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Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series) N85-10001 - N85-11975

IAA (A-10000 Series) A85-10001 - A85-12656

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SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

We are testing out this approach by helping readers bring foreign technology into focus. We would like to know whether it is useful, and how it might be improved.

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AEROSPACE MEDICINE
AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

(Supplement 268)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1985 in

• Scientific and Technical Aerospace Reports (STAR)
• International Aerospace Abstracts (IAA).

NASA
Scientific and Technical Information Branch
National Aeronautics and Space Administration
Washington, DC

1985
NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $7.00 domestic; $14.00 foreign.
INTRODUCTION

This Supplement to Aerospace Medicine and Biology lists 167 reports, articles and other documents announced during January 1985 in Scientific and Technical Aerospace Reports (STAR) or in International Aerospace Abstracts (IAA). The first issue of the bibliography was published in July 1964.

In its subject coverage, Aerospace Medicine and Biology concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth’s atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by STAR categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in IAA or STAR, including the original accession numbers from the respective announcement journals. The IAA items will precede the STAR items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1985 Supplements.
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Accession Number Index ............................................................................................. G-1
Utilization of National Aeronautics and Space Administration (NASA) technology in medicine is discussed. The objective is best obtained by stimulation of the introduction of new or improved commercially available medical products incorporating aerospace technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology. That methodology is designed to: (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on NASA technology. Two commercial transfers were completed: the Stowaway, a lightweight wheelchair that provides mobility for the disabled and elderly in the cabin of commercial aircraft, and Micromed, a portable medication infusion pump for the reliable, continuous infusion of medications such as heparin or insulin. The marketing and manufacturing factors critical to the commercialization of the lightweight walker incorporating composite materials were studied. Progress was made in the development and commercialization of each of the 18 currently active projects.

E.A.K.

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Electrostimulators and electronystagmographs are used for clinical studies of the effectiveness of vestibular analyzers. In experiments with a VV-II analyzer, the linearity of the nystagmus parameters determined by the analyzer corresponded to a range of eye movements from 0.5 to 8 degrees. The use of infrared light has made it possible to conduct experiments in complete darkness. It is found that tightly-bound fibers in the device completely eliminated the caloric effects of infrared radiation in the eye. The most important characteristics of the galvanic nystagmus are found to be the rate of the slow phase and frequency.

I.H.
AEROSPACE MEDICINE AND BIOLOGY
A Continuing Bibliography (Suppl. 268)
FEBRUARY 1985

51
LIFE SCIENCES (GENERAL)

Includes genetics.

A85-10173
MECHANISM OF THE INTERACTION OF BIOLOGICAL MOLECULES WITH COHERENT ELECTROMAGNETIC OSCILLATIONS [K MEKHAIZMU VZAIMODEISTVIIA BIOLOGICHESKIH MOLEKUL S KOGERENTNYMI ELEKTROMAGNITNYMI KOLEBANIA]I]
N. P. DIDENKO and V. I. ZELENTSOV (Tomskii Politekhnicheskii Institut, Tomsk, USSR) Fizika (ISSN 0021-3411), vol. 27, Aug. 1984, p. 112-114. In Russian. refs

The mechanism of Davydov and Kislukha (1973) describing the transport and storage of energy in proteins by means of solitons is examined. Certain experimental data concerning the interaction of hemoglobin molecules with millimeter-wave radiation can be explained in the framework of this mechanism: (1) the highly resonant character of the interaction; (2) the existence of many resonant frequencies with different responses; and (3) the serial character of the resonant frequencies. L.M.

A85-10264
METABOLISM OF MYOCARDIUM PROTEINS IN DIFFERENT PERIODS OF EXPERIMENTAL HYPOKINESSA IN RATS [METABOLIZM BELKOV MIOKARDA V RAZLICHNYE PERIODY EKSPERIMENTAL'NOI GIPOKINEZII U KRY]S]
G. D. SHITOV, E. A. RAPPORT, and V. A. KAZARIAN (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), July-Aug. 1984, p. 36-40. In Russian. refs

Possible influence of d.c. magnetic fields on the early embryonic development of frogs was studied. Embryos of African clawed toads, Xenopus laevis, were exposed to 1.0 T magnetic fields with different gradients of a range from 10 T/m to 1000 T/m either during cleavage to neurula stage, blastula to neurula stage, or neurula to tail bud stage. The developmental processes of embryos during and after magnetic field exposures were followed to examine a possibility of teratogenic effects. The results suggest that the magnetic field exerts no harmful or modifying effects on the important morphogenetic movements, such as gastrulation and neureulation. However, it was observed that embryos which were exposed to the gradient magnetic fields during cleavage to neurula stage occasionally developed into tadpoles with reduced pigmentation or some axial anomalies such as the formation of curled tail. Tadpoles with edema or microcephaly were also observed. Compared with the control, the rate of malformation was higher by about 35 percent. The influence of oxygen concentration in Ringer's solution on the embryonic development was also studied, and toxicity of oxygen with high concentration was discussed. Author
THE EFFECT OF ALLOPURINOL ON OXYGEN-INDUCED BUBBLE FORMATION OF AQUEOUS HUMOR AND LENS OPACITY DURING CHAMBER FLIGHT


A transparent miniature decompression chamber was placed on the stage of a large-working-distance zoom-stereo microscope so that the effect of decompression on the frog eye could be microscopically observed and photographed. It was found that chamber flight at a simulated altitude of 66,000 ft (20,117 m) or more caused bubble formation in aqueous humor and lens opacities in some of the experimental animals. On return to ground level, the bubbles either decreased in size or completely disappeared. The cataract could also regress after recompression to 1 atm. Such lens opacities may be termed altitude cataract, instead of asphyxial or anoxic cataract.

Author

PHYSIOLOGICAL MECHANISMS IN THE REGULATION OF NOCICEPTIVE SENSITIVITY [FIZIOLOGICHESKIE MEKHANIZMY REGULIATSII BOLEVOI CHUVSTVITEL'NOSTI]


The major physiological and neurochemical mechanisms of nociceptive stimulation are discussed systematically. Particular attention is given to the significance of interactions between nociceptive and antinociceptive endogenous systems in the generation of pain and in the regulation of pain sensitivity. On the basis of experimental data from the literature, the physiological and neurochemical properties of antinociceptive systems are considered, specifically the roles of opioid peptides (enkephalins and endorphins), serotoninergic compounds, and emotional factors in the regulation of pain sensitivity. Consideration is also given to the mechanisms responsible for the analgesic effects of acupuncture, transcutaneous nociceptive stimulation and stressful nociceptive stimulation.

I.H.

STUDIES OF THE ACCURACY OF MEASUREMENTS OF SERUM HIGH DENSITY LIPOPROTEIN CHOLESTEROL LEVELS

D. A. CLARK, N. J. GARCIA, P. R. ROZELL, and E. L. MOSSER (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 941-945. refs

It is pointed out that the concentration of high density lipoprotein cholesterol (HDL-C) in serum and the ratio of total cholesterol to HDL-C are useful factors in predicting the risk of coronary artery disease (CAD) in the general population and in U.S. Air Force aviators. Serum HDL-C levels are commonly measured by precipitating the low- and very-low-density lipoproteins (LDL and VLDL, respectively) and measuring the cholesterol in the supernatant solution. Ideally, all LDL and VLDL should be precipitated, but none of the HDL. The accuracy of HDL-C level measurement depends, therefore, on the degree to which this ideal situation is approached. In the present investigation, significant departures were found from the ideal situation with certain lipemic serums. Reliable estimates of HDL-C levels in lipemic serum may, therefore, require knowledge of the titration curve of the lipoprotein precipitant.

G.R.

FREQUENCY OF NONDISJUNCTION OF X-CHROMOSOMES OF FEMALES OF DROSOPHILA MELANOGASTER EXPOSED IN ORBITAL FLIGHT [CHASTOTA NERASKOZHEDENII X-KHROMOSOM U SAMOK DROSOPHILA MELANOGASTERO, EKSPONIROVANNYKH V ORBITAL'NOM POLETE]


NOURONAL UPTAKE OF H-3-NOREPINEPHRINE BY ISOLATED ORGANS OF RATS DURING HYPERTERMINA [NEURONAL'NYI ZAKHVT 3H-NORADRENALINA IZOLIROVANNYM ORGANAMI KRYS PRI GIPERTERMM]


HIGH DENSITY LIPOPROTEIN CHOLESTEROL LEVELS IN THE DETERMINATION OF RISK OF CORONARY ARTERY DISEASE [AKTIV浮IS V OPREDELENII RIZHA CORONARNYKH NAVKOV U GRUPEчисL BORISCHIKH RABOTNIKOV V MOSKVE]

A85-11844
A SYSTEMATIC APPROACH TO THE STABILITY AND PLASTICITY
OF NEUROPHYSIOLOGICAL PROCESSES IN THE ADAPTIVE
BEHAVIOR OF THE BRAIN [SISTEMNYI PODKHOD K
USTOICHIVOSTI I PLASTICHNOSTI
NEIROFIZIOLOGICHESKIH PROTSESSOV V KHODE
ADAPTIVNOI DEIATEL'NOSTI MOZGA]
N. N. VASILEVSKII (Akademii Meditsinskikh Nauk SSSR,
Leningradii, USSR) Fiziolohical Zhurnal SSSR (ISSN
0015-329X), vol. 70, July 1984, p. 961-967. In Russian. refs

The problem of stability and plasticity in brain regulatory
processes is considered in light of Bekhtereva's theory of the
stability of pathological states and of rigid and flexible links in
regulating systems. Emphasis is given to the need for a probabilistic
approach to the study of bioregulatory mechanisms. The results
of a number of previous investigations of the connection between
separate biorhythm components in physiological systems and the
stability of their functional frequency-amplitude parameters are
reviewed. The experimental data are expected to be useful in the
development of bioregulatory feedback methods for clinical
applications. D.H.

A85-12326
PERSPECTIVES IN CAROTID BODY RESEARCH
C. EYZAGUIRRE (Utah, University, Salt Lake City, UT) and P.
ZAPATA (Universidad Catolica de Chile, Santiago, Chile) Journal
of Applied Physiology: Respiratory, Environmental and Exercise
Research supported by the Universidad Catolica de Chile and
Fundacion Gildeheimer. refs

(The chemoreceptor mechanism of the carotid body (CB)
is discussed in a review of hypotheses and data from recent
investigations. The history of CB nomenclature and the problem
of the origin of the parenchymal constituents are examined; the
vascularization and innervation of the CB are described; the
chemoreceptor complex and its response to stimuli are
characterized; and pharmacological experiments are surveyed.
Consideration is given to the biophysics of cellular activity,
nerve-ending activity, synaptic mechanisms, biochemical cellular
mechanisms, and efferent control of CB chemoreceptors. The
factors which have made it impossible to prove or disprove the
validity of any of the main hypotheses are analyzed, and directions
for further research are indicated.

A85-12331
OZONE-INDUCED AIRWAY HYPERREACTIVITY IN THE GUINEA
PIG
T. GORDON, C. S. VENUGOPALAN, M. O. AMDUR, and J. M.
DRAZEN (MIT, Cambridge; Harvard University, Boston, MA)
Journal of Applied Physiology: Respiratory, Environmental and Exercise
1034-1038. refs

(Contact NIH-NS-05666; NIH-NS-07938)

The chemoreceptor mechanism is investigated in guinea pigs
in detail with the help of krypton-85 and carbon-14.

A85-12337
EARLY RECOVERY FROM HYPOXIC PULMONARY
HYPERTENSION - A STRUCTURAL AND FUNCTIONAL STUDY
R. FRIED (Children's Hospital, Boston, MA) and L. M. REID
(Harvard University, Boston, MA) Journal of Applied Physiology:
Respiratory, Environmental and Exercise Physiology (ISSN

(Contact NIH-F32-HL-06304; NII-0232)

The first month of recovery form 2 wks of hypobaric hypoxia
(380 torr) is investigated experimentally in 58 male Sprague-Dawley
rats. Parameters measured include pulmonary-artery pressure
(Pap), cardiac index, pulmonary vascular resistance, hematocrit,
lung volume, the weight ratio of left ventricle and septum to right
ventricle, the mean thickness of the intracranial arteries (MT), the
percentage of alveolar-wall-level arteries fully or partially muscular
(AW), the extension of muscle to alveolar-duet (AD) and
respiratory-bronchiolar arteries, and the index of functional arteries
per 100 alveoli (FI). The results are presented in tables and graphs
and discussed. Some recovery is observed in all parameters, but
full recovery to control levels is achieved only for hematocrit, AW,
MT, and FI. Changes in Pap, hematocrit, AW, and AD are seen
within 2 days, but those in the other parameters are more gradual
and are interpreted as secondary to the decrease (from 36.6 to
30.1 mm Hg) in Pap.

A85-12338
ESTIMATION OF RAT THERMOREGULATORY ABILITY BASED
ON BODY TEMPERATURE RESPONSE TO HEAT
F. FURUYAMA, K. OHARA, and A. OTA (Nagoya City University,
Nagoya, Japan) Journal of Applied Physiology: Respiratory,
Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57,
Oct. 1984, p. 1271-1275. refs

The flying situations which induce emotional disturbances in
pilots were determined. The effects of weight training on
acceleration tolerance were evaluated. Psychological uneasiness
and phobic tendencies in aircraft pilots were assessed. The inflating
characteristics of an anti-G pressure suit for pilots were studied.
The fatigue of air traffic controllers and other persons working
shiftwork was measured.

Aeromedical Lab.

THE REPORTS OF AEROMEDICAL LABORATORY, VOLUME
25, NO. 1/2
Jun. 1984 85 p refs In ENGLISH and JAPANESE

The reports of Aeromedical Laboratory, volume 25, number 1/2,
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1984, reports of aeromedical laboratory, volume 25, numbers 1/2,
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1984, reports of aeromedical laboratory, volume 25, numbers 1/2,

HEMOPOIEISIS IN RATS SUBMITTED TO WEIGHTLESSNESS
V. N. SHVETS, A. VACEK, G. I. KIZINETS, I. I. BRITVAN, V. I. KOROLKOV, and N. A. CHELNYA
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

Pathological changes of the ECG were examined in 10 adult dogs exposed to +G(z) once a day or 3 times a week for three days a week during 2 to 12 weeks. In response to acceleration during repeated exposure to +G(z) it was also demonstrated that animals can be specifically trained to tolerate sustained and high acceleration +G(z). Author


FREQUENCY AND NATURE OF ELECTROCARDIOGRAPHIC DISTURBANCES IN DOGS DURING SINGLE AND REPEATED EXPOSURE TO +G(z) AGCCELERATION
R. A. VARTBARONOV, G. D. GLOD, N. N. UGLOVA, M. N. KHomenko, and M. S. ROLIK
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

The effect of spaceflight factors, weightlessness in particular, on the genetic structures of bone marrow cells of rats flown for 18.5 days on Cosmos-1129 was investigated. Chromosome aberrations were measured on postflight days 6 and 25. The frequency and level of these disorders were dependent on the acceleration magnitude and the health state that varied during repeated exposure. These findings were used to develop a 5-score scale for measuring ECG disorders and to identify phase changes in acceleration tolerance during repeated exposure to +G(z). It was also demonstrated that animals can be specifically trained to tolerate sustained and high acceleration +G(z). Author


EFFECT OF SPACEFLIGHT FACTORS ON RAT BONE MARROW CELLS
D. K. BENOVA, A. K. BAIKAKOVA, I. V. BAEV, and H. G. NIKOLOV
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

The effect of spaceflight factors, weightlessness in particular, on the genetic structures of bone marrow cells of rats flown for 18.5 days on Cosmos-1129 was investigated. Chromosome aberrations were measured on postflight days 6 and 25. The frequency of unstable chromosome aberrations was similar in the flight, synchronous and vivarium rats. Karyotyping of metaphase plates revealed chromosome aberrations in the flight and synchronous rats. Exposure to weightlessness did not influence the mutagenic effect in bone marrow cells of the rats. Author


DYNAMICS OF MORPHOLOGICAL CHANGES IN ARTICULATION NERVOUS SYSTEM UNDER HYPOKINETIC CONDITIONS AS A MODEL OF A SPACEFLIGHT FACTOR
V. I. DROBYSHCHEV, V. V. ANTIPOV, and V. V. MAKAROV
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

Using statistical treatment, a neuromorphological examination of the joint capsule of rats exposed to hypokinesia for 7, 15, 20, 30, 40 and 60 days was carried out. The exposure to 7 days caused an increase in the number of reactively changed nerve fibers and receptors. The exposure to 15 days resulted in a significant increase of the number of nerve fibers with destructive changes that involved mostly large-caliber fibers. However, 20- and, especially, 30-day hypokinesia was followed by a significant reduction of destructive changes. After 40- and 60-day exposure they again became very distinct. This suggested a wave-like pattern of structural changes. At every stage of experimental hypokinesia all the compartments of the joint nervous apparatus showed adaptive-compensatory reactions. Author


EFFECT OF 1,25-DIHYDROXYCHOLECALCIFEROL AND 24,25 DIHYDROXYCHOLECALCIFEROL ON GROWTH AND ALTERATION OF RAT BONES DURING HYPOKINESIA (HISTOMORPHOMETRIC STUDY)
O. Y. KABITSKAYA, Z. F. SAVIK, A. S. KAPLANSKIY, V. N. SHVETS, I. N. SERGEYEV, M. S. BELAKOVSKY, and V. B. SPIRICHEV
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

The tubular bones of the fore- and hindlimbs of rats immobilized for five weeks were examined morphometrically and histologically. The rats were regularly given per os 1.25(OH)2D3, 24,25(OH)2D3 or their combination. The uptake of 24,25(OH)2D3 at a dose of 1.25 milligrams or a combination of 1.25(OH)2D3 and 24,25(OH)2D3 at a dose of 0.03 + 0.25 milligrams led to the recovery of the linear and volume-weight rates of bone formation that changed during hypokinesia. However, these D3 metabolites did not restore the width of the epiphseal growth plate, whereas the size of the primary and secondary spongiosa returned to normal or exceeded in in response to 24,25(OH)2D3 at a dose of 1.25 milligrams and 1,25(OH)2D3 at a dose of 0.15 milligrams, respectively (only these two doses were used); in other words, the D3 metabolites prevented osteoporosis which is typical of hypokinesia. It is assumed that hypokinesia may produce either disorders in D3 metabolism or changes in the sensitivity of bone cells to active D3 metabolites and other hormones that are directly or indirectly involved in osteogenesis regulation. Author


DYNAMICS OF SOME PARAMETERS OF CARBOHYDRATE AND LIPID METABOLISM IN RECOVERY PERIOD FOLLOWING LONG-TERM HYPOKINESIA
T. M. LOBOVA, P. P. POTAPOV, and A. V. CHERNYNY
In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984
Avail: NTIS HC A07

Eighty-seven white rats were exposed to prolonged hypokinesia. On the 90th hypokinesia day the content of cholesterol, free fatty acids and acetone bodies increased and the content of sugar and triglycerides decreased in blood, the content of glycogen decreased and the content of cholesterol increased in liver and skeletal muscles. On the 15th day after exposure most parameters returned to normal. However, glucose-6-phosphate dehydrogenase in liver and adipose tissue increased and remained elevated till recovery day 60. On the 30th recovery day the changes were similar to those during hypokinesia. On the 90th recovery day the content of triglycerides, cholesterol and acetone bodies in blood grew and the content of triglycerides and glycogen in muscles increased. Author
MACROMYCETES IN FOREST ASSOCIATIONS. A: INITIAL CONSIDERATIONS


The role and value of fungi in forest associations of Mt. Babia Gora massif were determined. The general physiographic characteristics of the research terrain, the distribution of the fungi sites, a list of the 618 taxons noted in the subalpine forests of Mt. Babia Gora, and the initial characteristics of the forest mycoflora of this massif are presented. R.S.F.

Fungi of Mount Babia Gora. 3: The Indicative Value of Macromycetes in Forest Associations. A: Initial Considerations


The results of a mycological investigation of the forests of the upper mountain forest zone of Mt. Babia Gora and the synthetic characteristics of the participation of macromycetes in all the forests studied are presented. Regularities and distinct connections were found in the occurrence of macromycetes on the background of various forest associations, differences in exposure, orography, climate, and changes induced by man. Author

Washington, D.C.

various forest associations, differences in exposure, orography, found in the occurrence of macromycetes on the background of

A01 CSCL 06C

OF MACROMYCETES IN THE FOREST ASSOCIATIONS

R.S.F.

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Washington, D. C.


Avail: NTIS HC A07

White male rats were exposed to hypokinesia of 4 to 30 days in duration. The exposure led to a moderate hypersecretion of gall which was more distinct in autumn and winter. The synthesis and secretion of gallic acid increased. The excretion of cholesteral also grew. The ratio of tauro- and glycoacids shifted in favor of the latter. The cholate cholesterol coefficient increased. These changes in gall formation during hypokinesia are closely related to disorders in lipid and carbohydrate metabolism, as well as in adrenal function. Author


EFFECT OF SHORT-TERM HYPOKINESIA ON RAT OPIOID SYSTEM REACTION


Avail: NTIS HC A07

The content of methionine-enkephalin, leucine-enkephalin and beta-endorphine was measured in various brain compartments (hypothalamus, midbrain, medulla oblongata, striatum), the adrenals, and blood plasma of the rats exposed to single and repeated immobilization. The reaction of the opiate systems to hypokinesia was very distinct in the emiotogenic brain structures (hypothalamus and midbrain) and hypophysis. The content of opiate-like peptides varied as a function of the immobilization time, with the most distinct changes occurring at the 150th minute. After daily immobilization was repeated 40 times, adaptation to the chronic stress effect developed. Author


FUNGI OF MT. BABIA GORA. 2: INDICATIVE VALUE OF MACROMYCETES IN FOREST ASSOCIATIONS. A: INITIAL CONSIDERATIONS


The role and value of fungi in forest associations of Mt. Babia Gora massif were determined. The general physiographic characteristics of the research terrain, the distribution of the fungi sites, a list of the 618 taxons noted in the subalpine forests of Mt. Babia Gora, and the initial characteristics of the forest mycoflora of this massif are presented. R.S.F.

N85-10633# National Aeronautics and Space Administration, Washington, D. C.

Fungi of Mount Babia Gora. 3: The Indicative Value of Macromycetes in the Forest Associations


The results of a mycological investigation of the forests of the upper mountain forest zone of Mt. Babia Gora and the synthetic characteristics of the participation of macromycetes in all the forests studied are presented. Regularities and distinct connections were found in the occurrence of macromycetes on the background of various forest associations, differences in exposure, orography, climate, and changes induced by man. Author

N85-10634# Systems Research Labs., Inc., Dayton, Ohio.


Well-trained rhesus macaques were tested for their ability to perform a compensatory tracking task (Primate Equilibrium Platform) under the influence of diazepam. Performance decrements were observed that depended not only on the dose, but also on the amount of prior experience of the animal with the drug. Such tolerance effects make it inappropriate to use repeated measures designs to derive dose-effects functions for performance. The impact of tolerance effects on the measurement and interpretation of drug-induced performance decrements was discussed. Author (GRA)

N85-10635# Department of the Air Force, Washington, D.C.

IN VIVO DERMAL ABSORPTION METHOD AND SYSTEM FOR LABORATORY ANIMALS Patent Application

J. N. MCDOUGHAL, inventor (to Air Force) 22 May 1984 17 p (AD-011231; US-PATENT-APPL-SN-612776) Avail: NTIS HC A02/MF A01 CSCL 14B

A method and system is described for in vivo dermal absorption testing of a laboratory animal uses a mask and harness for protecting the respiratory tract of the animal when the animal is housed within a sealed chamber with a hazardous test vapor introduced in the chamber. Because of the difficulty of getting a good seal with a protective mask on a laboratory animal, this system is designed with an air leak from inside the mask into the chamber. To ensure that the test vapor does not infiltrate the mask nor leak from the chamber, the vapor is maintained at a negative pressure within the chamber as compared to the external atmospheric pressure and air is supplied to the mask for the animal to breathe at a positive pressure and a greater rate than that needed by the animal. GRA


Avail: NTIS HC A03/MF A01

Poland's lagging development of biotechnology is described. Areas in which research could be best utilized include the pharmaceutical industry, chemical engineering and water pollution. Reasons are cited for this lag in development. B.W.


COMMENTARY ON DERIVATION OF BIOLOGICAL MATERIALS, COSMONAUT ADAPTATION Abstract Only

A. IVAKHNOV In its USSR Rept.: Space (JPRS-USP-84-005) p 30-35 3 Aug. 1984 Transl. into ENGLISH from Izv. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 48-53

Poland's lagging development of biotechnology is described. Areas in which research could be best utilized include the pharmaceutical industry, chemical engineering and water pollution. Reasons are cited for this lag in development. B.W.

The latest series of medical and biological experiments which were scheduled for performance on board the orbiting station "Salyut-7" are discussed. The progress of experiments for obtaining superpure substances has convinced specialists that it is both possible and economically advantageous to obtain, in space, superpure biological preparations in quantities sufficient for practical employment in public health and agriculture. An extrapure antiserum which is now being used as a standard in the production of standard vaccines was manufactured with the aid of a spaceborne preparation. This preparation was obtained from the membrane of the influenza virus. A small portion of this substance will be used to obtain so called diagnosticums for the routine determination of viral strains that cause epidemics at particular times. Work aimed at obtaining microorganisms which are efficient producers of fodder antibiotics, and at obtaining certain medical preparations which

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are free of undesirable impurities is being performed. A valuable medicinal protein is to be refined from a preparation obtained on Earth by a genetic engineering method. 

Author


SKELETAL MUSCLE METABOLISM IN HYPOKINETIC RATS Semiannual Progress Report, 1 Apr. - 30 Sep. 1984
M. E. TISCHLER 1984 5 p refs
(Contract NAGW-227)
(NASA-CR-174059; NAS 1.26:174059) Avail: NTIS HC A02/MF A01 CSCL 06C

Muscle growth, protein metabolism, and amino acid metabolism were studied in various groups of rats. Certain groups were adrenalectomized; some rats were suspended while others (the controls) were weight bearing. Results show that: (1) metabolic changes in the extensor digitorum longus muscle of suspended rats are due primarily to increased circulating glucocorticoids; (2) metabolic changes in the soleus muscle due to higher steroid levels are probably potentiated by greater numbers of steroid receptors; and (3) not all metabolic responses of the soleus muscle to unloading are due to the elevated levels of glucocorticoids or the increased sensitivity of this muscle to these hormones.

R.S.F.

N85-11521*# Research Triangle Inst., Research Triangle Park, N.C.

APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report
(Contract NASI-16177)
(NASA-CR-165872; NAS 1.26:165872) Avail: NTIS HC A07/MF A01 CSCL 06B

Utilization of National Aeronautics and Space Administration (NASA) technology in medicine is discussed. The objective is best obtained by stimulation of the introduction of new or improved commercially available medical products incorporating aerospace technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology. That methodology is designed to: (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on NASA technology. Two commercial transfers were completed: the Stowaway, a lightweight wheelchair that provides mobility for the disabled and elderly in the cabin of commercial aircraft, and the medical community of new medical products based on NASA technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology.

Author (GRA)

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A85-10422

THE ELECTRICAL STIMULATION OF A VESTIBULAR ANALYZER DURING THE PHOTOELECTRIC RECORDING OF EYE MOVEMENTS [ELEKTRICHESKAIA SFIMULIATSIA VESTIBULIARNOGO ANALIZATORA V USLOVIYakh FOTELEKTRICHESKOI REGISTRATSII DVIZHENII GLAZ]

Electrostimulators and electronicstereomagnograms are used for clinical studies of the effectiveness of vestibular analyzers. In experiments with a VV-II analyzer, the linearity of the nystagmus parameters determined by the analyzer corresponded to a range of eye movements from 0.5 to 6 degrees. The use of infrared light has made it possible to conduct experiments in complete darkness. It is found that tightly-bound fibers in the device completely eliminated the caloric effects of infrared radiation in the eye. The most important characteristics of the galvanic nystagmus are found to be the rate of the slow phase and frequency.

I.H.

A85-10423

THE CLASSIFICATION OF VESTIBULAR NYSTAGMUS [O KLASSIFIKATSII VESTIBULIARNOGO NISTAGMA]

A classification for different types of vestibular nystagmus (VN) is proposed on the basis of several clinical and experimental studies of the development of labyrinthine and retro labyrinthine vestibular disorders. The classification scheme is divided into three groups according to the spontaneous, provocative, or experimental factors.
inducing VN. The provocative nystagmus group includes two subgroups: primary labyrinthine nystagmus and vascular nystagmus. The experimental group consists of rotatory, caloric, and galvanic nystagmus.

The results to approximate the role that the ligaments of the spine play in supporting the load. It was found that accelerations of up to 40 g can be supported for the appropriate posture and acceleration direction.

A85-10734

PHYSIOLOGICAL AND PERCEPTUAL RESPONSES TO CYCLIC HEAT STRESS VARIATIONS

P. H. MAIRIAUX (Louvain, Universite Catholique, Louvain-la-Neuve, Belgium; CNRS, Centre d’Etudes Bioclimatiques, Strasbourg, France), J. P. LIBERT, V. CANDAS, and J. J. VOGT (CNRS, Centre d’Etudes Bioclimatiques, Strasbourg, France) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 935-940. Sponsorship: European Coel and Soil Community. refs (Contract ECSC-724S/352/003)

The present investigation has two objectives. The first is related to an examination of the effects of the period of a heating-cooling schedule on the strain perceived by the subject, while the second is concerned with the relationships between the perceptual and physiological responses. The subjects used in the experiments included five healthy unacclimated male students. All experiments were conducted in a climatic chamber. Under the conditions investigated, the subjects marked a clear preference for the heating-cooling cycle with the shortest period duration. The results

A85-10732

CENTRAL NERVOUS REACTIONS TO A 6.5-HOUR ALTITUDE EXPOSURE AT 3048 METERS

R. J. VAERNES (Bergen, Universitetet, Bergen; Norwegian Underwater Technology Centre, Norway), J. O. OWE (Institute of Aviation Medicine, Oslo, Norway), and O. MYKING (Haukeland Hospital, Bergen, Norway) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 921-926. refs (Contract NHMRC-80/4265)

Attention is given to the effects of mild hypoxia on performance in an aircrew required to maintain peak performance for hours while performing monotonous tasks under hypobaric conditions. It is found that earlier studies have produced some contradictory evidence. An investigation is, therefore, conducted to examine the effects of a prolonged exposure to mild hypoxia on performance and endocrine reactivity. An altitude of 3048 m is simulated in an altitude chamber for 6.5 h. Seven subjects participated in the study, including one female and six males. On the basis of the obtained results, it is concluded that staying at 3048 m for more than 6.5 h after rapid decompression causes significant effects of hypoxia.

G.R.
of the investigation showed that, under intermittent exposure to dry heat, the period duration of the heat-cooling cycle can affect the subject's perceived strain through an increased sweat accumulation in some skin areas, even in the absence of any sweat drippage. Under such conditions, perceptual criteria would offer a useful means of discriminating slight differences in strain.

G.R.

A85-10737
THE EFFECTS OF SPECTACLE FRAMES ON FIELD OF VIEW
J. R. DILLE and J. A. MARANO (FAA, Civil Aeromedical Institute, Oklahoma City, OK; U.S. Navy, Optometry Clinic, Alameda, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 957-959.

A85-10739
THE 1980 AND 1981 ACCIDENT EXPERIENCE OF CIVIL AIRMEN WITH SELECTED VISUAL PATHOLOGY
J. R. DILLE and C. F. BOOZE, JR. (FAA, Civil Aeromedical Institute, Oklahoma City, OK) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 966-986. refs

A85-11001
HIGH ALTITUDE AND MAN
J. B. WEST, ED. (California, University, La Jolla, CA) and S. LAHIRI, ED. (Pennsylvania, University, Philadelphia, PA) Bethesda, MD, American Physiological Society, 1984, 206 p. For individual items see A85-11002 to A85-11017.

Consideration is given to a number of investigations of the physiological effects of high altitude, including the general physiological condition of climbers on Mt. Everest; hypoxic ventilatory response and exercise ventilation; human cerebral function at extreme altitude; and metabolic and endocrine changes at high altitude. Among the other topics discussed are: the effect of altitude on the renin aldosterone system; red-cell formation at high altitude; sleep and periodic breathing at high altitude in Sherpas and visitors; ventilatory control during sleep in normal humans at high altitude; hypoxia and blood flow; and hypoxic versus hypocapnic effects on periodic breathing during sleep. Consideration is also given to the effects of acclimatization on sleep hypoxia at high altitude; respiratory control in Andean and Himalayan high altitude natives; ventilatory function in the adaptation to high altitude; and ventilation in human populations native to high altitude living.

I.H.

A85-11002
MAN ON THE SUMMIT OF MOUNT EVEREST
J. B. WEST (California, University, La Jolla, CA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 5-17. Research supported by the American Alpine Club, American Lung Association, National Geographic Society, Servier Laboratories, Explorers Club, U.S. Army, and NSF. refs (Contract PHS-R01-HL-24355; NIH-N01-HR-29151)

A number of experimental results from physiological investigations conducted during the American Medical Research Expedition to Mt. Everest (AMREE) are summarized, with reference to theoretical models of human physiology at extreme altitudes and to existing experimental data. The methodology and instruments used during the expedition for measuring barometric pressure, alveolar gas composition, partial pressure of arterial oxygen, acid-base status, and oxygen uptake are described. It is found that the subjects of the study performed better than was predicted in a pre-expedition theoretical analysis. The improved performance is explained by three factors: (1) the barometric pressure on the summit (8,848 m) was higher than predicted; (2) the base excess of the subjects was higher than predicted; and (3) the level of hyperventilation was much higher than expected. A series of graphs is presented which describe the effects of the altitude induced hypoxemia in detail.

I.H.

A85-11003
HYPOXIC VENTILATORY RESPONSE AND EXERCISE VENTILATION AT SEA LEVEL AND HIGH ALTITUDE

The results of an experiment conducted on Mt. Everest to investigate the relationship between hypoxic ventilatory response (HVR) and exercise performance at sea level and high altitude are reported. Examinations were made of HVR in natives of high altitude and in a group of mountain climbers in the course of the American Medical Research Expedition to Mt. Everest (AMREE). Specific attention was given to the association of blunted HVR with outstanding endurance athletes, and to the association of normal to high HVR with performance at high altitude. It is shown statistically that HVR correlates well with the response to altitude after acclimatization is useful in predicting exercise ventilation at sea level, protects oxygen saturation during exercise, and may be useful in predicting adaptation and performance at extreme altitude. Arterial oxygen saturation during exercise at high altitude was only partially explained by ventilation.

I.H.

A85-11004
HUMAN CEREBRAL FUNCTION AT EXTREME ALTITUDE
B. D. TOWNES, T. F. HORNBEIN, R. B. SCHOENE, F. H. SARNQUIST, and I. GRANT (Washington, University, Seattle, WA; Stanford University, Medical Center, Stanford; U.S. Veterans Administration, San Diego; California, University, Medical Center, La Jolla, CA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 31-36. Research supported by the National Geographic Society and U.S. Army. refs (Contract NIH-NC-00906)

The results of an investigation of the effects of high altitude on long-term cognition and behavior in 21 members of the American Medical Research Expedition to Mt. Everest (AMREE) are reported. Psychological tests were administered before, during, and one year after the expedition. Both transient and long term neurobehavioral effects were found after exposure to the extreme hypoxemia of the high altitude environment. Transient effects included a mild deterioration in the learning, memory, and expression of verbal material. These impairments were present within three days of descent into Katmandu but not one year following the expedition. A bilateral reduction in motor speed characterized by rapid muscle fatigue persisted one year after the expedition. The full results of the study are summarized in a table.

I.H.

A85-11005
METABOLIC AND ENDOCRINE CHANGES AT ALTITUDE

The effects of prolonged exposure to high and extremely high altitude (more than 5,000 m) on metabolic and endocrine levels are investigated, as part of the 1981 American Medical Research Expedition to Mt. Everest (AMREE). The study consisted of measurements of metabolic and endocrine levels in fourteen males between the ages of 28 and 52 at sea level and again at altitudes of 5,400 and 6,300 m. The similarities and differences between data from previous studies and the results for extreme altitude are discussed. It is found that the duration and level of high-altitude exposure can cause a number of varied effects on body metabolism including weight loss, water loss, and changes in the levels of pancreatic and thyroid hormones. As acclimatization occurs, the metabolic changes are lessened or disappear altogether. It is suggested that the significant losses of body fat and protein stores observed in the test subjects represent the utilization of these materials to meet the increased energy demands of the high altitude environment.

I.H.
A85-11006
RENIN-ALDOSTERONE SYSTEM
The results of a physiological investigation of the effects of continuous exercise on fluid retention are presented. A series of experiments were performed in order to determine whether moderate exercise induced hypoxia inhibited angiotensin-converting enzyme (ACE) activity in humans, and whether inhibited ACE activity would alter the relationship between plasma renin activity (PRA) and plasma aldosterone concentration (PAC). In the laboratory phase of the study, hypoxia was induced by breathing an air mixture of 12.8 percent oxygen during light exercise. Field experiments were conducted on mountains in Switzerland and China, at different altitudes between 900 and 4500 m for long and short periods of time. PAC was measured in samples of saliva, urine, and blood. The complete results for both the laboratory and field experiments are summarized in a series of tables. It is found that if the main renin-aldosterone system is stimulated for several hours by exercise at low or high altitude, a significant amount of sodium is retained and this may be a factor in the genesis of acute mountain sickness and High Altitude Pulmonary Edema (HAPE). Hypoxia is found to be synergistic to exercise in stimulating renin production, and the reaction to increased renin in the body is the production of aldosterone and angiotensin II, which is also considered a factor in HAPE and strokes at high altitude. I.H.

A85-11007
RED CELL FUNCTION AT EXTREME ALTITUDE
R. M. WINSLOW (U.S. Public Health Service, Center for Infectious Diseases, Atlanta, GA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 59-72. refs
The results of a series of experiments investigating the effects of extremely high altitude of hemoglobin structure and function are presented. A number of measurements of the important red blood cell parameters (hemoglobin concentration, blood pH, hematocrit percentage, and mean corpuscular hemoglobin concentration) were made from blood samples taken from 1-20 mountaineers at altitudes ranging from sea level in San Diego, CA, to the summit of Mt. Everest (about 8000 m). The hematological data obtained from the measurements are presented in the form of a curve representing the statistical relationship between the amount of blood oxygen bound to hemoglobin and the amount of oxygen physically dissolved in solution under equilibrium conditions. It is found that the oxygen equilibrium of humans at sea-level can be maintained at high altitudes and that it may be possible to blunt the effects of high altitude hypoxia through the use of drugs. I.H.

A85-11008
SLEEP AND PERIODIC BREATHING AT HIGH ALTITUDE - SHERPA NATIVES VERSUS SOJOURNERS
A physiological experiment investigating the causes of periodic breathing (Cheyne-Stokes breathing) in Sherpa natives at high altitudes is described. A general model for the genesis of periodic breathing is proposed which takes into account the effects of hypoxemia, respiratory alkalosis, increased oscillations of alveolar gases, and increased central carbon dioxide sensitivity. Respiratory studies during sleep were carried out on adult male volunteers at the Base Camp Laboratory of the American Medical Research Expedition to Mt. Everest. Measurements were made of oxygen ventilation arterial oxygen saturation, and heart rate in both sleeping and waking states. The data obtained for the Sherpa subjects were compared with similar data obtained for non-native members of the expedition. Several of the important results are discussed in reference to the general model. I.H.

A85-11009
VENTILATORY CONTROL DURING SLEEP IN NORMAL HUMANS
J. V. WEIL, D. P. WHITE, N. J. DOUGLAS, and C. W. ZWILLICH (Colorado, University, Denver, CO) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 91-100. refs
Some aspects of ventilatory control in normal humans during sleep are discussed with reference to a number of experimental investigations. Among the topics addressed are: hypercapnic ventilatory response during sleep; hypoxic ventilatory supply during sleep; sex differences in ventilatory control during sleep and wakefulness; and metabolic rate changes during sleep. The potential effects of high altitude on these processes is briefly examined. I.H.

A85-11011
HYPOXIC VERSUS HYPOCAPNIC EFFECTS ON PERIODIC BREATHING DURING SLEEP
A. BERSSENBRUGGE, J. DEMPSEY, and J. SKATRUD (Wisconsin, University; William S. Middleton Memorial Veterans Administration Hospital, Madison, WI) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 115-127. Research supported by the U.S. Veterans Administration. refs (Contract DAMD17-77-C-7006; NIH-HL-15469)
A quantitative description of hypoxia-induced periodic breathing is presented. On the basis of a series of experimental investigations of the empirical relationships between sleep-state, hypoxia, hypocapnic alakalosis hypoxia-induced ventilatory instability and periodic breathing. Six healthy male subjects were studied during sleep and wakefulness under conditions of both normoxia and hypobaric hypoxia in an altitude chamber. Measurements were made of arterial oxygen saturation, arterial pH, partial pressure of CO2, and ventilation (inductance plethysmography) in REM and non-REM stages of sleep. The results of the experiments are presented in the form of a generalized model of periodic breathing under hypoxic conditions. It is shown that the genesis of self-sustaining periodic breathing during non-REM sleep requires the combined influence of both hypoxia and hypocapnia. During wakefulness and REM sleep the state-dependent nonchemical influences on inspiratory activity contribute to the maintenance of respiratory cycle rhythm and may prevent periodic breathing and apneas by inhibiting the expression of a CO2-apnea threshold. The breath-to-breath pathogenic model is presented in the form of a schematic illustration. I.H.

A85-11012
MECHANISMS FOR RECURRENT APNEAS AT ALTITUDE
N. S. CHERNIACK, B. GOTE, and K. P. STROHL (Case Western Reserve University, Cleveland, OH) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 129-140. refs
The results of a number of experiments investigating the physiological mechanisms for recurrent central obstructive breathing apneas at high altitude are reviewed. Attention is given to the role of hypoxia and hypocapnia in regulating apnea at altitude, as well as physical processes regulating the activity of the nasal, pharyngeal and laryngeal muscles in obstructive apneas. Instability in feedback control of respiratory function is also discussed as a possible cause of recurrent apnea, and the effect of high altitude hypoxia on the respiratory feedback control system is considered. I.H.

A85-11013
EFFECTS OF ACCLIMATIZATION ON SLEEP HYPOXEMIA AT ALTITUDE
The results of a series of experimental investigations of the effects of acclimatization on sleep hypoxemia at altitude are reported. The studies were conducted on five normal male and
female subjects between the ages of 22-36 yrs, who had spent 3-5 days at a staging camp (3,290 m), and eight days at a high camp (5,400 m). It is found that all subjects experienced marked sleep hypoxemia during the night which is associated with periodic breathing or apnea. A statistical analysis of the mean oxygen saturation level showed that the true change in arterial oxygen saturation during sleep after acclimatization lies between -3.67 and 23.7 percent.

I.H.

A85-11014
RESPIRATORY CONTROL IN ANDEAN AND HIMALAYAN HIGH-ALTITUDE NATIVES

(Contract NIH-HL-26533)

The results of a number of experimental investigations of the ventilatory response characteristics of Himalayan Sherpas at an altitude of 5,400 m are reported. Several aspects of ventilatory control were examined, including variations in alveolar gas composition and CO2 partial pressure, the pH of arterial blood and cerebrospinal fluid, steady-state and non-steady-state ventilatory responses of work and at rest, and the hypoxic chemosensitivity of both Sherpas and a control group. A generalized theoretical model for ventilation response in high-altitude natives is proposed on the basis of the experimental data. I.H.

A85-11015
HIGH-ALTITUDE POLYCYTHEMIA
R. M. WINSLOW (U.S. Public Health Service, Center for Infectious Diseases, Atlanta, GA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 163-172. refs

(Contract NSF INT-77-21785; NSF INT-80-07728)

The physiological mechanisms for erythropoiesis at high altitudes are briefly reviewed. Attention is given to the results of recent clinical studies of the physiological effects of polycythemia in natives to high altitude and lowlander visitors to high-altitudes. Some of the benefits and risks of phlebotomy and hemodilution treatments to reduce erythropoietic effects are considered. I.H.

A85-11016
VENTILATORY FUNCTION IN ADAPTATION TO HIGH ALTITUDE - STUDIES IN TIBET

The ventilatory function of a group of Tibetan highlanders was compared to that of a group of lowlander visitors in order to test the hypothesis that Tibetans possess the highest degree of acclimatization to high-altitude conditions. Measurements were taken of minute ventilation, tidal volume, respiratory frequency, arterial O2 saturation, and for the partial pressure of CO2 in arterial blood. Arterial blood pH and diffusion capacity for CO were also measured. The results indicated that the patients with chronic mountain sickness had lower values for all but two of the ventilatory function indexes. Poorly acclimatized subjects who had polycythemia and required hospitalization for chronic mountain sickness had impaired ventilation and gas-exchange functions. It is concluded that polycythemia in Tibetans is less severe than in sojourners from lower altitudes, and that the acclimatized new arrivals to Tibet from lower altitudes and those who have remained for many months have the same ventilatory function as healthy Tibetans. I.H.

A85-11017
VENTILATION IN HUMAN POPULATIONS NATIVE TO HIGH ALTITUDE
P. H. HACKETT, J. T. REEVES, R. F. GROVER, and J. V. WEIL (Alaska, University, Anchorage, AK; Colorado, University, Denver, CO) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 179-191. refs

The combined results of a number of clinical investigations of the ventilation mechanisms of four different high altitude populations are compared, in order to develop a generalized theoretical model of ventilation in high-altitude natives. The studies were conducted on residents of Peru, Tibet, Nepal, and residents of Leadville, CO. A number of different aspects of ventilation function were examined, including: hypoxic ventilatory response (HVR), chronic mountain sickness, the changes in hemoglobin concentration with altitude, and the incidence of excessive polycythemia in high altitude natives. It is found that the relative importance of pulmonary ventilation in adaptation to altitude is also discussed. I.H.

A85-11734
MEDICAL SUPERVISION OF GLIDER PILOTS WORLDWIDE - THE RESULTS OF AN INTERNATIONAL SURVEY (LE CONTROLE MEDICAL DES PILOTES DE PLANEUR DANS LE MONDE RESULTATS D'UNE ENQUETE INTERNATIONALE)

A questionnaire was sent to various countries to ascertain the national medical standards for glider pilots. It is of concern that the physical health of glider pilots be sufficient to assure flight safety, while not necessarily requiring a fitness level needed by professional pilots. The advent of new, lightweight materials and improved aerodynamics is expanding the flight envelope of gliders. With 16 countries reporting, it was determined that not all countries require glider pilots to take medical examinations. Disparities also exist between internal requirements and ICAO standards for the minimum pilot age, the intervals between license renewals, and the kinds of tests for physical, visual, and hearing fitness. It is suggested that more stringent certification standards be established and agreed to on an international basis. M.S.K.

A85-11735
THOUGHTS ON THE PATHOGENESIS OF MOTION SICKNESS (REFLEXIONS SUR LA PATHOGENIE DES CINETOSES)

Anxiety is the first symptom of motion sickness, and leads to increasingly more severe symptoms, e.g., sweating, vomiting, hypercardia, etc., which raise the level of anxiety and thus close the loop. About 15 percent of all pilots experience the condition, which may be critical for an astronaut. Air sickness, especially in weightlessness, arises from conflicting sensory data from vision, the muscle and tendons, and the labyrinthine canals. The latter are particularly sensitive to rotational and angular accelerations in response to quantifiable levels of excitation. The lack of stimulation from gravity also is an excitatory factor, as is the absence of normal cabin visual cues in helicopter night flights. The degree of susceptibility to motion sickness, however, varies from individual to individual. M.S.K.
A85-11736
A METHODOLOGY FOR STUDYING THE HEAD UP-HEAD DOWN TRANSITION [METHODOLOGIE D'ETUDE DE LA TRANSITION TETE HAUTE TETE BASSE]
Techniques devised to examine visual accommodation processes in pilots changing from head up views (HUD) to head down instrument reading (HDI) are described. The trials were run in terms of the Mirage 2000 aircraft, which requires a transition from a view at infinity to 60 cm distance. Subjects were exposed to simulated flight imagery and instrumental readings and required to attack or track an image and then to move to the HDV mode. Scores were recorded on the basis of task proficiency, response time and postural variation, and in terms of visual or tactile response time. The presence of microfluctuations in vision during accommodation was confirmed, and verbal responses were quicker than manual responses. Further tests are indicated on intermediate visual colimation.
M.S.K.

A85-11737
THE COMPLETE RIGHT BUNDLE BRANCH BLOCK, ISOLATED AND NONSYMPTOMATIC, OF FLYING PERSONNEL [LE BLOC COMPLET DE BRANCHE DROITE DU FAISCEAU DE HIS, ISOLE ET NON SYMPTOMATIQUE, CHEZ LES MEMBRES DUPE PERSONNEL NAVIGANT]
Complete right bundle blockage (RBBB) in pilots could be grounds for refusing to certify a pilot as fit to fly. However, an air medical examiner discovered 40 cases of RBBB over 8 yr of practice covering ECG tests of 11,600 pilots. Family and personal medical histories were developed of the RBBB pilots, echocardiograms were taken, and some underwent centrifuge tests, maximal effort tests, ventriculography and coronaryography, and myocardial scintigraphy. The occurrence of RBBB was 3.45/1000 pilots of ages of 23-65 yr, the most frequency being over 50 yr of age. Onset began more than a third of the time between 30-40 yr. The ECG detected RBBB in terms of Wilson blocks. No confirmation was found of a congenital condition. In the absence of other symptoms, i.e., a diagnosis of isolated condition, even military flying is considered permissible. Further tests become necessary if other symptoms are noted.
M.S.K.

A85-11738
CARDIO-VASCULAR EVALUATION OF THE PRIVATE PILOT [L'EXPERTISE CARDIO-VASCULAIRE DU PILOTE PRIVE]
The level of cardio-vascular health necessary for a pilot to be certified for flight fitness is discussed. ECGs and other tests are usually recommended only after the pilot reaches 40 yr of age. The tests seek evidence of dyspnea, syncope, medithoracic anterior pain, palpitation and muscular cramps from exertion. High blood pressure can be tolerated only if the associated medication and the illness in no way degrade flight safety. Echocardiography is applied to discovering any cardiac obstruction should extra noises be heard during examinations. Each doubtful symptom leads to further tests. Weight losses may be recommended, as may changes of birth control methods. The important factor is to determine the source of any perceived irregularities and to assess their significance with respect to flight safety.
M.S.K.

A85-11740
PROBLEMS LINKED TO CIRCADIAN RHYTHMS FOR FLYING PERSONNEL II [LES PROBLEMES LIES AUX DECALAGES HORAIRES CHEZ LE PERSONNEL NAVIGANT. II]
Pilots experience health and functional risks due to departure schedules which disrupt their circadian rhythms. The situation is most apparent with flights to the far east, where hotels and foods often have negative effects on rest and digestion. The disruptions are aggravated by flying in hostile weather, which increases the pilot workload. Night take-off or return flights further deprive the pilot of sleep and induce a state of stress. Using stimulants such as amphetamines to combat fatigue can lead to euphoria and threaten flight safety. Sleeping pills, available without prescription in many far east countries, provide similar hazards. Techniques which can ameliorate the difficulties include scheduling departures which coincide with circadian rhythms, or changing the rhythms to match flight schedules by shifting the awake-sleep cycle one hour per day, starting a sufficient time before a long distance flight. Other measures are assuring pilots of comfortable lodging and acceptable food, preselecting pilots who more easily accommodate circadian alterations, and maintaining close medical supervision of personnel who regularly fly long distance routes.
M.S.K.

A85-11845
FLEXIBLE AND RIGID CONTRACTIONS IN THE REGULATION OF MOTOR ACTIVITY [GIBKIE I ZHESTKIE SVIAZI PRI REGULIATSIID DVIGATEL'NOI DEIATEL'NOSTI]
N. V. ZIMKIN and A. M. ZIMKINA (Leningradski Gosudarstvenny Institut Fizicheskoi Kultury, Leningrad, USSR) Fiziologicheski Zhurnal SSSR (ISSN 0015-329X), vol. 70, July 1984, p. 1031-1037. In Russian. refs
Fibrillation is given to a description of the functions and interrelations between flexible and rigid connections during repeated stereotype activity. It is shown that flexible connections are necessary in the course of motor activity because of the constantly varying contractile capacity of muscles in response to changes in the internal environment (intramuscular temperature, oxygen saturation, and metabolite concentration). Flexibility is also related to the initial elongation of muscle fiber and a simultaneous contraction of muscles not directly related to test muscle activity. It is shown that different muscle loadings at different training levels can result in variations in the statistical relationship between rigid and flexible connections.
I.H.

A85-12298
PREDICTING THE SUBJECTIVE RESPONSE TO NONSTEADY VIBRATION BASED ON THE SUMMATION OF SUBJECTIVE MAGNITUDE
K. HIRAMATSU (Kyoto University, Kyoto, Japan) and M. J. GRIFFIN (Southampton, University, Southhampton, England) Acoustical Society of America, Journal, (ISSN 0001-4966), vol. 76, Oct. 1984, p. 1080-1089. refs
The values of exponents of psychophysical functions for the discomfort produced by whole-body vertical vibration were determined, and the applicability of a method for predicting the average stimulus intensity of a stimulus whose intensity varies with time was investigated. The magnitude estimation method was used to experimentally study the effect of duration of vibration and of vibration acceleration magnitude on discomfort. The results show that the logarithm of the magnitude estimated is in linear proportion to both the logarithm of the acceleration and the logarithm of the duration. The point of subjective equality of each of 16 nonsteady vibrations was measured and compared with the stimulus intensity predicted by a proposed method. Good agreement is found, and it is shown that the proposed method can be applied to vibration as well as noise.
C.D.
A85-12327

BREATHING AFFECTS VENOUS RETURN FROM LEGS IN HUMANS
R. WILLEPUT, C. RONDEUX, and A. DE TROYER (Erasmus University Hospital; Brussels School of Medicine, Brussels, Belgium) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 971-976. refs

The effect of various breathing maneuvers on the blood flow in the femoral vein is investigated experimentally in three women and ten men in recumbent posture. The results are presented in tables and graphs and characterized. It is shown that quiet inspiration is accompanied by a fall in femoral venous flow (to 65 + or - 1 percent of the end-expiratory value) which is attributed to concomitant changes in abdominal pressure. Greater use of the diaphragm in breathing is found to produce greater decreases in venous return from the legs, while mainly rib-cage breathing leads to a slight increase in venous return. T.K.

A85-12328

PULMONARY FUNCTION CHANGES AFTER 1 H CONTINUOUS HEAVY EXERCISE IN 0.21 PPM OZONE

Contract EPA-R-80790-02; NIH-HL-26034-2

A85-12329

ENDURANCE TRAINING IN OLDER MEN AND WOMEN. I - CARDIOVASCULAR RESPONSES TO EXERCISE

(Contract NIH-AG-03038)

A85-12330

ENDURANCE TRAINING IN OLDER MEN AND WOMEN. II - BLOOD LACTATE RESPONSE TO SUBMAXIMAL EXERCISE

(Contract NIH-AG-03039)

A85-12332

HEAT EXCHANGE DURING UPPER- AND LOWER-BODY EXERCISE
M. N. SAWKA, R. R. GONZALEZ, L. L. DROLET, and K. B. PANDOLFO (John B. Pierce Foundation; Yale University, New Haven, CT; U.S. Army, Army Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1050-1054. refs

(Contract NIH-OH-00836)

The roles of radiative-conductive (RC) and evaporative (E) heat loss during arm-crank or leg-crank ergometer exercise at O2 uptake 1.6 l/min are evaluated in four male subjects in environments with dew-point temperature 14 C and ambient temperature either 18 or 35 C. The parameters measured included torso RC (using a net radiometer), arm and thigh RC (using heat-flow disks), E (using ventilated dew-point sensors), and esophageal temperature; the results are presented in graphs and characterized. The only significant differences found to result from the different exercise types are greater torso RC, in either environment, during arm crank than during leg crank; greater leg RC during leg crank than during arm crank at 18 C; and greater leg E during leg crank than during arm crank at 35 C. A compensatory mechanism involving differential heat-transfer coefficients which affect tissue conductivity and mass transfer is considered. T.K.

A85-12333

PHYSIOLOGICAL RESPONSES TO EXERCISE AT 47 AND 66 ATA

(Contract NIH-HL-07896)

The work tolerance and physiological responses to different atmospheres (air; O2/N2; He/O2; and He/O2/N2 with inspiratory partial O2 pressure 0.5 and N2 2.34, 4.67, or 6.56) at pressures 47 and 66 ATA are determined experimentally in three simulated divers involving five male subjects. The results are presented in detailed tables and graphs and characterized. A predominantly inspiratory dyspnea is observed in all subjects but does not prevent performance of work requiring O2 uptake excess of 2 l/min, although this performance is accompanied by alveolar hypoventilation, arterial hypercapnia, increased dead space, higher arterial lactate concentration, and simultaneous respiratory and metabolic acidosis (without the increased ventilation observed at 1 ATA). The acidosis is more severe than at 1 ATA, but does not vary significantly between 47 and 66 ATA as or the N2 partial pressure in the He/O2/N2 mixture is increased from zero to 6.56 (corresponding to an inspired mixture density range 7.9-17.1 g/l). T.K.

A85-12334

EFFECTS OF SLEEP STATE ON VENTILATORY ACCLIMATIZATION TO HYPOXIA IN HUMANS
A. D. BERSSSENBRUGGE, J. A. DEMPSEY, and J. B. SKATRUD (Wisconsin, University; William S. Middleton Memorial Veterans Hospital, Madison, WI) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1089-1096. Research supported by the U.S. Veterans Administration. refs

(Contract DAMD17-77-C-7006; NIH-HL-15469)

Ventilatory acclimatization to hypobaric hypoxia (455 torr) over a 4-day period is monitored in seven male subjects during wakefulness (W), non-REM (NREM) sleep, and REM sleep. Parameters measured include material partial CO2 pressure, pH, and O2 saturation; minute ventilation; tidal volume; and breathing rate. The results are presented in tables and graphs and discussed. Relative hypoventilation during sleep is observed in normoxia and hypoxia, while the time-dependent response to hypoxia is found to be the same in W, REM, and NREM. It is inferred that ventilatory acclimatization does not require suprapontine control of ventilatory processes. T.K.

A85-12335

INSPIRATORY FLOW PATTERN IN HUMANS

Inspiratory flow curves recorded during rest, exercise hyperventilation (EH), and maximum voluntary ventilation (MVV) in six male subjects are subjected to Fourier analysis of their harmonic content, and the results are compared with those of model computations assuming sinusoidal or rectangular waves in terms of the dynamic work of breathing (DWB). The data and results are presented in graphs and tables and discussed. It is found that the experimental and sinusoidal-model DWB levels are approximately equal in the resting state, but that the experimental wave during EH or MVV is 16-20 percent more efficient than the sinusoidal wave. T.K.
A85-12336

INFLUENCE OF BLOOD FLOW ON CUTANEOUS PERMEABILITY TO INERT GAS


The relationship between cutaneous blood flow and outward transcutaneous diffusion of He or N2 is investigated experimentally in the hands of three healthy male subjects. Blood flow is changed by varying the temperature in the measurement chamber between 20 and 40°C, and the results of conductance, permeability, and body-store replacement-time computations are presented in tables and graphs. It is found that He and N2 conductance and permeability both increase exponentially as a function of temperature and hence of blood flow, with He permeability slightly higher than N2 permeability and with a corresponding reduction in the N2 replacement time (by transcutaneous diffusion alone) from 26.8 h at 31°C to 15.1 h at 37°C. It is suggested that the efficiency of decompression procedures can be increased by adjusting the inert-gas transcutaneous pressure gradient and increasing the ambient temperature. T.K.

A85-12425

AVIATION MEDICINE


After discussing the range of medical emergencies for which commercial airline operators must be prepared, and the various factors affecting the fitness of passengers for air travel, attention is given to such fundamental problems of flight at high altitudes as pressure and temperature drops with increasing altitude, the required pressurization of cabins, and the emergency measures called for by safe depressurization. The physiological factors responsible for hypoxia, hyperventilation, and decompression thickness are then treated, as well as the response of passengers to various forces of acceleration. The ways in which the visual, vestibular and auditory senses respond to abnormal flight environments are discussed, together with the perceptual and workload limitations affecting 'aviation psychology'. Attention is given to the fitness of crew members for airline operations. O.C.

N85-10052#

National Aeronautics and Space Administration.

Langley Research Center, Hampton, Va.

EFFECTS OF FOVEAL INFORMATION PROCESSING

R. L. HARRIS, SR. In NASA Dryden Flight Research Center Peripheral Vision Horizon Display (PVHD) p 81-89 Apr. 1984 Refs

The scanning behavior of pilots must be understood so that cockpit displays can be assembled which will provide the most information accurately and quickly to the pilot. The results of seven years of collecting and analyzing pilot scanning data are summarized. The data indicate that pilot scanning behavior is: (1) subconscious; (2) situation dependent; and (3) can be disrupted if pilots are forced to make conscious decisions. Testing techniques and scanning analysis techniques have been developed that are sensitive to pilot workload. B.W.

N85-10607#


Aeromedical Lab.

THE EFFECTS OF ISO-TONIC TRAINING ON +GZ TOLERANCE


The effects of isotonic training on the tolerance to + Gz were performed. Five healthy, sedentary men aged from 20 to 31 performed the weight training program consisting of nine exercises: leg press, bench press, back extension, chin up, leg curl, straight arm pulldown, shoulder shrug, sit up, and arm curl. The main results obtained include: (1) muscle strength including back strength, grip strength, and leg strength increased significantly with the training; (2) the tolerance to gradual onset run exposure increased by 0.4 to 0.9G in four subjects and did not change in one; (3) the tolerance to rapid onset run exposure increased by 1.0 to 1.5G in two subjects, did not change in two, and decreased in one by 0.5G; and (4) the correlation between the tolerance to ROR exposure and the weight of one maximum repetition of leg press was statistically significant. It is concluded that the isotonic training, especially the leg press, was effective in improving the G tolerance. R.S.F.

N85-10610#


Aeromedical Lab.

A STUDY OF FATIGUE OF SHIFTFWOKERS IN AIR TRAFFIC CONTROL AND WEATHER SERVICE GROUPS IN JASDF.


Avail: NTIS HC A05/MF A01

The fatigue of air traffic controllers and weather service persons working shiftwork was investigated. Subjective fatigue, flicker values, uncorrected electrocardiograms, and sleep surveys were used for a fatigue assessment scale. Cormel Medica index (CMI) and fatigue feeling surveys were also carried out. Results suggest that: (1) fatigue resulting from one cycle of shiftwork was largely offset by off duty rest; (2) normal circadian rhythms were frequently disturbed in weather observers and teletype operators who had to work through midnight without a sleep; (3) there was no difference in average sleeping time between daytime workers and shiftworkers; (4) fatigue complaints among shiftworkers tended to increase in over forty-one years old; and (5) 3.6% of air traffic controllers and weather service persons diagnosed to be neurotic by the CMI tended to have stronger fatigue feeling and sleep-related dissatisfaction. R.S.F.

N85-10615#


VITAMIN METABOLISM IN COSMONAUTS FOLLOWING SHORT-TERM FLIGHTS


Avail: NTIS HC A07

The vitamin status of the cosmonauts after short term (4 to 13 days) flights showed different variations. Vitamin consumption was basically adequate to the requirements in space flights. Some vitamins were occasionally in deficiency, thus indicating their enhanced metabolism. Author

N85-10616#


COMPENSATORY AND ADAPTIVE REGIONAL HEMODYNAMIC REACTIONS TO WEIGHTLESSNESS DURING LONG-TERM SPACEFLIGHTS


Avail: NTIS HC A07

Regional hemodynamics and vascular regulation during and after spaceflights of over 3 months in duration are discussed. Mechanisms of cardiovascular adaptation to weightlessness are described. The postflight differences in the recovery of regional hemodynamics seem to depend on the individual characteristics, age related changes of the cardiovascular system, as well as the
countermeasures and rehabilitation measures performed during and after flight. Author

N58-10617# Joint Publications Research Service, Arlington, Va. FUNCTIONAL CAPACITIES OF ELDERLY SUBJECTS EXPOSED TO SIMULATED SPACEFLIGHT FACTORS T. N. KRUPINA, K. K. YARULLIN, N. P. ARTAMONOVA, V. A. CHIBISHEV, D. A. ALEKSSEYEV, N. I. TSYGANOVA, M. P. KUZMIN, L. M. FILATOVA, L. A. FOTINA, and O. A. SMIRNOV In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 37-42 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1984 p 29-32 Avail: NTIS HC A07 In response to stimulated space flights cardiovascular and metabolic changes of 86 volunteers, aged 40 to 49 and 50 to 56, were similar to those of young people (25 to 39 years old). In most aged test subjects, the changes produced by 8 day head down tilt (-8 deg) and 7 day water immersion were moderate and reversible. This type of variation of the adaptive compensatory reactions give evidence that aged people have sufficiently high functional capabilities. Nevertheless, 36% test subjects, aged 40 to 49, and 50% test subjects, aged 50 to 56, displayed certain features suggesting a reduction of the adaptive compensatory capabilities (functional reserves) as a result of age related and atherosclerotic changes of the cardiovascular system. Author

N58-10618# Joint Publications Research Service, Arlington, Va. EFFECT OF FLUID AND SALT SUPPLEMENTS TO FOOD ALLOWANCE ON ENDURANCE OF HEAD-TO-PELVIS ACCELERATIONS FOLLOWING 7-DAY DRY IMMERSION AND UNDER ORDINARY MOTOR ACTIVITY CONDITIONS N. I. KOKOVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 43-49 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 33-37 Avail: NTIS HC A07 The effect of water salt supplements as an agent increasing human tolerance to head to feet acceleration with a slow onset was examined. The test subjects were rotated in a 7.25 m arm centrifuge after 7 day dry immersion or normal motor activity. The water salt supplements were given at a dose of 0.15 g NaCl and 18 ml water per kg body weight (with the total daily dose consumed in four fractions). During immersion fluid retention was significantly higher than during normal activity (818 + or - 139.7 ml versus 528 + or - 69 ml). Water salt supplements consumed produced a positive effect on tolerance to head to feet acceleration. During centrifugation after water salt supplementation the physiological responses were less strained. Water salt supplements taken on the last immersion day increased the tolerance level as compared to the control. The amount of the fluid retained in the body was found to be inversely proportional to the tolerance level. It is concluded that water salt supplements may be recommended to increase tolerance to head to feet acceleration in aerospace medicine. Author

N58-10626# Joint Publications Research Service, Arlington, Va. CHANGE IN ENERGETICS OF MUSCULAR CONTRACTION AS A RESULT OF HYPEROXIA L. D. PCHELENKO and N. A. BEBYAKOVA In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 111-117 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 77-81 Avail: NTIS HC A07 Using a highly sensitive thermometric method, it was found that the heat production of a single isometric contraction of an isolated diaphragm of the rats exposed to 99% O2 at normal pressure for 3 and 6 hours significantly differed from the norm. After 3 hr hyperoxygenation muscle heat production increased almost three-fold, and after 6 hr of hyperoxygenation it decreased almost two-fold. The increase is regarded as a result of an oxygen-potentiated increase of energy expenditures involved in a contraction and of a decrease of the performance of muscle contraction. The decrease is considered to be a consequence of the primary uneconomical energy expenditures by an intensively working muscle (represented by the diaphragm) and of a reduced viability of the muscle preparation incubated in vitro. Author
The role of prostaglandins in the pathogenesis of acute mountain sickness and two hypoxia-induced vascular responses was evaluated using the cyclooxygenase inhibitor naproxen. Eleven males spent 24h at sea level, followed by 34h of decompression to 428 torr while receiving naproxen (N), 250 mg twice daily or placebo (P) in a double-blind crossover trial. Serum naproxen levels by high pressure liquid chromatography were not changed by hypoxia. Retinal artery diameter measured from projected fundus photographs was increased after 27h at altitude (11.4 + or - 5mm) vs sea level (9.4 + or = 5.5mm, p< .05) during both trials. Upright mean arterial pressure fell after 6h at altitude (79 + or - 3 mmHg during N and P vs. 92 + or - 3 at S.L., p<.01). The severity of acute mountain sickness (AMS) by the Environmental Symptoms Questionnaire scores and observer assessment were unaffected by drug treatment. Minute ventilation, and expiratory alveolar PO2 and PCO2 did not differ between drug trials. This study suggests vasodilating prostaglandins do not have a major role in the genesis of AMS, hypoxia-induced retinal vasodilatation, or postural blood pressure responses in man.

The effects of water temperature and flavoring on voluntary dehydration (D), sweat electrolyte losses (SEL) and total body electrolyte losses (TBE) were studied in 12 healthy males during six hours of intermittent exercise at 40.6 C DB, 25.5 C WB. Trials involved three water temperatures (6, 22, 46 C) and two flavorings (Chlorinated and plain). Subjects (Ss) who were presented with 46 C water consumed less (p<0.0001), had a larger % body weight loss (p<0.0001), and a D which was 1050 g larger (p<.000:1) than subjects who consumed 6 C. Most of the Na+ was secreted in sweat, while K+ losses primarily originated in urine. Based on 24 hour projections of total body electrolyte balance, K+ depletion was considered to be more likely than Na+ depletion because food can be easily supplemented with sodium chloride.

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The EPA NAAOS Exposure Model (NEM) as applied to carbon monoxide, supplemented by four mobile source microenvironments: the environments covered by the NEM. The methodology for using the NEM was developed. The information was combined with previously reported data from other studies, led to the conclusion that observer scores can be predicted from photometric data. Author (ESA)

THE PERCEPTUAL QUALITY OF SMOKE SCREENS: AN ANALYSIS OF THE OLDBROEK 2 TRIALS, MAY 1981

Target detection by human observers with unaided vision was recorded during field trials, using hexachloroethane and white phosphorus smoke, to obtain a perceptual quality measure for a smoke screen, as a single-parameter index. Smoke was laid midway between observers and targets. Target visibility was continuously recorded. Cumulative distributions of recorded holes and obscurations were determined over 7 duration classes from 2 to 40 sec. A see-through probability for each smoke screen was obtained, and is proposed as a single-parameter quality index Q, expressed in percent: 100% is a perfect smoke screen, Q = 80% means that there is an effective see-through probability of 20% and Q = 0% is no smoke. Author (ESA)

M. N. INGALLS Mar. 1984 136 p refs (Contract EPA-68-03-3073)

A national exposure, in person hours, to nonreactive mobile source pollutants was analyzed. The basis for the estimate was the EPA NAAOS Exposure Model (NEM) as applied to carbon monoxide, supplemented by four mobile source microenvironments: parking garages, street canyons, on expressways, and roadway tunnels. The CO concentration distributions and national population estimates, by hour of the day, for each of these mobile source microenvironments were developed. The information was combined to determine national exposure in the microenvironments. By using the mobile source CO emission factor, exposure to mobile source pollutants based on a pollutant emission rate of one gram per minute was determined for each of the microenvironments and the environments covered by the NEM. The methodology for using this information to determine exposure to any mobile source pollutant, regulated or unregulated is explained. GRA


The current technologies used in photocopiers are briefly described. Concerns that were raised about health and safety at each step of the copying process are discussed. Particular emphasis was placed on the chemical components of the copying technologies. Where appropriate, exposure controls are suggested. Recommendations are made with regard to the safety features of machines and the need to enhance the free flow of information from the manufacturers to the public. Author

THE EFFECT OF SLEEP LOSS ON THE HUMAN VISUAL EVENT-RELATED POTENTIAL Interim Report D. J. HORD and M. TRACY 1984 13 p (Contract DARPA ORDER 1596; F63528)

In eight volunteer subjects, the latency of both crest and trough components of visual sensory Event-Related Potentials (ERPs) was found to be increased following 48 hours of total sleep deprivation, relative to baseline levels. The amplitude of the component was not affected, nor was the recovery cycle. These results, together with previously reported data from other studies, led to the hypothesis that the ERP may be a measure of brain function that differentiates fatigue and drowsiness. Whereas drowsiness is accompanied by changes in amplitude but not latency of the ERP, after sleep deprivation the opposite effect is seen; the latency of the ERP differentiates fatigue and drowsiness. Whereas drowsiness is also addressed. Existing radiation standards and exposure limit values are given. R.S.F.

THE CASE FOR CONCERN ABOUT VERY LOW FREQUENCY FIELDS FROM VISUAL DISPLAY TERMINALS: THE NEED FOR FURTHER RESEARCH AND SHIELDING OF VDTS

Very low frequency (VLF) electromagnetic fields emitted from visual display terminals (VDT) are considered. Evidence of pulsed VLF electromagnetic fields from VDTs is presented along with evidence of biological and detrimental effects of pulsed electromagnetic radiation. The effectiveness of radiation shielding is also addressed. Existing radiation standards and exposure limit values are given. E.A.K.

52 AEROSPACE MEDICINE
N85-11529#  Harvard Medical School, Boston, Mass. Dept. of Physiology and Biophysics.

M. C. MOORE-EDE  31 Mar. 1984  17 p
(Contract AF-AFOSR-3560-76)
(AD-A145444; AFSOR-84-07527R) Avail: NTIS HC A02/MF
A01  C56L 06P

This research program was concerned with the physiological mechanisms that underlie the phenomenon of jet-lag and was aimed at developing therapeutic techniques to minimize the performance and physiological deficits that occur in rapid transmeridian air travel. During the course of this project, the circadian pacemaker responsible for the timing of the daily rest-activity was identified in the brain of the diurnal primate, the squirrel monkey (Saimiri sciureus). The suprachiasmatic nuclei were also identified in the human brain. A number of other significant advances included: developing a model of the circadian sleep-wake cycle, characterizing how phase shifts of the light-dark cycle reset the timing of the sleep-wake cycle, and identifying pharmacological agents which can phase-reset the circadian system. GRA

N85-11530#  Naval Aerospace Medical Research Lab., Pensacola, Fla.

DARK FOCUS: INTERSUBJECT VARIATION, INTRASUBJECT STABILITY, AND RELATIONSHIP TO NEAR RETINESCOPY Interim Report
W. A. MONACO and C. G. KNOWLTON  Apr. 1984  18 p
(AD-A145488; AD-E000594; NAMRL-1307) Avail: NTIS HC
A02/MF A01  C56L 06P

Previous studies have shown that dark focus varies between individuals while remaining relatively fixed over time. These relationships were quantified in a population of future naval aircrewmen to determine whether or not individual variability exists in a group who have stringent visual screening requirements. In addition, it has been reported that near retinoscopy, a clinical measure, is a means to determine dark focus that may be used by clinicians. The relationship between near retinoscopic values and dark focus measures needed further study. This study found that dark focus exhibited intersubject variation and intra-subject stability in a population of future naval aircrewmen. Because dark focus is correlated with empty field myopia, it could have potential in screening aviators for susceptibility to empty field myopia and their ability to detect air-to-air targets. Near retinoscopy was found to be correlated with dark focus, but further study is needed to define the relationship. GRA


M. L. LOBB  30 Aug. 1984  13 p
(Contract AF-AFOSR-0129-83)
(AD-A145702; AFSOR-84-07737R) Avail: NTIS HC A02/MF
A01  C56L 06P

Nine normal human subjects were measured by electrooculographic and video tape of the eyes during performance on a human/animal analog of the serial probe recognition task. The task was modified to distinguish attention (the missed signal) errors from decision (failure to make same versus different discrimination) errors. Two types of eyelid closing and reopening sequences were observed to be progressive with time-on-task, with the earlier. Type 1 sequence being indicative of correct responses. The velocity of the eyelid in motion over the pupil also significantly discriminated decision correct from decision error trials. The results were interpreted to support the hypothesis that information processing function progressively deteriorates over time-on-task and is indicated by variations in oculomotor patterns. GRA

N85-11532#  Harvard Medical School, Boston, Mass. Dept. of Physiology and Biophysics.

(Contract AF-AFOSR-0133-81)
(AD-A145712; AFSOR-84-07817R) Avail: NTIS HC A11/MF
A01  C56L 06P

This contract funded a Satellite Symposium on the Mathematical Modeling of Circadian Systems which was held on June 21, 1981 in conjunction with the Annual Meeting of the Association for the Psychophysiological Study of Sleep (APSS) from June 17-21, 1981, at Dunfrey's Hyannis Hotel on Cape Cod, Massachusetts. The Satellite Symposium brought together the leading investigators concerned with modeling the circadian system to ensure that the various proposed models were critically reviewed and their strengths and weaknesses in predicting periodic biological phenomena were fully understood. The papers of each participant and an edited transcription of the discussion were published as a book entitled "Mathematical Models of the Circadian Sleep-Wake Cycle" by Raven Press in 1984. The published volume serves as an important source of all those who are concerned about the temporal organization of human and animal behavior and physiology. Author (GRA)

N85-11533#  Research Inst. of National Defence, Stockholm (Sweden).

MAN'S PHYSICAL TOLERANCE TO HEAT. HEAT STORAGE, BURN INJURY
U. DANIELSSON  May 1984  54 p refs
In SWEDISH; ENGLISH summary
(FOA-C-54055-H1; ISSN-0347-7665) Avail: NTIS HC A04/MF
A01

Heat exposure time which results in 50% risk of heat exhaustion was calculated for metabolic heat production = 150 W/sq m and 300 W/sq m, and air temperatures and heat radiation between 30 C, 1200 W/sq m and 300 C, 7300 W/sq m. These parameters correspond to moderate and heavy physical workloads in an ordinary indoor fire. The effects of time to heat exhaustion were calculated for clothes with various insulations for air temperature = 140 C. The shortest time to heat exhaustion, not resulting in heat injury, is 5 min if the body is uniformly exposed. The capacity of protective clothing to reduce heat load depends on the thickness of the material. Author (ESA)

N85-11534#  Sheffield Univ. (England). Dept. of Control Engineering.

SMITH PREDICTOR AND SELF-TUNING CONTROL OF MUSCLE RELAXANT DRUG ADMINISTRATION
D. A. LINKENS, M. MENAD, and A. J. ASBURY  1984  27 p refs
(RR-257) Avail: NTIS HC A03/MF A01

Control, dead-time compensation, and on-line identification and control were applied to relaxation management in anesthesia, in clinical trials using a dog. Closed-loop control gives insight into the classic pharmacokinetic compartmental modeling problem and provides a test environment capable of quantifying interacting effects from other drugs. Provided care is taken to jacket the self-tuner, self-tuning control of muscle relaxation is shown to be feasible, safe and efficient. As well as being a satisfactory control strategy in its own right, the Smith predictor structure, when used to provide jacketing, greatly improves system speed of response. Author (ESA)
(BMFT-FB-T-83-187-VOL-1; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31.50

A climbing test track for the determination of human locomotion and foot-ground forces during horizontal walking and step climbing was developed. The measurement information is furnished by an opto-electronic movement monitoring system, a multicomponent measuring platform, and an interference pattern sandwich platform. An optimization method program system to calculate the time-dependent muscle and joint forces is described. Sixteen subjects and 64 test runs, taken into account the gait velocity, the body height and weight were analyzed. The characteristics of the neutral gait and the joint forces in the pelvis-leg skeleton are shown.

A programme was used to calculate time dependent and three-dimensional muscle and joint forces depending on gait speed, body weight and height are shown. Taking into account the possibility that while noise and vibration acting independently might cause impairment of performance, offering them in combination at levels judged to be subjectively equal would lead to a lesser impairment. Three experiments were conducted. Each experiment involved a different intensity of vibration with concomitant changes in noise levels. In the experiments, the subjects had to solve arithmetic problems, while exposed to four different conditions. The significance of the results is discussed.

A85-11250
THE PSYCHODIAGNOSTICS OF HUMAN FUNCTIONAL STATES [PSIKHODIAGNOSTIKA FUNKTSIONAL'NYKH SOSTOIANII CHELOVEKA]
A. B. LEONOVA Moscow, Izdatel'stvo Moskovskogo Universiteta, 1984, 200 p. In Russian. refs

The objects and methods of a psychology of human functional states are explored with particular emphasis on the study of those emotional states which occur as the result of heavy or prolonged physical activity, stress, or boredom. Methods are developed for effectively measuring the dynamics of fatigue according to changes in the microstructure of known physiological processes, as well as the multidimensional changes in subjective symptoms. On the basis of a number of concrete examples, some principles are offered which can be applied toward the development of a program for the prophylaxis and correction of disorders caused by reactions to stress or boredom.

I.H.
aircraft which are felt to be easy or difficult to control. Whether an aircraft is felt to be easy or difficult supposedly does not depend upon a pilot's flying experience but upon characteristics of the aircraft. Irritancy during flight is experienced more by jet pilots including instructors and fighters than by rescue pilots. More fighter pilots experience solitude during flight than other multiple seat aircraft pilots. R.S.F.


A questionnaire to survey JASDF pilot's emotional experiences during flying by duty assessment and the Emotional Tension Scale was administered to 173 JASDF pilots. The Emotional Tension Scale is a questionnaire to evaluate emotional tensions or anxieties which are supposed to effect behaviors in frustrating situations. The questions about flying situations consisted of multiple choice and sentence completion type. Answers given by the pilots were converted to Z scores, and Pearson's product moment correlation coefficients were computed. Results suggest that: (1) younger pilots tend to be less stable psychologically; (2) the Emotional Tension Scale cannot be used to project pilot psychological uneasinesses in actual flying; (3) the Emotional Tension Scale score is related to the frequency of reluctance to fly and the uneasiness before flying; (4) question items inquiring of phobic tendencies and physical complaints in the Scale have significant correlation with the frequency of reluctance to fly; and those of obsessive tendencies and of social phobic tendencies slightly correlate with the psychological uneasiness before flying; and (5) phobic experiences during flying have no relations with any other item, therefore every pilot has the possibility to have such experiences, regardless of his age, flight hours, or psychological traits. R.S.F.


The relationship between simple reaction time (RT) and the pattern-reversal visual evoked potential (PRVEP) and the effect of changes of arousal level on the latter were studied in 17 subjects. Results show increased P100 amplitude and decreased latency with increased arousal. The RT was correlated with P100 latency but not with amplitude. Differences between results and those obtained using flash VEPs are discussed. R.S.F.


The National Institute for Personnel Research (NIPR) is in the process of developing a computerized psychological testing system. The programs developed for the system are divided into four categories: the control programs, the tests, test manuals and statistical procedures. The advantages and disadvantages of computerized testing are discussed. Some of the main features of NIPR computerized tests are described. Finally, one of the tests, the Arithmetic Reasoning Test, is described in some detail to illustrate the type of testing material which is being programmed on the system. Author


This paper reports the results of our studies with an unsupervised learning paradigm which we have called Competitive Learning. We have examined competitive learning using both computer simulation and formal analysis and have found that when it is applied to parallel networks of neuron-like elements, many potentially useful learning tasks can be accomplished. How a very simple competitive mechanism can discover a set of feature detectors which capture important aspects of the set of stimulus input patterns. How these feature detectors can form the basis of a multi-layer system that can serve to learn categorizations of stimulus sets which are not linearly separable. How the use of correlated stimuli can be served as a kind of teaching input to the system to allow the development of feature detectors which would not develop otherwise. Competitive learning is an essentially non-associative statistical learning scheme. We certainly imagine that other kinds of learning mechanisms will be involved in the building of associations among patterns of activation in a more complete neural network. GRA


Self-paced training in the Air Force has not met with the success that had been anticipated from the controlled experiments with self-pacing reported in both the civilian and military literature. The reasons for this lack of wide-scale success were systematically investigated to identify those factors that are critical to the success of the self-paced course. Administrative and instructional factors were hypothesized from a review of the literature and were investigated through case studies of 12 courses at four Air Force technical bases. The results of this study show that it is not one but a combination of factors that primarily influences success and that management factors are more important in Air Force technical training than in the training reported in the general literature. Based on a success model generated by the study, six recommendations are provided for enhancing the successful implementation of self-paced instruction. Author (GRA)


In a previous effort the literature pertaining to self-paced instruction was initially collected and reviewed to support a study of factors associated with the successful utilization of self-paced instruction in Air Force technical training. The purpose of this technical paper is to provide a more in-depth analysis of the literature relevant to the findings of that study. In general, the analysis of the literature revealed a high level consensus among military and civilian reports with respect to factors associated with successful implementation of self-paced instruction. GRA
A goal of neuropsychology is to connect cognitive functions with underlying neural systems. Posner (in press) has proposed a framework for doing so in which elementary mental operations in cognitive models are expressed in terms of component facilitations and inhibitions in the performance domain. These components are in turn linked to underlying neural systems. In the area of spatial attention one such component is the tendency to inhibit orienting toward visual locations which have been previously attended (inhibition of return). The current studies use patients and normals to demonstrate the relationship of this component to systems which generate saccades. These mid-brain systems appear to contribute specific components to the generation of programs for visual attention. The deficits found in patients and the conditions under which the inhibition is found in normals suggest that inhibition of return may function to favor foveation of information at new locations.

Two experiments assess the processes by which written instructions for operating a piece of equipment are comprehended. Experiment 1 shows that comprehension is fastest when information on the action is to be performed, the consequences of the action, and the conditions under which it is to be performed, match the order in which it is needed to fill in a schema for executing the instruction. Experiment 2 shows that subjects use a step schema for organizing the reading process even when the material is to be read and recalled verbatim instead of being executed. (Author GRA)
we are in a position to take advantage of each one's strengths and approaches. It is argued in this paper that by combining the three, distinct perspectives. This paper develops a way of melding the approaches of Artificial Intelligence, Cognitive Psychology, and Neuropsychology, and explores the advantages of such a hybrid approach.

The ongoing research investigates the representations of visual texture and the processes that detect discontinuities and structure in visual texture. Psychophysical experiments have investigated the salience of bar orientation and the effect of groupings in texture segmentation. We are examining the role of elongated receptive field mechanisms in computing both local measures of orientation and their possible role in texture segmentation. We have found such mechanisms, however, to be less appropriate for determining one-dimensional groupings of (collinear) discrete items of texture. Combined psychophysical and computational studies have provided evidence for place tokens in groupings, and current work is directed towards understanding how these tokens may be defined in fine-scale texture detail. To support this work, a vision laboratory has been established based on a Symbolics 3600 Lisp Machine.

Author (GRA)

GRA

Visually represented subroutines of texture perception

N85-11541# Nova Technical, Inc., Tarzana, Calif.

An investigation of the use of steady-state evoked potentials for human performance and workload assessment and control.

53 Behavioral Sciences

N85-11542# Rice Univ., Houston, Tex. Dept. of Psychology.

The effects of feedback and predictability of human judgment.

N85-11543# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

Using gross outline features in long range target identification.
composition of the target set with regard to similarity between the targets has a great influence on the performance. Author (ESA)

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

LIMITATIONS OF SPATIAL-FREQUENCY-BASED CRITERIA FOR ASSESSMENT OF RASTER DISPLAY SYSTEMS


A new approach, based on knowledge of early image processing in the human visual system, is developed for taking into account raster effects on the visual function. A highly controlled experiment has demonstrated some acute nonlinearities and a large fall-off of performance with over-large display subtenses. It is found that the anticipated effects predicted from knowledge of the early neural function appear largely to explain the experimental results. It is concluded that the reassessment of spatial-frequency-based performance measures such as the MRTD (minimum resolvable temperature difference) and MRC (minimum resolvable contrast) in the light of these results suggests that caution should be exercised in the use of such measures.

HUMAN FACTORS IN AIRCRAFT INCIDENTS - RESULTS OF A 7-YEAR STUDY (ANDRE ALLARD MEMORIAL LECTURE)


It is pointed out that nearly all fatal aircraft accidents are preventable, and that most such accidents are due to human error. The present discussion is concerned with the results of a seven-year study of the data collected by the NASA Aviation Safety Reporting System (ASRS). The Aviation Safety Reporting System was designed to stimulate as large a flow as possible of information regarding errors and operational problems in the conduct of air operations. It was implemented in April, 1976. In the following 7.5 years, 35,000 reports have been received from pilots, controllers, and the armed forces. Human errors are found in more than 80 percent of these reports. Attention is given to the types of events reported, possible causal factors in incidents, the relationship of incidents and accidents, and sources of error in the data. ASRS reports include sufficient detail to permit authorities to institute changes in the national aviation system designed to minimize the likelihood of human error, and to insulate the system against the effects of errors.

ROBUST CONTROL OF BILATERAL FORCE-REFLECTING MANIPULATOR


A control-system design method for Bilateral-Force Reflecting master-slave type manipulators is given. A very wide range of sensor signals are considered. A systematic procedure for selecting the control gains that yield a robust control system and improve the performance is described. Two systems employing electromechanical and electrohydraulic joints were built. The controllers employ a nonlinear control technique known as Bidirectional Pulse-Frequency Pulse-Width or Two-State modulation to improve the Force Feedback characteristics. A linearized model for the nonlinear controller has been used in analysis. Control gains were implemented. Results obtained verified the design approach and highlighted areas for improvements. Author
The Spaced Shuttle crew's Manned Maneuvering Unit is hand-controlled, and employs pressurized nitrogen gas as a propellant. O.C.

**N85-10049#** California Univ., Davis. Dept. of Ophthalmology. STIMULUS FACTORS IN MOTION PERCEPTION AND SPATIAL ORIENTATION


Avail: NTIS HC A07/MF A01 CSCL 05H

The Malcolm horizon utilizes a large projected light stimulus Peripheral Vision Horizon Device (PVHD) as an attitude indicator in order to achieve a more compelling sense of roll than is obtained with smaller devices. The basic principle is that the larger stimulus is more similar to visibility of a real horizon during roll, and does not require fixation and attention to the degree that smaller displays do. Successful implementation of such a device requires adjustment of the parameters of the visual stimulus so that its effects on motion perception and spatial orientation are optimized. With this purpose in mind, the effects of relevant image variables on the perception of object motion, self motion and spatial orientation are reviewed.

Author

**N85-10050#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. THE PERIPHERAL VISUAL CUE ASSESSMENT FACILITY AT AMES RESEARCH CENTER

R. F. HAINES In NASA. Dryden Flight Research Center Peripheral Vision Horizon Display (PVHD) p 63-70 Apr. 1984 refs

Avail: NTIS HC A07/MF A01 CSCL 05H

The Peripheral Visual Cue Assessment Facility was established to study various responses to controlled dynamic stimuli that could be considered as visual analogs of some real world counterparts such as the horizon. Careful stimulus control permits specific responses to be traced to specific stimulus dynamics. The ability of the visual system to assess various kinds of stimulus motion is examined. A major emphasis is placed upon the peripheral vision field, which plays an important role in a pilot's assessment of where he is in space, where he is going, how fast he is travelling and what angular and linear rates of movement is taking place. The facility was designed to be able to carry out carefully controlled psychophysical vision research over a wide angular range. E.R.


A. ONOZAWA, W. OGAWA, S. OGATA, M. OSHIBUCHI, M. ONO, and M. IWANE In its The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 47-64 Jun. 1984 refs In JAPANESE; ENGLISH summary

Avail: NTIS HC A05/MF A01

A modified anti-G suit developed in light of rapid onset G rates was made. The inflating characteristics of the modified anti-G suit were assessed by human centrifuge test, ground test, and flight test. According to the measurement of inflation time, change of inner pressure, and pressure error score in each bladder, the modified anti-G suit responded to the rapid onset G rate. Human subjects could not distinguish between the inflating characteristics between a JASDF standard suit and a modified suit. The modified anti-G inflates with a rapid velocity of inner pressure of each bladder. Periodic differences between inner pressure of each bladder and outer pressure to the body surface. The modified suit inflates smoothly without any unbalance. According to pilots' comments, the modified suit was superior in fitness, but no differences in G-tolerance between the standard and the modified one were reported. In conclusion, it is necessary to develop a ready pressure valve and new anti-G systems for enhancement of G-tolerance of the fighter pilots. R.S.F.


Avail: NTIS HC A07

Atmospheric contamination of spacecraft crew cabins has been a toxicological concern since the United States began its efforts in manned spaceflight. Procedures were developed and utilized for determining the identities and quantities of contaminant gases present in the crew cabin environment. Methods were also developed and for assessing and controlling the trace gas contaminant buildup within the closed environment of spacecraft cabins. Although nearly one hundred contaminant gases were detected in the shuttle crew cabin, for the most part, the concentrations of these gases were maintained below a toxicity hazard level.

Author

**N85-10654#** Prins Maurita Lab. TNO, Rijswijk (Netherlands). ULTRAFILTRATION AS PRETREATMENT FOR THE PREPARATION OF DRINKING WATER BY REVERSE OSMOSIS ONBOARD SHIPS [ULTRAFILTRATIE ALS VOORBEHANDELING VOOR DE BEREIDING VAN DRINKWATER DOOR OMGEKEERDE OSMOSE AAN BOORD VAN SCHEPEN]

I. DEVRIES and S. C. VANSWIETEN Dec. 1983 64 p refs

In DUTCH; ENGLISH summary

Contract A81/KM/148

(PML-1984-32; TDCK-79376) Avail: Issuing Activity

Reverse osmosis desalination of sea water was investigated in order to develop a low power, reliable, simple, compact and completely automated system for the preparation of drinking water onboard naval ships. Tubular, spiral wound and hollow fiber membrane configuration ultrafiltration systems were compared. Membrane surface area required to produce a constant flow as feed prior to the reverse osmosis process was studied. The three systems are suitable for pretreatment. The quality of the water guarantees an undisturbed functioning of the reverse osmosis process. Fouling of the reverse osmosis membranes by undissolved particles, including bacteria and viruses, does not occur. The tubular and spiral wound systems are the most suitable. Author (ESA)

**N85-10655#** Navy Clothing and Textile Research Unit, Natick, Mass. THE EXPERIMENTAL MOD 3 FIREFIGHTERS' ALUMINIZED CRASH-RESCUE, FIRE-PROXIMITY HOOD Final Report

H. P. WINER Jul. 1984 15 p

(AD-A144993; NCTRF-154) Avail: NTIS HC A02/MF A01 CSCL 06Q

The Navy Clothing and Textile Research Facility (NCTRF) has developed the experimental Mod III Firefighters' Aluminized Crash-Rescue Fire-Proximity Hood, which improves upon the standard firefighters' aluminized hood (MIL-H-29144). Reports from the firefighting community have indicated that the standard hood is not compatible with the current self-contained breathing apparatus. To allow for the self-contained breathing apparatus, a new aluminum frame with a greater front radius has been developed, and a liftup visor with an enlarged area for improved vision and voice communications has been incorporated in the experimental hood. This visor also reduces fogging of the face shield. Also, a bib is attached to the front to serve as a protective flap over the vacuum-deposited gold-coated facepiece when the hood is not being worn. NCTRF has conducted a service evaluation of the experimental Mod III hood. As a result of this evaluation, NCTRF recommends the adoption of the Mod III hood with a two-piece, adjustable chinstrap.

GRA
To assess physical aviator-cockpit reach capabilities, eight small subjects 146.9 to 162.5 cm in stature and eight tall subjects 162.3 to 194.5 cm in stature were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft. Subjects were dressed in the warm weather training uniform of US Army aviators and were requested to operate all primary controls and instructor-pilot designated critical switches, knobs, etc., with the shoulder harness in the unlocked position. Helmed head clearance also was evaluated. Among several candidate measures of upper- and lower-body reach capabilities, total arm reach (span), and crotch height, respectively, were found to be the most efficient discriminators between those who could and those who could not perform all critical operational reaches. Sitting height was employed to assess helmeted head clearance. Substantial variation was encountered in the reach-related demands for different aircraft. Minimum total arm-reach requirements throughout the fleet ranged from 147 to 168 cm; minimum crotch-height requirements ranged from 69 to 78 cm. Three aircraft could not accommodate a sitting height above 102 cm. Very large personnel experienced difficulty in achieving full lateral cyclic and stick movement in several aircraft.

**Decision Tree Rating Scales for Workload Estimation: Theme and Variations**


The Modified Cooper-Harper (MCH) scale which is a sensitive indicator of workload in several different types of aircrew tasks was examined. The study determined if variations of the scale might provide greater sensitivity and the reasons for the sensitivity of the scale. The MCH scale and five newly devised scales were examined in two different aircraft simulator experiments in which pilot loading was treated as an independent variable. It is indicated that while one of the new scales may be more sensitive in a given experiment, task dependency is a problem. The MCH scale exhibits consistent sensitivity and remains the scale recommended for general use.

**Anthropometric Cockpit Compatibility Assessment of US Army Aircraft for Large and Small Personnel Wearing a Cold Weather, Armored Vest, Chemical Defense Protective Clothing Configuration**

D. O. COTE and A. W. SCHOPPER Jul. 1984 55 p

This report on individuals wearing a warm weather uniform presents the results of an anthropometric cockpit compatibility evaluation conducted with individuals wearing a worst-case tactical clothing configuration; i.e., a combination of cold weather, armored vest, and chemical defense protective clothing. Subjects correspond to the upper 5th and lower 95th percentiles of the Army male population were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft, and requested to demonstrate critical operational reaches with the shoulder harness unlocked. A relatively wide range of upper- and lower-body reach requirements were encountered. With the exception of a very large requirement associated with the TH-55 helicopter, upper-body reach requirements, as measured by total arm reach (span), ranged from 147-173 cm. For crotch height, the measure of leg-reach capability found most efficient, the range was 69-78 cm. Four aircraft could not accommodate the individual with the tallest sitting height (102 cm).

**Anthropometric Cockpit Compatibility Assessment of Large and Small Personnel Wearing a Training, Warm-Weather Clothing of US Army Aircraft for Large and Small Personnel Wearing a Cold Weather, Armored Vest, Chemical Defense Protective Clothing Configuration**


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and as Ongoing Research and Development (R&D) as determined by the degree of completeness of the project. Additionally, the activities are presented in terms of the Laboratory’s major thrusts and sub thrusts: Diagrams highlighting the R&D thrusts (Maintenance and Combat Support, Training Design and Delivery, Manpower and Force Management, and Air Crew Training) and their sub thrusts are presented to provide the context for the descriptions of specific projects.

N85-11549#  Navy Personnel Research and Development Center, San Diego, Calif.

D. MEISTER Jul. 1984 362 p
(AD-A145704; NPrDC-TR-84-1) Avail: NTIS HC A16/MF A01

This guide is intended to serve as a source of basic data for display engineers on human capabilities and performance as related to the visual display characteristics of CRT and other displays. Its primary purpose is to acquaint visual display engineers with what is currently known about the relation between observer characteristics and various types of display applications. The literature dealing with operator performance in using electronic displays has been compiled to serve as a human performance data base and guide for the design of new Navy systems. GRA

N85-11550#  Research Inst. of National Defence, Umea (Sweden).

A85-10370#  PRESENCE OF A SUPERPARAMAGNETIC COMPONENT IN THE ORGUEIL METEORITE
T. J. WDOWIAK and D. G. AGRESTI (Alabama, University, Birmingham, AL) Nature (ISSN 0028-0836), vol. 311, Sept. 13, 1984, p. 140-142. Research supported by the University of Alabama. refs

The Orgueil Cl carbonaceous chondrite meteorite fall of May 14, 1864 is of particular interest because of the presence of an organic component which included amino acids. Using Moessbauer spectroscopy, it has been determined that the Orgueil meteorite contains an appreciable fraction of its iron in the superparamagnetic state. This result implies that the superparamagnetic iron component was formed during an aequous phase in the history of the parent body, and that the superparamagnetic component may have served as a catalyst for formation of the organic component.

Author (ESA)

N85-11551#  Linkoeping Univ. (Sweden). Dept. of Biomedical Engineering.

THE WATER VAPOR RESISTANCES OF SOME CLOTHING ASSEMBLIES USED BY FLYING PERSONNEL OF THE SWEDISH ARMED FORCES: A SERIES OF MODEL STUDIES
(FOA-C-59011-H1; ISSN-0347-7665) Avail: NTIS HC A03/MF A01

Water vapor resistance of clothing assemblies used by the flying personnel of the Swedish armed forces was determined using a dish filled with an evaporative solution above which the clothing was fixed. Measurements were performed in a hot, dry environment without forced convection and temperature gradients. Flying suits made from Kermel are more resistive to sweat transfer than those made from Ventile fabric. Eiser sweat absorption shirts and Intertherm sweat absorption shirts have the same sweat transfer properties. Eiser underwear and Intertherm underwear have better sweat transfer properties than cotton underwear. Water vapor transfer can be improved by applying air pressure gradient.

Author (ESA)

N85-11552#  Research Inst. of National Defence, Stockholm (Sweden).

TESTING OF THREE DIFFERENT FLIGHT SUITS IN FIRE ENVIRONMENT
C. SPAANGBERG May 1984 67 p refs
In SWEDISH; ENGLISH summary
Sponsored by Swedish Material Administration of Armed Forces
(FOA-C-59012-H1; ISSN-0347-7665) Avail: NTIS HC A04/MF A07

Flight suits manufactured from cotton, cotton/polyester, and polyamidamide were tested on a glassfiber reinforced plastic arm. The surface temperature of the arm was adjusted to 27/33 C by water circulation inside; the surface temperatures of the arm were measured by thermocouples. Results show that the protection assured by the suits depends on the type of fabric and the thermal insulation under the suits. Two of the suits shrank during the first seconds exposure, so that the isolating air layer mostly disappeared. The resistance to heat is much better with the isolated-type suit, the fabric of which has two stable, not very porous, heavy layers. The thermal damage to the dermis and epidermis was evaluated for each test.

Author (ESA)

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A85-12196*  California Univ., La Jolla.

THE SPARK DISCHARGE SYNTHESIS OF AMINO ACIDS FROM VARIOUS HYDROCARBONS
D. RING (Cetus Corp., Immune Div., Palo Alto; California, University, La Jolla, CA) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 7-15. refs
(Contract NAGW-20)

The spark discharge synthesis of amino acids using an atmosphere of CH4+N2+H2O+NH3 has been investigated with variable pNH3. The amino acids produced using higher hydrocarbons (ethane, ethylene, acetylene, propane, butane, and isobutane) instead of CH4 were also investigated. There was considerable range in the absolute yields of amino acids, but the yields relative to glycine (or alpha-amino-n-butyric acid) were more uniform. The relative yields of the C3 to C6 aliphatic alpha-amino acids are nearly the same (with a few exceptions) with all the hydrocarbons. The glycine yields are more variable. The precursors to the C3-C6 aliphatic amino acids seem to be produced in the same process, which is separate from the synthesis of glycine precursors. It may be possible to use these relative yields as a signature for a spark discharge synthesis provided corrections can be made for subsequent decomposition events (e.g. in the Murchison meteorite).

Author

Author
The 'energy-rich' thioester, N-acetyl-S-lactoylcysteine, is formed from low concentrations of glyceraldehyde and N-acetylcysteine under anaerobic conditions at ambient temperature in aqueous solutions of sodium phosphate (pH 7.0). Reactions with 2mM glyceraldehyde, 2mM N-acetylcysteine, and 500 mM sodium phosphate (pH 7.0) convert about 0.3 percent/day of the glyceraldehyde to lactoyl thioester. The formation of lactoyl thioester in similar reactions with 500 mM imidazole hydrochloride (pH 7.0) is supported by the thiol-dependence of lactate formation, which is 3-fold greater in the presence of thiol (0.11 percent/day) than in the absence of thiol (0.04 percent/day). The formation of lactoyl thioester is thought to proceed by the phosphate (or imidazole)-catalyzed dehydration of glyceraldehyde, which adds to the thiol to form a hemithioacetal that rearranges to the thioester. A limited amount of a second thioester, N-acetyl-S-glyceroyl-cysteine, is also formed at the beginning of these reactions. The significance of these reactions to the origin of life is discussed.

The hydrolysis of phenylalanyl- and N-acetylpheynylalanyl adenylate anhydrides (AcPhe-AMP) is studied experimentally using a new spectrophotometric method. The hydrolysis process was analyzed at low concentrations (0.0001 M), constant temperature of 25 C, constant buffer concentration (0.05 M), and as a function of pH. It is found that while Phe-AMP is susceptible to attack by OH(-), AcPhe-AMP is susceptible to acid decomposition as well. At a pH of 4 to 8, Phe-AMP hydrolyzes faster than AcPhe-AMP, but at pH less than four or greater than eight, the blocked form hydrolyzes faster. Both forms are attacked by H2O at the same rate. The rate laws for the various hydrolytic mechanisms and the activation energies for the hydrolysates at pH 7.1 are given in a table, and the possible relevance of the findings to the origin and evolution of the process of protein synthesis is discussed.

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### Absorption Method and System

**Absorptivity**

- In vivo dermal absorption method and system for laboratory animals

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### Absorptivity

**Absorptivity**

- In vivo dermal absorption method and system for laboratory animals

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**Accleration (Physics)**

- The Reports of Aeromedical Laboratory, volume 25, no. 1/2

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  The effects of isotonic training on +Gz tolerance

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**Accleration Stresses (Physiology)**

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- Tolerance of the human cervical spine to high acceleration - A modelling approach

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  The effects of isotonic training on +Gz tolerance

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  Effect of fluid and salt supplements to food allowance on endurance of head-to-pelvis accelerations following 7-day dry immersion and under ordinary motor activity conditions

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  Frequency and nature of electrocardiographic disturbances in dogs during single and repeated exposure to +G sub z accelerations

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- USSR report: Space Biology and Aerospace Medicine, volume 18, no. 4, July - August 1984

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AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
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(205) 297-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.—Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor—State Cap.
1700 West Washington Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
P.O. Box 184
Tucson, AZ 85721
(512) 471-2996

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Documents Department
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Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
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1357 Broadway
Denver, CO 80202
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Government Information Services
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Tallahassee, FL 32304
(850) 224-3550

UNIV. OF GEORGIA LIBRARIES
Government Documents Section
Athens, GA 30602
(404) 542-8451

UNIV. OF HAWAII LIBRARY
Government Documents Section
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(808) 944-6330

UNIV. OF IOWA LIBRARY
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Iowa City, IA 52242
(319) 335-3318

LOUISIANA STATE UNIVERSITY
Middleton Library
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV.
Government Documents Division
Ruston, LA 71272
(205) 257-3139

ILLINOIS STATE LIBRARY
Information Services Branch
Cenetcool Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

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Government Documents Division
Iowa City, IA 52242
(319) 335-3318

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

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Govt. Documents Dept.
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Government Documents Department
Baton Rouge, LA 70803
(504) 388-2570

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Government Documents Division
Orono, ME 04469
(207) 581-6160

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

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Government Docs. Dept.
Boston, MA 02117
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Sociology Department
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Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
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Lansing, MI 48909
(517) 373-6640

UNIVERSITY OF MINNESOTA
Government Publications Division
405 Wilson Library
Minneapolis, MN 55455
(612) 373-7813

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Documents Department
University, MS 38677
(601) 232-5857

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Mansfield Library
Missoula, MT 59812
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Zimmerman Library
Government Documents Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
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Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12220
(518) 474-5553

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At Chapel Hill
Wilson Library
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Reno, NV 89557

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Oklahoma City, OK 73105
(405) 521-2502

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Government Documents
Department
Stillwater, OK 74078
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Government Publications Division
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Portland, OR 97207
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STATE LIBRARY OF PENN.
Government Publications Section
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Harrisburg, PA 17105
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TEXAS STATE LIBRARY
Government Documents Section
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Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Documents Department
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Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderian Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Government Documents Department
Morganfield, WV 26505
(304) 293-3640

WISCONSIN STATE LIBRARY
Governments Docs. Section
Olympia, WA 98504
(206) 753-4027

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Government Documents Division
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Oklahoma City, OK 73105
(405) 521-2502

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Cheyenne, WY 82002
(307) 777-6344