jul-Aug 84)

JPRS-UBB-85-008, 13 February 1985

Selected Articles:

Effects of Overall Vibration and Noise on Operational Personnel (Yu. N. Kamenskiy; GIGIYENA TRUDA I PROFESIONAL'NYYE ZABOLEVANIYE, No 10, Oct 84)

Combined Effects of Heterogenous 2,4 GHz Microwave and Gamma-Irradiation on Blood-Brain Barrier in Rats (I. B. Ushakov, V. G. Zuyev; IZVESTIYE AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA, No 5, Sep-Oct 84)

Modulated Sinusoidal Currents in Management of Vibration Sickness (M. M. Gerasimova, T. S. Kupriyanova; GIGIYENA TRUDA PROFESIONAL'NYYE ZABOLEVANIYE, No 10, Oct 84)

Effects of Partial Deprivation of Slow-Wave Sleep on Wakefulness-Sleep Cycles (T. N. Oniani, et al.; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA, No 3, Mar 84)

Quantitative Measurement of Human Auditory Acuity (V. V. Popov, A. Ya. Supin; DOKLADY AKADEMII NAUK SSSR, No 4, Oct 84)

Influence of Hyperthermia on Body Temperature and Content of Catecholamines in White Rat Hypothalamus (F. F. Sultanov, et al.; DOKLADY AKADEMII NAUK SSSR, No 5, Aug 84)

JPRS-UBB-85-009, 19 February 1985

Selected Articles:

Be Healthy, Pilot (A. Potapenko; LENINGRADSKAYA PRAVDA, 24 Nov 84)

Role of Sleep Peptides in Stress (PRIRODA, No 9, Sep 84)

Methods of Monitoring Mental Work Efficiency, Emotional Activity (K. R. Stavitskiy, N. A. Gosudarev; GIGIYENA I SANITARIYA, No 11, Nov 84)

JPRS-UBB-85-011, 26 February 1985

Selected Articles:

Specifics of Human Thermal Regulatory Reactions Upon Exposure to Coriolis Acceleration (O. Ya. Plepis, L. A. Glaznikov; ZHURNAL USHNYKH, NOSOVYKH I GORLOVYKH BOLEZNEY, No 5, Sep-Oct 84)

Functional Role of Type of Person's Temperament in Individual and Mutual Activity (V. V. Belous; VOPROSY PSIKHOLOGII, No 4, Jul-Aug 84)

Electrosleep Therapy Advanced at Medical Institute (MEDITSINSKAYA GAZETA, 7 Dec 84)

Clinical-Physiological Principles of New Method of Recovering Vision Through Direct Electrical Stimulation of Damaged Human Visual Nerves (A. N. Shandurina, V. A. Khil'ko, et al; FIZIOLOGIYA CHELOVEKA, No 5, Sep-Oct 84)

Restructuring of the Process of Visual Recognition As Perception Conditions Alter (V. M. Krol', Ye. I. Bondar'; ZHURNAL VYSSHEY NERVNOY DEYATEL'NOSTI IMENI I. P. PAVLOVA, No 5, Sep-Oct 84)

Heated Clothing Research (V. Klimenko; RABOCHAYA GAZETA, 14 Sep 84)

JPRS-UBB-85-012, 25 March 1985

Selected Articles:

Complex Program of Ergonomic Studies 'Pilot' Described (A. I. Kuznetsov; NEDELYA, 3-9 Dec 84)

Conference on Medical Problems Held at Gagra (ZARYA VOSTOKA, 23 Nov 84)

Second Soviet-French Symposium on Space Cytology (V. Ovcharov; SOVETSKAYA ESTONIYA, 1 Dec 84)

Instrument for Determining Spatial Coordination of Hand Movements (G. I. Kutsenko, Ye. I. Soshnikov, et al.; GIGIYENA I SANITARIYA, No 9, Sep 84)

Pressure Suit for Restoring Circulation (A. Rozeniyene; SOVETSKAYA KIRGIZIYA, 12 Jan 85)

Effect of Decimeter Waves on Relative T-Lymphocyte Content in Lymphoid Organs (V. M. Yevstropov, R. A. Zul'karneyev; ZDRAVOOKHRANYENIYE KIRGIZII, No 5, Sep-Oct 84)

Hygienic Standardization of Electromagnetic Fields of Radar Systems
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SANITARIYA, No 9, Sep 84)

Adaptation Studies at Antartic Station "Molodezhnaya"
(MEDITSINKAYA GAZETA, 1 Jan 85)

Results of 15-Day Trip Without Eating (B. Bychkov; NEDELYA, No
51, 17-23 Dec 84)

Acid-Base Blood State During Adaptation to High Altitude
Conditions in Mono- and Dizygotic Twins (V. A. Berezovskiy,
T. A. Mel'nik, et al.; FIZIOLOGICHESKIY ZHURNAL, No 5, Nov-
Dec 84)

Principal Patterns of Functional Changes of Human Respiratory
System in Adaptation to High Pressure (S. A. Gulyar;
FIZIOLOGICHESKIY ZHURNAL, No 5, Nov-Dec 84)

Activity of Catalase and Superoxide Dismutase in Isogenous
Strains of Bacteria With Varying Radioresistance
(Ye. I. Vasil'eva, Ye. N. Goncharenko, et al.;
BIOLOGICHESKIYE NAUKI, No 9, Sep 84)

Method of Determining Actinoids in Fast Reactor Sodium Coolant
(A. M. Vorob'yev, N. P. Starodonova; GIGIYENA I SANITARIYA,
No 9, Sep 84)

Some Data and Aspects of Comparative Study of Biological Effect
of External Irradiation and Internal Irradiation
(V. I. Dedov; IZVESTIYA AKADEMII NAUK SSSR; SERIYA
BIOLOGICHESKAYA, No 6, Nov-Dec 84)

JPRS-UBB-85-014, 23 April 1985

Selected Articles:

Pressure Chamber Therapy in Vascular Diseases (Anna Yanina;
NEDELYA, No 3, 14-20 Jan 85)

Immunoglobulin Molecules as Precursors of Natural Immunoregulators
(G. I. Chipens; DOKLADY AKADEMII NAUK LATVIYSKIY SSR, No 12,
Dec 84)

Achievements and Prospects in Protein and Peptide Chemistry and
Biology (G. I. Chipens; IZVESTIYA AKADEMII NAUK LATVIYSKIY
SSR, No 12, Dec 84)

Experimental Simulation of Hypoxia in Hygienic Studies
(M. I. Rudnev; GIGIYENA I SANITARIYA, No 12, Dec 84)

Radionuclides Incorporated Into Polynucleotides: Model System
for DNA Radiation Damage (V. G. Korolev; RADIOBIOLOGIYA, No
5, Nov-Dec 84)

- Comparative Study of Cutaneous Blood Flow Control Factors in Thermoneutral Temperature Range (Ya. A. Bedrov, B. I. Gekhman, et al.; FIZIOLOGICHESKIY ZHURNAL IMENI I. M. SECHENOVA, No 11, Nov 84)
- Hygienic Thermal Standards in Indoor Sports Facilities (A. P. Laptev, S. A. Poliyevskiy, et al.; GIGIYENA I SANITARIYA, No 12, Dec 84)
- Effects of Prolonged Low Calorie Diet on Human Orthostatic Stability (E. P. Tsyganov, Ye. V. Kolchin, et al.; VOPROSY PITANIYA, No 6, Nov-Dec 84)
- Possible Existence of Tetrodotoxin-Sensitive, Potential-Dependent Chlorine Conductance in Membranes of Perfused Cardiomyocytes (V. I. Pidoplichko, A. N. Verkhatskiy; DOKLADY AKADEMII NAUK SSSR, No 4, Dec 84)
- Putative Mechanisms of Action of Enkephalins on Learning and Memory (R. I. Kruglikov, G. I. Chippens, et al.; BIOLOGICHESKIYE NAUKI, No 12, Dec 84)
- Comparative Studies on Effects of Several Radionuclides on Chlorella Populations (R. Ya. Shvobene, D. P. Marchulyonene, et al.; RADIOBIOLOGIYA, No 6, Nov-Dec 84)

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JPRS-USP-85-001-L, 8 January 1985

Selected Articles:

- Biological Investigations on Board the 'Salyut' Orbital Stations (N. F. Dubinin; BIOLOGICHESKIYE ISSLEDOVANIYA PO ORBITAL'NYKH STANTSIIYAKH "SALYUT", 1984)
- Human Hearing and Equilibrium Physiology in Air and Space Flight (Eduard Vladimirovich Lapayev, Yuriy Viktorovich Krylov, et al.; PROBLEMY KOSMICHESKOY BIOLOGII: FUNKTSIYA SLUKHOVOGO I VESTIBULYARNOGO ANALIZATOROV PRI DEYSTVII FAKTOROV AVIAKOSMICHESKOGO POLETA, Vol 47, 1983)

JPRS-USP-85-001, 4 February 1985

Selected Articles:

- Value of Physician At'kov's Role in 'Salyut-7' Mission (Ye. Chazov; PRAVDA, 25 Oct 84)
- TASS Update of Unmanned Flight of 'Salyut-7' (IZVESTIYA, 20 Dec 84)
- Relation of Manned, Automatic Equipment in Space Programs Viewed (Yu. N. Glazkov, Ye. I. Zhuk; ZEMLYA I VSELENNAYA, No 2, Mar-Apr 84)

Lyakhov and Aleksandrov on 150-Day Flight (V. A. Lyakhov, A. P. Aleksandrov; ZEMLYA I VSELENNAYA, No 3, May-Jun 84)

Comments on 'Salyut-7' 150-Day Flight (K. P. Feoktistov, A. A. Longov; ZEMLYA I VSELENNAYA, No 3, May-Jun 84)

Symposium on 'Cosmos-1514' Biological Experiments (V. Ovcharov; LENINGARDSKAYA PRAVDA, 22 Nov 84)

Comment on Orchids Grown on 'Salyut-6' Station (V. Khokhachev; PRAVDA UKRAINY, 11 Nov 84)

Artificial Soil for Closed-Environment Plant Growing (N. Matukovskiy; IZVESTIYA, 4 Nov 84)

JPRS-USP-85-003, 4 March 1985

Selected Articles:

Second Soviet-French Symposium on Space Cytology (V. Ovcharov; SOVETSKAYA ESTONIAY, 1 Dec 84)

Plasmodium of Myzomycete as Research Object in Gravitational Biology (M. G. Tairbekov, S. I. Beylina, et al.; IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA, No 2, Mar-Apr 84)

JPRS-USP-85-004, 6 May 1985

Selected Articles:

TASS Reports Program for 'Salyut-7' Fully Completed (PRAVDA, 2 Mar 85)

Cosmonaut Savitskaya Says Many Women in Cosmonaut Training (V. Fartyshev; KOMSOMOL'SKAYA PRAVDA, 22 Jan 85)

Research on Zero-Gravity Botany Apparatus (S. Lapenis; KOMSOMOL'SKAYA PRAVDA, 2 Feb 85)

Structural-Functional Changes in Bacterial Cells Under Spaceflight Conditions (S. N. Zaloguyev, et al.; DOKLADY AKADEMII NAUK SSSR, No 5, Oct 84)

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<p>This is the first issue of the bi-monthly digest of USSR Space Life Sciences. Abstracts are included for 49 Soviet periodical articles in 19 areas of aerospace medicine and space biology and published in Russian during the first quarter of 1985. In addition, translated introductions and table of contents for nine Russian books on topics related to NASA's life science concerns are presented. Areas covered are: botany, cardiovascular and respiratory systems, cybernetics and biomedical data processing, endocrinology, gastrointestinal system, genetics, group dynamics, habitability and environmental effects, health and medicine, hematology, immunology, life support systems, man-machine systems, metabolism, musculoskeletal system, neurophysiology, perception, personnel selection, psychology, radiobiology, reproductive system, and space biology. This initial issue concentrates on aerospace medicine and space biology, but subsequent issues will give greater coverage to exobiology and global biology.</p>					
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