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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



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In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on 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. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

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Typical Report Citation and Abstract

- ❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
- ❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 462)

APRIL 6, 1998

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LIFE SCIENCES (GENERAL)

19980017083 Yale Univ., New Haven, CT USA

Cultivation of Tomato Tissues Capable of Forming Flowers and Fruits in Vitro *Final Report*

Galston, Arthur W., Yale Univ., USA; Jan. 27, 1998; 22p; In English

Contract(s)/Grant(s): NCC2-726

Report No.(s): NASA/CR-1998-207062; NAS 1.26:207062; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The final phase of this research project was designed to develop a practical method for producing a steady supply of fresh cherry tomato fruits over a period of several months, for possible use as a fresh vegetable supplement to a standard diet of astronauts on extended missions. This effort was successful. We were able to excise immature flowers from Pixie tomato plants grown in a controlled condition room, implant them on artificial media under aseptic conditions, and get them to develop into edible fruits in a little over a month. The medium (Murashige-Skoog) was purchased from Sigma, supplemented with sugar plus a synthetic analog of the plant hormone cytokinin, and adjusted to pH 5.8. A temperature of at least 25 C and visible light helped to produce ripe red fruits within 7 weeks. To ensure a steady supply of such tomatoes, we found it possible to store the explanted flower buds in MS medium at 5 C for at least 6 weeks without significant loss of ability to develop into fruits. This means that many containers could be prepared before launch and put into a refrigerator; a convenient number could then be removed periodically to guarantee a succession of harvests during the life of an extended mission. Details are found in the attached reprints. Subsequent applications for funds for flight or continued research were denied, and the project was terminated.

Derived from text

Tomatoes; Cultivation; Vegetables; Fruits; Diets; Astronauts

19980017091 Department of Health and Human Services, National Toxicology Program, Research Triangle Park, NC USA

Toxicity Studies of Cyclohexanone Oxime Administered by Drinking Water to B6C3F1 Mice

Burka, L. T., Department of Health and Human Services, USA; Apr. 1996; 68p; In English

Report No.(s): PB96-175559; NIH/PUB-96-3934; NTP-TOXICITY-SER-50; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Cyclohexanone oxime is used primarily as a captive intermediate in the synthesis of caprolactam for the production of polycaprolactam (Nylon-6) fibers and plastics and also in a variety of industrial applications. Cyclohexanone oxime was selected for study because of the potential for human exposure and the interest in oximes as a chemical class. Toxicity studies of cyclohexanone oxime (approximately 99% pure) were carried out in male and female B6C3F1 mice; the compounds was administered in drinking water for 2 weeks or 13 weeks. The frequency of micronucleated normochromatic erythrocytes in the bone marrow and peripheral blood of mice from the 13-week study was also determined.

NTIS

Toxicity; Mice; Biological Effects; Cyclic Compounds; Erythrocytes; Potable Water; Carcinogens

19980017234 Joint Inst. for Nuclear Research, Lab. of Neutron Physics, Dubna, USSR

Element analysis of biological materials by the RBS and PIXE methods *Ehlementnyj analiz biologicheskikh obraztsov s pomoshch'yu yaderno-fizicheskikh metodik RBS i PIXE*

Podgorski, W., Agriculture Univ., Poland; Studzinski, T., Agriculture Univ., Poland; Majewski, T., Agriculture Univ., Poland; Kobzev, A.P., Joint Inst. for Nuclear Research, USSR; Maczka, D., Joint Inst. for Nuclear Research, USSR; Latuszynski, A., Marie Curie-Sklodowska Univ., Poland; 1996; 13p; In Russian

Report No.(s): JINR-R-19-96-309; DE97-621492; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The element analysis of the samples of cow milk and animal brain was performed by nuclear-physics methods. The contents of some minerals (P, Cl, K, Ca) and microelements (Mn, Fe, Co, Cu, Zn) in the brain of rats, dogs and cattle and in the milk of cows has been investigated. Such elements as As, Se, Br, Rb difficult to be detected by classic analytical methods, as well as environmental pollutants (Ti, V, Ni, Pb) were identified. Heavy metals were found in the samples of milk from industrial districts. Heavy metals (including Pb) were also found in the brain of animals living in the urban conditions.

DOE

Brain; Contaminants; Dogs; Metals; Milk

19980017305 Burnham Inst., La Jolla, CA USA

Training in Support of Research Project Entitled Genetic Regulation of the Bcl-2/Bax Cell Death Pathway Annual Report, 1 Jul. 1996 - 30 Jun. 1997

Xu, Qunli, Burnham Inst., USA; Jul. 1997; 26p; In English

Contract(s)/Grant(s): DAMD17-96-I-6210

Report No.(s): AD-A332479; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Bcl-2 family proteins function in an evolutionarily conserved pathway regulating programmed cell death. In an effort to delineate this cell death pathway, we undertook a novel functional screening approach. The pro-apoptotic Bax protein not only promotes apoptosis in mammals, but can also induce cell death when expressed in yeast. Based on this observation, we screened a human cDNA library for genes whose products protect *S. cerevisiae* against Bax-killing. Two human proteins, designated Bax Inhibitors - 1 and -2 (BI- 1 and BI-2), were identified during the screen that inhibit the death-inducing activity of Bax both in yeast and in mammalian cell line models. The deduced amino acid sequence suggests that BI- 1 is likely an integral membrane protein with six potential transmembrane helices, and this was biochemically by showing that BI-1 was predominantly located in the detergent-enriched phase during Triton X-1 14 phase separation. We found that BI- 1 is localized to intracellular membranes, similar to Bcl-2 and Bax. Moreover, BI-1 is able to interact physically with Bcl-2 but not Bax, as demonstrated both by in vivo cross-linking and by co-immunoprecipitation assays. Therefore BI- 1 is a novel apoptosis regulator which functions in the Bcl-2/Bax pathway for programmed cell death.

DTIC

Amino Acids; Inhibitors; Libraries; Mammals; Membranes; Proteins; Regulators; Yeast

19980017338 Department of Health and Human Services, National Toxicology Program, Research Triangle Park, NC USA

NTP Technical Report on Toxicity Studies of 1-Nitropyrene Administered by Inhalation to F344/N Rats

Chan, P. C., Department of Health and Human Services, USA; Apr. 1996; 148p; In English

Report No.(s): PB96-176342; NIH/PUB-96-3383; NTP-TOXICITY-SER-34; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

1-Nitropyrene is a by-product of combustion. It is the predominant nitrated polycyclic aromatic hydrocarbon emitted in diesel engine exhaust and has been found at concentrations of up to 57 pg/cubic m in the air over urban and suburban areas. 1-Nitropyrene was nominated for toxicity study because it is mutagenic, it is found in the environment, and it has potential for human exposure. Administration by inhalation was chosen because humans are exposed to 1-nitropyrene mainly by inhalation. Nose-only inhalation was chosen because whole-body inhalation exposure would require a large quantity of purified 1-nitropyrene that is expensive and difficult to procure.

NTIS

Pyrenes; Toxicity; Biological Effects; By-Products; Combustion

19980017358 Woods Hole Oceanographic Inst., MA USA

Characterization of Ferredoxin and Flavodoxin as Molecular Indicators of Iron Limitation in Marine Eukaryotic Phytoplankton

Erdner, Deana L., Massachusetts Inst. of Tech., USA; Sep. 1997; 178p; In English

Report No.(s): AD-A333365; MIT/WHOI97-26; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

Expression and regulation of the proteins ferredoxin and flavodoxin were investigated to assess their usefulness as biomarkers of iron limitation in marine phytoplankton. A phylogenetic survey of seventeen species found replacement of ferredoxin by flavodoxin to be a common response to iron stress. A minority of organisms examined never expressed flavodoxin, a condition associated with, but not characteristic of, neritic habitats. Flavodoxin induction responded specifically to iron limitation but not to nitrogen, phosphorous, silicate, zinc or light deficiency. Under conditions of iron stress, the relative cellular ferredoxin and flavo-

doxin content varied with iron-limited growth rate and not affected by growth on nitrate or ammonium as a sole nitrogen source. HPLC measurements of ferredoxin and flavodoxin were successfully used to monitor phytoplankton response to iron addition during the IronExII mesoscale enrichment experiment. A persistent flavodoxin signal observed in the absence of ferredoxin resynthesis suggests that Fe addition alleviated iron starvation but was insufficient to completely relieve physiological iron limitation. Results of a laboratory iron addition experiment investigating differences between changes in cellular ferredoxin/flavodoxin content and photosynthetic efficiency were combined with data from IronExII to construct a model that describes a complementary relationship between the two measures.

DTIC

Iron; Liquid Chromatography; Mesoscale Phenomena; Photosynthesis; Phytoplankton

19980017440 Environmental Protection Agency, Chesapeake Bay Program, Annapolis, MD USA

Chesapeake Bay Living Resources 1995-96: Living Resources Subcommittee Biennial Report

Feb. 1997; 24p; In English

Report No.(s): PB97-155410; EPA/903/R-97/005; CBP/TRS-165/97; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Many Living Resources Subcommittee projects matured during 1995 and 1996, with several stream restoration projects hitting the ground. Watershed groups in Pennsylvania, Maryland, and Virginia started planting trees and assessing natural resources. Throughout the watershed, the opening of 13 blockages that prevented migratory fish from miles of fish habitat were opened during 1995 and 1996. Wild weather dominated 1996. Huge floods in January and September poured debris, sediment, and nutrients into Chesapeake Bay. One positive effect of the flooding was low salinity, which kept oyster diseases in check.

NTIS

Chesapeake Bay (US); Habitats; Watersheds; Resources Management

19980017609 Texas Univ. Health Science Center, Dept. of Anesthesiology, Houston, TX USA

Cardiopulmonary Changes with Moderate Decompression in Rats

Robinson, R., Texas Univ. Health Science Center, USA; Little, T., Texas Univ. Health Science Center, USA; Doursout, M.-F., Texas Univ. Health Science Center, USA; Butler, B. D., Texas Univ. Health Science Center, USA; Chelly, J. E., Texas Univ. Health Science Center, USA; Feb. 1996, pp. 83-89; In English

Contract(s)/Grant(s): NCC9-20; NAG9-215

Report No.(s): NASA/CR-96-207113; NAS 1.26:207113; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

Sprague-Dawley rats were compressed to 616 kPa for 120 min then decompressed at 38 kPa/min to assess the cardiovascular and pulmonary responses to moderate decompression stress. In one series of experiments the rats were chronically instrumented with Doppler ultrasonic probes for simultaneous measurement of blood pressure, cardiac output, heart rate, left and right ventricular wall thickening fraction, and venous bubble detection. Data were collected at base-line, throughout the compression/decompression protocol, and for 120 min post decompression. In a second series of experiments the pulmonary responses to the decompression protocol were evaluated in non-instrumented rats. Analyses included blood gases, pleural and bronchoalveolar lavage (BAL) protein and hemoglobin concentration, pulmonary edema, BAL and lung tissue phospholipids, lung compliance, and cell counts. Venous bubbles were directly observed in 90% of the rats where immediate post-decompression autopsy was performed and in 37% using implanted Doppler monitors. Cardiac output, stroke volume, and right ventricular wall thickening fractions were significantly decreased post decompression, whereas systemic vascular resistance was increased suggesting a decrease in venous return. BAL Hb and total protein levels were increased 0 and 60 min post decompression, pleural and plasma levels were unchanged. BAL white blood cells and neutrophil percentages were increased 0 and 60 min post decompression and pulmonary edema was detected. Venous bubbles produced with moderate decompression profiles give detectable cardiovascular and pulmonary responses in the rat.

Author

Pulmonary Functions; Cardiovascular System; Pressure Reduction; Physiological Responses; Bubbles

19980017610 Old Dominion Univ., Dept. of Civil and Environmental Engineering, Norfolk, VA USA

Evaluation of the Effects of AFFF Inputs on the VIP Biological Nutrient Removal Process and Pass-Through Toxicity. Phase 1A, Volume 2, Acute Toxicity Test Results Final Report, Sep. 1996 - Sep. 1997

Erten-Unal, Mujde, Old Dominion Univ., USA; Schafran, Gary C., Old Dominion Univ., USA; Oct. 1997; 430p; In English

Contract(s)/Grant(s): N00014-96-I-G021

Report No.(s): AD-A332291; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

This report discusses the results of a bench scale study conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the Virginia Initiative Plant (VIP) biological nutrient removal process. A bench-scale study was conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the nitrification process of the Virginia Initiative Plant biological nutrient removal system. Under this testing, bench-scale reactors simulating the nitrification process were loaded at various AFFF concentrations and the influence on the process performance was evaluated. The purpose of this effort was to determine the level of AFFF that could be incorporated into the influent of a biological nutrient removal process without causing inhibitory effects. The results of the nitrification inhibition study showed that the AFFF concentrations tested in the range between 10 ppm to 60 ppm did not show any significant inhibition to biological nitrification. The effluent from each reactor did not exhibit any pass-through toxicity as well.

DTIC

Effluents; Toxicity; Waste Water

19980017611 Old Dominion Univ., Dept. of Civil and Environmental Engineering, Norfolk, VA USA

Evaluation of the Effects of AFFF Inputs on the VIP Biological Nutrient Removal Process and Pass-Through Toxicity, Volume 1 Final Report, Sep. 1996 - Sep. 1997

Erten-Unal, Mujde, Old Dominion Univ., USA; Schafran, Gary C., Old Dominion Univ., USA; Oct. 1997; 186p; In English
Contract(s)/Grant(s): N00014-96-I-G021

Report No.(s): AD-A332290; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report discusses the results of a bench scale study conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the Virginia Initiative Plant (VIP) biological nutrient removal process. A bench-scale study was conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the nitrification process of the Virginia Initiative Plant biological nutrient removal system. Under this testing, bench-scale reactors simulating the nitrification process were loaded at various AFFF concentrations and the influence on the process performance was evaluated. The purpose of this effort was to determine the level of AFFF that could be incorporated into the influent of a biological nutrient removal process without causing inhibitory effects. The results of the nitrification inhibition study showed that the AFFF concentrations tested in the range between 10 ppm to 60 ppm did not show any significant inhibition to biological nitrification. The effluent from each reactor did not exhibit any pass-through toxicity as well.

DTIC

Waste Water; Scale Models; Effluents

19980017669 Interstate Commission on the Potomac River Basin, Rockville, MD USA

Comprehensive List of Chesapeake Bay Basin Species, 1997

Feb. 1997; 100p; In English

Report No.(s): PB97-155170; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

A Comprehensive List of Chesapeake Bay Basin Species 1997 is an update of a 1992 document published by the Environmental Protection Agency Chesapeake Bay Program Office (CBP/TRS 70/92). It provides a list of aquatic and aquatic-associated organisms found in recent decades in the Chesapeake Bay Basin. The list was originally extracted from monitoring data collected by federal and state agencies and private institutions. An extensive search identified other available aquatic Chesapeake Bay species information. Species data were collected from the following agencies: Interstate Commission on the Potomac River Basin; Maryland Department of the Environment; and Virginia Institute of Marine Sciences; Species identified by these sources were then verified and merged with: preexisting EPA Chesapeake Bay species list. In addition, three documents were reviewed to identify and include water-associated biota such as waterfowl, raptors and wetlands vegetation.

NTIS

Chesapeake Bay (US); Environment Protection; Ecosystems; Marine Environments

19980017699 Department of Health and Human Services, National Toxicology Program,, Research Triangle Park, NC USA

NTP Technical Report on Toxicity Studies of t-Butyl Alcohol (CAS No. 75-65-0) Administered by Inhalation to F344/N Rats and B6C3F1 Mice

Mahler, J., Department of Health and Human Services, USA; Jul. 1997; 104p; In English

Report No.(s): PB98-108905; NTP-TOXICITY-SER-53; NIH/PUB-97-3942; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Toxicity studies of t-butyl alcohol were conducted by whole-body inhalation in groups of ten male and ten female F344/N rats and B6C3F1 mice at concentrations of 0, 135, 270, 540, 1,080, and 2,100 ppm for 6 hours per day, 5 days per week, for 13 weeks. There were no treatment-related gross findings in male or female rats or mice; no microscopic lesions occurred in female

rats or male or female mice that survived to the end of the study. In male rats, there was an exposure concentration-related increase in the severity of chronic nephropathy. Splenic lymphoid depletion was present in male mice that died during the studies; this lesion was presumed to be secondary to stress. t-Butyl alcohol produced no adverse effects on reproductive parameters in male or female rats or mice. The results of all tests of t-butyl alcohol for induction of genetic damage in vitro and in vivo were negative. In summary, inhalation exposure of rats and mice to t-butyl alcohol resulted in deaths following a single 7,000 ppm exposure and clinical findings of alcohol toxicity (hyper- and hypoactivity, ataxia) at concentrations of 900 ppm and greater in rats and 1,750 ppm and greater in mice. In 13-week studies at concentrations up to 2,100 ppm, only one death (that of a 2,100 ppm mouse) was attributed to chemical exposure. The most notable evidence of toxicity at the end of 13 weeks was limited to males and consisted of increased kidney weights, which correlated microscopically to increase severity of chronic nephropathy. Reproductive parameters in male and female rats and mice were unaffected after 13 weeks of exposure, and the results of all tests for genetic toxicity were negative.

NTIS

Alcohols; Toxicity; Rats; Genetics; Respiration

19980017782 Oregon State Univ., College of Oceanic and Atmospheric Sciences, Corvallis, OR USA

Accumulation of Dissolved DMSP by Marine Bacteria and its Degradation Via Bacterivory

Wolfe, Gordon V., Oregon State Univ., USA; Biological and Environmental Chemistry of DMSP and Related Sulfonium Compounds; 1996, pp. 277-291; In English

Contract(s)/Grant(s): NAGw-3737

Report No.(s): NASA/CR-96-207168; NAS 1.26:207168; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Several bacterial isolates enriched from seawater using complex media were able to accumulate dimethylsulfoniopropionate (DMSP) from media into cells over several hours without degrading it. Uptake only occurred in metabolically active cells, and was repressed in some strains by the presence of additional carbon sources. Accumulation was also more rapid in osmotically-stressed cells, suggesting DMSP is used as an osmotic solute. Uptake could be blocked by inhibitors of active transport systems (2,4-dinitrophenol, azide, arsenate) and of protein synthesis (chloramphenicol). Some structural analogs such as glycine betaine and S-methyl methionine also blocked DMSP uptake, suggesting that the availability of alternate organic osmolytes may influence DMSP uptake. Stresses such as freezing, heating, or osmotic down shock resulted in partial release of DMSP back to the medium. One strain which contained a DMSP-lyase was also able to accumulate DMSP, and DMS was only produced in the absence of alternate carbon sources. Bacteria containing DMSP were prepared as prey for bacterivorous ciliates and flagellates, to examine the fate of the DMSP during grazing. In all cases, predators metabolized the DMSP in bacteria. In some cases, DMS was produced, but it is not clear if this was due to the predators or to associated bacteria in the non-axenic grazer cultures. Bacterivores may influence DMSP cycling by either modulating populations of DMSP-metabolizing bacteria, or by metabolizing DMSP accumulated by bacterial prey.

Author

Bacteria; Sea Water; Arsenates; Methyl Compounds; Protein Synthesis; Accumulations

19980017917 Louisiana State Univ., Medical Center, Shreveport, LA USA

Effects of Serotonergic Compounds on Stress-Induced Behavior in Rats *Final Report, 1 Jul. 1994 - 30 Jun. 1997*

Dunn, Adrian J., Louisiana State Univ., USA; Swiergiel, Artur H., Louisiana State Univ., USA; Aug. 31, 1997; 6p; In English
Contract(s)/Grant(s): AF Proj. 3484; AF Proj. 2312

Report No.(s): AD-A332827; AFOSR-97-0721TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Because our earlier experiments with fenfluramine and serotonin antagonists did not provide encouraging results, we decided to study effects of endotoxin (lipopolysaccharide, LPS) and interleukin-1 (IL-1) which are known to reduce food intake, and which we have shown also alter cerebral serotonergic and noradrenergic metabolism. Thus it is possible that there is a relationship between the activation of these cerebral neurotransmitter systems and the hypophagia. Specifically, it can be hypothesized that LPS- and IL-1-induced hypophagia are related to the increased noradrenergic and serotonergic activity. This hypothesis has been tested using a variety of neurotransmitter receptor antagonists for their ability to antagonize LPS- or IL-1-induced hypophagia in mice. Several behavioral experiments were completed.

DTIC

Cerebrum; Immune Systems; Metabolism; Rats; Serotonin; Mice

19980017930 Wisconsin Univ., Madison, WI USA

Biophysical Studies of the Type 1 Repeats of Human Thrombospondin-1 to Characterize the Structural Basis of Its Angiostatic Effect *Annual Report, 1 Aug. 1996 - 31 Jul. 1997*

Huwiler, Kristin G., Wisconsin Univ., USA; Mosher, Deane F., Wisconsin Univ., USA; Aug. 1997; 26p; In English

Contract(s)/Grant(s): DAMD17-96-I-6151

Report No.(s): AD-A333301; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Thrombospondin-1 (TSP1) is a modular trimeric protein with several documented functions, including its role as an angiogenic inhibitor. TSP1, TSP1 fragments, and certain TSP1 conserved peptide sequences have been shown to exert an endothelial-specific inhibition of growth and migration. Peptides derived from conserved sequences within the type 1 repeats of TSP1 have been shown to block neo-vascularization in vivo, inhibit DNA synthesis, and migration of cultured endothelial cells in vitro. Our laboratory has shown that recombinantly expressed human TSP1 (hTSP1) type 1 repeats inhibit migration of bFGF stimulated bovine adrenal microvascular endothelial cells. This study seeks to define the structural basis for the angiostatic effect of the hTSP1 type 1 repeats. I will employ biophysical methods in a comparative study of TSP 1 type 1 repeats and active peptides based on type 1 sequences. I have successfully generated recombinant baculoviruses that express the three type 1 repeats in tandem (P123) and the third type 1 repeat (P3) as histidine-tagged fusion proteins. A purification scheme for the recombinant proteins including removal of the histidine-tag has been established. to date, N-terminal sequencing, carbohydrate analysis, and circular dichroism have been performed.

DTIC

Biophysics; Deoxyribonucleic Acid; Physical Work; Adrenal Gland

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19980016908 Johns Hopkins Univ., School of Hygiene and Public Health, Baltimore, MD USA

Traumatic Brain Injury in the US Army: Behavioral Sequelae and Medical Disability

Ommaya, A. K., Johns Hopkins Univ., USA; 1996; 185p; In English; Portions of this document are not fully legible

Report No.(s): PB96-182548; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This study examined the behavioral and medical consequences of hospital admissions during fiscal years 1992 and 1993 for traumatic brain injury (TBI n = 1,617), orthopedic/internal injury (n = 4,626), and a random sample of the active duty Army population (n = 9,997). Adverse action (disciplinary action recorded in a soldier's personnel file), discharge from military service for behavioral criteria, criminal conviction, and medical discharge were compared in these groups. of the population of head injured individuals 21% were cited with an adverse action post injury. Additionally, 11% were discharged for behavioral criteria or criminal conviction, 9% received a medical discharge for their injury, and 1% were discharged for alcohol or drug abuse. of the orthopedic population, 13% were cited with an adverse action post injury. Additionally, 6% were discharged for behavioral criteria or criminal conviction, 11% received a medical discharge for their injury, and 1% were discharged for alcohol or drug abuse. of the random sample of active duty Army personnel, 4% were discharged for behavioral criteria or criminal conviction, 1% received a medical discharge for their injury, and 0.5% were discharged for alcohol or drug abuse. Groups who received their injuries as a result of fights had higher percentages of individuals with post injury adverse action, behavioral and criminal discharge, and lower percentages with medical discharge when compared to other groups. Utilizing Cox proportional hazards models to adjust for confounding factors, head injury increased risk for behavioral separation by 4 times and increased the risk of criminal conviction 5 times compared to the normal group.

NTIS

Brain; Brain Damage; Head (Anatomy)

19980016956 Federal Communications Commission, Office of Engineering and Technology, Washington, DC USA

Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Additional Information for Amateur Radio Stations. Supplement B. Edition 97-01

Ulcek, J. L., Federal Communications Commission, USA; Cleveland, R. F., Federal Communications Commission, USA; Nov. 1997; 68p; In English

Report No.(s): PB98-114218; OET/BULL-65-SUP-B; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The supplement is designed to be used in connection with the FCC's OET Bulletin 65, Version 97-01. The information in the supplement provides additional detailed information that can be used for evaluating compliance of amateur radio stations with

FCC guidelines for exposure to radiofrequency electromagnetic fields. However, users of the supplement should also consult Bulletin 65 for complete information on FCC policies, guidelines and compliance-related issues.

NTIS

Electromagnetic Fields; Electromagnetism; Quantum Electrodynamics

19980016993 National Heart, Lung and Blood Inst., Bethesda, MD USA

National Cholesterol Education Program: Recommendations on Lipoprotein Measurement. From the Working Group on Lipoprotein Measurement

Sep. 1995; 89p; In English

Report No.(s): PB96-130661; NIH/PUB-95-3044; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Elevation of low density lipoprotein (LDL)-cholesterol constitutes a major risk factor for the development of coronary heart disease (CHD). In humans, LDL carries most of the circulating cholesterol concentration provides a useful surrogate indicator of LDL-cholesterol concentration. It is necessary in the diagnosis and treatment of hyperlipidemia, however, to assess the distribution of cholesterol amount the major plasma lipoproteins, particularly LDL and high density lipoproteins (HDL). The working group's recommendation for LDL-cholesterol measurement are summarized in this paper along with some of the issues that the group considered in developing the recommendations.

NTIS

Cholesterol; Circulation; Heart Diseases; Lipoproteins

19980017248 Shadyside Medical Center, Pittsburgh, PA USA

Second International Workshop on Robotics and Computer Assisted Medical Interventions Final Report, 15 Apr. 1996 - 14 Apr. 1997

Oct. 1997; 146p; In English; 2nd; International Workshop on Robotics and Computer Assisted Medical Interventions, 23-26 Jun. 1996, Bristol, UK

Contract(s)/Grant(s): DAMD17-96-I-6057

Report No.(s): AD-A331064; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Robotics and Computer Assisted Medical Interventions (RCAMI) has emerged as a rapidly evolving area of research and development with great potential for improving clinical out-comes while also reducing patient morbidity and the cost of health care. The first generation of computer-assisted systems are being utilized in operating rooms and hospitals throughout the world. Advancing RCAMI technology to the next levels of development and utilization requires collaboration among the disciplines of engineering, science and medicine. The RCAMI workshop brought together clinicians, engineers, scientists, and industrial representatives. Through intensive discussions, the participants defined current status and clinical applications of these technologies, and explored future directions and requirements. We have divided the RCAMI field into four sub-areas: 1. Image Guided Therapy - the use of images obtained either during or prior to treatment, coupled with the use of computers, sensors, graphics, or other technologies to assist or guide the administration of treatment. For the purpose of this workshop, this group did not consider active or semi-active robotic systems, although many robotic systems employ image guidance to administer treatment. 2. Robotics - the intra-operative use of active or semi-active robotic/manipulation systems to significantly enhance the ability of humans to perform interventional procedures. 3. Surgical Simulators - the use of medical imaging, computer graphics, biomechanical analysis, and virtual environments, to simulate surgery for medical education, scientific analysis and pre-treatment planning. 4. Teleintervention - the application of information-based technologies to deliver procedural health care through an electronic interface. Indirect patient contact is implicit; however, the distance separating patient and physician may be insignificant

DTIC

Biodynamics; Computer Graphics; Computer Techniques; Computers; Costs; Education; Engineers; Imaging Techniques; Robotics; Rooms; Simulators

19980017274 Civil Aeromedical Inst., Oklahoma City, OK USA

Index to FAA Office of Aviation Medicine Reports: 1961 through 1997 Final Report

Collins, William E., Civil Aeromedical Inst., USA; Wayda, Michael E., Civil Aeromedical Inst., USA; Jan. 1998; 84p; In English Report No.(s): DOT/FAA/AM-98/1; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

An index to Federal Aviation Administration Office of Aviation Medicine Reports (1964-1997) and Civil Aeromedical Institute Reports is presented for those engaged in aviation medicine and related activities. The index lists all FAA aviation medicine reports published from 1961 through 1997: chronologically (pp. 1-43), alphabetically by author (pp. 45-52), and alphabetically

by subject (pp. 53-75). A foreword illustrates historical aspects of the Civil Aeromedical Institute's 35 years of service, describes the index's sections, and explains how to obtain copies of published Office of Aviation Medicine technical reports.

Author

Aerospace Medicine; Indexes (Documentation)

19980017357 Illinois Univ., Urbana, IL USA

Development of Efficient Dynamic Magnetic Resonance Imaging Methods with Application to Breast Cancer Detection and Diagnosis Final Report

Hanson, Jill M., Illinois Univ., USA; Lauterbur, Paul, Illinois Univ., USA; Aug. 1997; 48p; In English

Contract(s)/Grant(s): DAMD17-94-J-4126

Report No.(s): AD-A333252; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of this predoctoral fellowship research project is to improve the temporal and spatial resolutions in dynamic contrast-enhanced magnetic resonance imaging of the breast. Specifically, we investigated the use of non-Fourier encoding for collecting the reduced encoding dynamic data sets. The conclusion from our study was that the current wavelet and SVD encoding methods do not achieve the desired goal of exploiting the desirable truncation properties of these basis functions and, at times, can introduce dangerous artifacts. For Fourier-encoded data, the Reduced-encoding Imaging by Generalized-series Reconstruction (RIGR) method was shown to be a better way to extrapolate the unmeasured dynamic data using a priori constraints than Fourier-keyhole. Next, we further optimized the basis functions of the generalized-series (GS) model used by the RIGR algorithm. The Two-reference RIGR (TRIGR) method resulted from suppressing background information in the GS basis functions, enabling them to better represent the regions of dynamic change. Explicit edge constraints derived from the reference image were then used with contrast information from the dynamic data to inject dynamic information into the GS basis functions. Finally, the problem of motion in dynamic imaging was addressed using a similarity norm to accurately detect the motion in spite of contrast changes and the low-resolution nature of the dynamic data.

DTIC

Magnetic Resonance; Imaging Techniques; Cancer; Temporal Resolution; Spatial Resolution

19980017373 Air Command and Staff Coll., Maxwell AFB, AL USA

Differences in Mechanism Between Syncope Resulting from Rapid Onset Acceleration and Orthostatic Stress

Self, David A., Air Command and Staff Coll., USA; White, Curtis D., Air Command and Staff Coll., USA; Shaffstall, Robert M., Air Command and Staff Coll., USA; Mtinangi, Benjamin L., Air Command and Staff Coll., USA; Croft, Jennifer S., Air Command and Staff Coll., USA; Apr. 1996; 42p; In English

Report No.(s): AD-A333371; ACSC/DR/224/96-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Orthostatically-induced syncope is accompanied by venous pooling and vasodilatation. Loss of consciousness during head-to-foot acceleration (G-LOC) in aviators may be caused by a different mechanism, as venous pooling should be prevented through the use of an anti-G suit. This research was conducted to test the hypothesis that in individuals wearing a well-fitted anti-G garment, there are no important changes in volume of dependent regions during loss of consciousness resulting from rapid onset acceleration stress. Furthermore, this work compares venous pooling patterns in G-LOC subjects to patterns seen during syncope in volunteers and patients subjected to orthostatic stress. The tilt/LBNP tests were conducted to establish what level of venous pooling was required to induce syncope in the absence of a hydrostatic component (other than 1 G) and to confirm that our equipment was sensitive enough to detect volume changes large enough to cause syncope.

DTIC

Research and Development; Lower Body Negative Pressure; Hypotheses; Hydrostatics

19980017415 Search for Extraterrestrial Intelligence Inst., Mountain View, CA USA

Advanced Signal Processing Methods Applied to Digital Mammography Final Report, 1 Aug. 1994 - 31 Oct. 1997

Stauduhar, Richard P., Search for Extraterrestrial Intelligence Inst., USA; 1997; 42p; In English

Contract(s)/Grant(s): NCC2-881

Report No.(s): NASA/CR-97-206756; NAS 1.26:206756; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The work reported here is on the extension of the earlier proposal of the same title, August 1994-June 1996. The report for that work is also being submitted. The work reported there forms the foundation for this work from January 1997 to September 1997. After the earlier work was completed there were a few items that needed to be completed prior to submission of a new and more comprehensive proposal for further research. Those tasks have been completed and two new proposals have been submitted, one to NASA, and one to Health & Human Services WS). The main purpose of this extension was to refine some of the techniques that lead to automatic large scale evaluation of full mammograms. Progress on each of the proposed tasks follows. Task 1: A multi-

resolution segmentation of background from breast has been developed and tested. The method is based on the different noise characteristics of the two different fields. The breast field has more power in the lower octaves and the off-breast field behaves similar to a wideband process, where more power is in the high frequency octaves. After the two fields are separated by lowpass filtering, a region labeling routine is used to find the largest contiguous region, the breast. Task 2: A wavelet expansion that can decompose the image without zero padding has been developed. The method preserves all properties of the power-of-two wavelet transform and does not add appreciably to computation time or storage. This work is essential for analysis of the full mammogram, as opposed to selecting sections from the full mammogram. Task 3: A clustering method has been developed based on a simple counting mechanism. No ROC analysis has been performed (and was not proposed), so we cannot finally evaluate this work without further support. Task 4: Further testing of the filter reveals that different wavelet bases do yield slightly different qualitative results. We cannot provide quantitative conclusions about this for all possible bases without further support. Task 5: Better modeling does indeed make an improvement in the detection output. After the proposal ended, we came up with some new theoretical explanations that helps in understanding when the D4 filter should be better. This work is currently in the review process. Task 6: N/A. This no longer applies in view of Tasks 4-5. Task 7: Comprehensive plans for further work have been completed. These plans are the subject of two proposals, one to NASA and one to HHS. These proposals represent plans for a complete evaluation of the methods for identifying normal mammograms, augmented with significant further theoretical work.

Derived from text

Mammary Glands; Signal Processing; Image Resolution; Medical Services; High Frequencies; Wavelet Analysis

19980017432 Battelle Pacific Northwest Labs., Richland, WA USA

Real-Time 3D Ultrasound for Physiological Monitoring Annual Report, 15 Sep. 1996 - 14 Sep. 1997

Littlefield, Richard J., Battelle Pacific Northwest Labs., USA; Sep. 14, 1997; 66p; In English

Contract(s)/Grant(s): DAMD17-94-C-4127

Report No.(s): AD-A332369; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report documents the third year of a 4 year project to develop field prototype 3-D ultrasonic imaging system. During the reporting period, the major result was development of a third generation sequential B scan 3-D ultrasound telemedicine system prototype called MUSTPAC-2 (Medical Ultrasound, Three dimensional and Portable, with Advanced Communications). MUSTPAC-2 is a successor to the MUSTPAC-1, an award winning system that was successfully field tested in Germany and Bosnia in 1996. MUSTPAC-2 retains the operating principles of MUSTPAC-1 but is being designed to be manufacturable and FDA approved as well as having improved size, weight, usability, and robustness. As of this writing development of MUSTPAC-2 is approximately 50 percent complete. A working prototype is available.

DTIC

Imaging Techniques; Real Time Operation; Robustness (Mathematics); Ultrasonics

19980017502 Iowa Univ., Coll. of Medicine, Iowa City, IA USA

Is Bronchial Hyperreactivity Protective in Grain Dust Induced Airway Inflammation?

Jagiello, P. J., Iowa Univ., USA; Watt, J. L., Iowa Univ., USA; Quinn, T. J., Iowa Univ., USA; Schwartz, D. A., Iowa Univ., USA; 1997; 28p; In English

Report No.(s): PB97-207146; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Exposure studies were performed on five subjects with bronchial hyperreactivity (BHR) in an effort to better understand the relative importance of BHR in the physiologic and inflammatory responses of the lung following acute inhalation challenge to corn dust extract (CDE). The responses of these five subjects were compared to those from five subjects with normal airway reactivity (NAR). In the first hour following challenge, subjects with BHR complained more frequently of chest tightness and dyspnea. They also developed a significantly greater percent decline in forced expiratory volume in 1 second (FEV1) at time points 10, 20, and 30 minutes following exposure to CDE. This exaggerated decline in FEV1 did improve over time, and there were not significant differences in the percent decline at 1, 2, 3, 4, and 24 hours post exposure. In both subject groups, there were increases in bronchoalveolar lavage total cells, neutrophils, tumor necrosis factor alpha, interleukin-6, and interleukin-8 by 4 hours following inhalation of CDE but these were similar between the two groups. The authors conclude that, while the subjects with BHR develop an exaggerated initial decline in FEV1 following CDE exposure, the physiologic and inflammatory response to CDE is similar in subjects with and without BHR.

NTIS

Bronchi; Physiological Responses; Physiological Tests; Dust

19980017531 NASA Johnson Space Center, Houston, TX USA

Exercise Countermeasures Demonstration Project During the Lunar-Mars Life Support Test Project Phase 2A

Lee, Stuart M. C., Krug Life Sciences, Inc., USA; Guilliams, Mark E., Krug Life Sciences, Inc., USA; Moore, Alan D., Jr., Krug Life Sciences, Inc., USA; Williams, W. Jon, Krug Life Sciences, Inc., USA; Greenisen, M. C., NASA Johnson Space Center, USA; Fortney, S. M., NASA Johnson Space Center, USA; Jan. 1998; 70p; In English

Report No.(s): NASA/TP-1998-206537; NAS 1.60:206537; S-836; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This demonstration project assessed the crew members' compliance to a portion of the exercise countermeasures planned for use onboard the International Space Station (ISS) and the outcomes of their performing these countermeasures. Although these countermeasures have been used separately in other projects and investigations, this was the first time they'd been used together for an extended period (60 days) in an investigation of this nature. Crew members exercised every day for six days, alternating every other day between aerobic and resistive exercise, and rested on the seventh day. On the aerobic exercise days, subjects exercised on an electronically braked cycle ergometer using a protocol that has been previously shown to maintain aerobic capacity in subjects exposed to a space flight analogue. On the resistive exercise days, crew members performed five major multijoint resistive exercises in a concentric mode, targeting those muscle groups and bones we believe are most severely affected by space flight. The subjects favorably tolerated both exercise protocols, with a 98% compliance to aerobic exercise prescription and a 91% adherence to the resistive exercise protocol. After 60 days, the crew members improved their peak aerobic capacity by an average 7%, and strength gains were noted in all subjects. These results suggest that these exercise protocols can be performed during ISS, lunar, and Mars missions, although we anticipate more frequent bouts with both protocols for long-duration spaceflight. Future projects should investigate the impact of increased exercise duration and frequency on subject compliance, and the efficacy of such exercise prescriptions.

Author

Physical Exercise; Life Support Systems; Crews; International Space Station; Countermeasures

19980017591 Washington Univ., Dept. of Environmental Health, Seattle, WA USA

Silica, Silicosis, and Lung Cancer in Diatomite Workers Final Report

Checkoway, H., Washington Univ., USA; Heyer, N. J., Washington Univ., USA; Seixas, N. S., Washington Univ., USA; Welp, E. A. E., Washington Univ., USA; Demers, P. A., British Columbia Univ., Canada; Nov. 1996; 53p; In English

Report No.(s): PB97-207120; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The project served to update a cohort mortality study of workers exposed to crystalline silica (14808607), primarily as cristobalite (14464461). Exposure occurred during the mining and processing of diatomaceous-earth in two facilities located in California. There were 2,961 workers in the cohort who had at least 12 months of cumulative service at either facility. This update extended an earlier study by 7 years. Mortality was followed up for 1942 through 1994. Chest radiographs were obtained for 2,520 workers. As expected, radiographically determined silicosis was strongly related to cumulative exposure to crystalline silica. Compared to national rates, mortality rates from both nonmalignant respiratory disease and lung cancer were elevated among these workers. A strong dose response association was noted for cumulative exposure to crystalline silica and mortality from nonmalignant respiratory diseases. Lung cancer mortality was also associated with cumulative exposure to crystalline silica, but the association was not as strong as that from nonmalignant respiratory disease. Confounding by either smoking or by occupational asbestos (1332214) exposure was not likely to account for the observed exposure/response relations with nonmalignant respiratory disease and lung cancer mortality.

NTIS

Lungs; Cancer; Dust; Silicon Dioxide

19980017592 Iowa Univ., Coll. of Medicine, Iowa City, IA USA

Grain Dust Induced Lung Inflammation Is Reduced by Rhodobacter sphaeroides Diphosphoryl Lipid A

Jagiello, P. J., Iowa Univ., USA; Quinn, T. J., Iowa Univ., USA; Qureshi, N., Iowa Univ., USA; Schwartz, D. A., Iowa Univ., USA; 1996; 28p; In English

Report No.(s): PB97-207138; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The efficacy of pentaacylated diphosphoryl-lipid-A derived from the lipopolysaccharide (LPS) of Rhodobacter-sphaeroides (RsDPLA) was examined as a competitive inhibitor of grain dust induced airway inflammation. THP-1 cells were incubated with RsDPLA, LPS, or cotton dust extract (CDE). Incubation with LPS or CDE resulted in TNF-alpha release at 0.02 microgram/milliliter. Pretreatment of THP-1 cells with varying concentrations of RsDPLA prior to incubation with LPS or CDE resulted in a dose dependent reduction in the LPS or CDE induced tumor necrosis factor alpha (TNF-alpha) release. The unique LPS inhibitory property of RsDPLA was used to determine the inflammatory response to inhaled CDE in mice in the presence of RsDPLA. No signifi-

cant inflammatory response was caused by 10 micrograms of RsDPLA intratracheally in comparison to intratracheal saline. Pretreatment with RsDPLA intratracheally prior to exposure to CDE or LPS resulted in significant reductions in the lung lavage concentrations of total cells, neutrophils, TNF-alpha, and interleukin-6 compared to mice pretreated with sterile saline. The authors conclude the LPS inhibitory effect of RsDPLA is confirmed.

NTIS

Dust; Lungs; Lipids

19980017618 Texas Univ. Health Science Center, Dept. of Anesthesiology, Houston, TX USA

Cardiovascular Deconditioning and Venous Air Embolism in Simulated Microgravity in the Rat

Robinson, R. R., Texas Univ. Health Science Center, USA; Doursout, M.-F., Texas Univ. Health Science Center, USA; Chelly, J. E., Texas Univ. Health Science Center, USA; Powell, M. R., Space Biomedical Research Inst., USA; Little, T. M., Texas Univ. Health Science Center, USA; Butler, B. D., Texas Univ. Health Science Center, USA; Aviation, Space and Environmental Medicine; Sep. 1996; Volume 67, No. 9, pp. 835-840; In English

Contract(s)/Grant(s): NCC9-20; NAG9-215

Report No.(s): NASA/CR-96-207112; NAS 1.26:207112; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Astronauts conducting extravehicular activities undergo decompression to a lower ambient pressure, potentially resulting in gas bubble formation within the tissues and venous circulation. Additionally, exposure to microgravity produces fluid shifts within the body leading to cardiovascular deconditioning. A lower incidence of decompression illness in actual spaceflight compared with that in ground-based altitude chamber flights suggests that there is a possible interaction between microgravity exposure and decompression illness. The purpose of this study was to evaluate the cardiovascular and pulmonary effects of simulated hypobaric decompression stress using a tail suspension (head-down tilt) model of microgravity to produce the fluid shifts associated with weightlessness in conscious, chronically instrumented rats. Venous bubble formation resulting from altitude decompression illness was simulated by a 3-h intravenous air infusion. Cardiovascular deconditioning was simulated by 96 h of head-down tilt. Heart rate, mean arterial blood pressure, central venous pressure, left ventricular wall thickening and cardiac output were continuously recorded. Lung studies were performed to evaluate edema formation and compliance measurement. Blood and pleural fluid were examined for changes in white cell counts and protein concentration. Our data demonstrated that in tail-suspended rats subjected to venous air infusions, there was a reduction in pulmonary edema formation and less of a decrease in cardiac output than occurred following venous air infusion alone. Mean arterial blood pressure and myocardial wall thickening fractions were unchanged with either tail-suspension or venous air infusion. Heart rate decreased in both conditions while systemic vascular resistance increased. These differences may be due in part to a change or redistribution of pulmonary blood flow or to a diminished cellular response to the microvascular insult of the venous air embolization.

Author

Cardiovascular System; Deconditioning; Embolisms; Microgravity; Rats; Extravehicular Activity; Heart Rate; Decompression Sickness

19980017727 Gezondheidsraad, Hague, Netherlands

1- and 2-Propanol: Health Based Recommended Occupational Exposure Limit. Report of the Dutch Expert Committee on Occupational Standards

Dec. 15, 1994; 112p; In English

Report No.(s): PB96-168497; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

Upon request of the Secretary of State of Social Affairs and Employment the Health Council of the Netherlands recommends health-based occupational exposure limits for the concentration of toxic substances in the air of the workplace. These recommendations are made by the Dutch Expert Committee on Occupational the Standards, a Committee of the Health Council. It constitutes the first step in a three-stage procedure that leads to legally binding limit values. In the present report the Committee discusses the effects of exposure to 1-propanol and 2-propanol and recommends a health based occupational exposure limit for 2-propanol. The Committee's conclusions are based on scientific publications from prior to 1993.

NTIS

Exposure; Standards; Toxicity; Propane

19980017755 Naval Health Research Center, San Diego, CA USA

Epidemiology of Illness, Injury, and Attrition Among Select U.S. Military Female Populations Final Report, 15 Nov. 1994 - 31 Jan. 1996

Shaffer, Richard A., Naval Health Research Center, USA; Mar. 01, 1996; 32p; In English

Contract(s)/Grant(s): MIPR-95MM5521

Report No.(s): AD-A327395; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Evidence suggests that female military populations are at greater risk than their male counterparts for certain training and combat-related illnesses and injuries. Precise etiologies, risk factors, and impact of disease and injury in military women are not available. The objective of this prospective, multi-site, epidemiologic study is to define the patterns of illness and injury in military women. Musculoskeletal injuries have been emphasized due to their high cost in terms of morbidity, lost training time, and attrition. A computer-based outpatient tracking system for on-site, prospective data collection, originally designed for studying male trainees, was developed. This system was modified to include medical diagnoses pertinent to female personnel, and it has been implemented at (1) OCS, Quantico (USMC female officers); (2) MCRD, Parris Island (USMC enlisted women); and (3) RTC, Great Lakes (USN enlisted women). At NCRD, - Parris Island, only musculoskeletal injuries were recorded. Over 90% of female Navy recruits and Marine Corps officer candidates reported to medical at least once. Forty-nine percent of all female recruits reported at least one musculoskeletal injury during training. Incidence rates for specific diseases and injury diagnoses were presented by type of military training. Databases will be used to address morbidity and attrition issues and to target areas for future preventive interventions.

DTIC

Combat; Computer Techniques; Epidemiology; Etiology; Females; Musculoskeletal System

19980017912 Army Research Inst. of Environmental Medicine, Natick, MA USA

Multiple Event Analysis of Injuries Using Adaptations to the Cox Proportional Hazards Model

Schneider, Gary A., Army Research Inst. of Environmental Medicine, USA; Sep. 1997; 74p; In English

Report No.(s): AD-A332905; USARIEM-TN98-1; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Understanding the epidemiology of injuries is of great importance to the USA Military. However, there is presently limited information regarding statistical methodology, as it pertains to a setting where an individual can experience multiple injuries. This thesis explores the use of three statistical models, each with distinctive underlying assumptions, that are commonly used in recurrent failure time settings. Each was applied to the same data set of USA Army Airborne soldiers (n=1214). The outcome of interest was lower extremity or low back injury, and only the first and second injury events were examined. The methods employed were two Cox Proportional Hazards Models, each representing a separate injury event; the Andersen-Gill (AG) Multiplicative Hazards Model, which employs a counting process formulation; and the Prentice, Williams and Petersen (PWP) Model, where the multiple events are modelled via stratification. The final results for the Cox Model to first injury, and the first strata of the PWP Model are equivalent. The final AG Model, yielded coinciding covariates to the first injury event in the other models, with minimal differences between the parameter estimates. Similarly, the final Cox Model for the second injury event and the second strata of the PWP Model are equivalent; however, they produce different risk factors than the Cox Model for first event and the first strata of the PWP Model. The comparison of the different methodologies demonstrate that the PWP Model is best suited for the multiple injury setting. The facts that both the baseline hazard and the parameter estimates alter by event, and that it allows for easy comparison between strata (injury events), justifies this claim.

DTIC

Back Injuries; Epidemiology; Hazards; Injuries; Risk

19980017924 Army Aeromedical Research Lab., Fort Rucker, AL USA

Predicting the Ability to Maintain Alertness During Sleep Deprivation: The Accuracy of Subjective Evaluations

Caldwell John A., Jr., Army Aeromedical Research Lab., USA; Ruyak, Peggy S., Army Aeromedical Research Lab., USA; Nov. 1997; 21p; In English

Contract(s)/Grant(s): Proj. 3M162787A789

Report No.(s): AD-A332855; USAARL-98-05; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To determine the extent of agreement between subjective measures of mood/sleepiness and an objective electroencephalographic (EEG) based measure of sleepiness/alertness, 18 subjects were administered the Profile of Mood States (POMS), a Visual Analog Scale (VAS), and the Repeated Test of Sustained Wakefulness (RTSW) throughout 38-hour periods of continuous wakefulness. Multivariate analysis of variance (MANOVA) indicated that all of the measures, with the exception of VAS anxiety, were sensitive to the effects of sleep loss. Multiple regression analysis showed that 34% of the overall variance in RTSW scores could be accounted for by the linear combination of the subjective self report scores, although when the data were grouped according to whether subjects were totally sleep deprived or whether they were permitted a 2-hour nap, the percentages ranged from 53 to 24 percent. A stepwise regression indicated that VAS sleepiness was the best predictor of RTSW and POMS fatigue was the next best, followed by VAS alertness. Bivariate correlations showed that the 3 best predictors (sleepiness, fatigue, and alertness) correlated -0.49, -0.47, and 0.36 with RTSW scores overall; however, bivariate correlations conducted within each cell of the design generally were not significant due to low statistical power and the relatively weak relationship between subjective measures and

RTSW sleep latency. A stepwise discriminant analysis conducted on the variables indicated that 58 percent of the time subjects were correctly classified into groups of low, medium, and high alertness. The results of this study indicate that an objective measure of sleepiness/alertness which emphasizes the maintenance of wakefulness (the RTSW) is not more strongly related to self reports of sleepiness than tests which emphasize the ability to fall asleep, such as the Multiple Sleep Latency Test (MSLT).

DTIC

Alertness; Analysis of Variance; Anxiety; Sleep; Sleep Deprivation; Wakefulness; Losses; Moods

19980017937 Aberdeen Proving Ground, MD USA

The Effects of Sustained Operations on Female Soldiers Performance Final Report, 23 Jan. 1995 - 31 Dec. 1995

Treadwell, Teresa A., Aberdeen Proving Ground, USA; May 1997; 120p; In English

Contract(s)/Grant(s): MIPR-95MM5591

Report No.(s): AD-A332956; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Many studies have evaluated male soldiers from combat arms occupations during sustained operations. However, it is not known to what extent these findings can be applied to female soldiers for determining whether Army training and doctrine ensure their military effectiveness. Therefore, the major objective of this study was to compare the effects of sustained operations of male and female soldiers in a field environment. The field study examined cognitive performance; subjective mood, fatigue, and environmental ratings; and physiological measurements. Sleep deprivation and time-of-testing factors were evaluated for these measures. The study's secondary objective was to describe changes in the soldier's activity levels and performance assessments of field work. A total of 26 soldiers (13 females and 13 males) from the 180th Transportation Battalion, stationed at Ford Hood, Texas, participated in this study. One of the main objectives of this study was to determine if sustained operations affected women and men differently. With the exceptions of oral temperature and logical reasoning, gender differences during sleep deprivation were not found. Results indicate there would be minimum impact on extended military operations involving women participants.

DTIC

Females; Mental Performance; Military Operations; Physiology; Combat

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19980017421 Rutherford Appleton Lab., Chilton, UK

Research in to Various Aspects of Visual Perception and Virtual Reality

Prime, M., Rutherford Appleton Lab., UK; Feb. 1996; 47p; In English

Report No.(s): PB96-158191; RAL-TR-95-077; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes a six month European Research Consortium for Informatics and Mathematics (ERCIM) international research fellowship which was completed between October 93 and April 94. The objective of the fellowship program is to widen the contacts between the individual ERCIM partners allowing staff to contribute to research at another institute, gain insight into workings of a different research organization, and help to foster closer links in the future between ERCIM member organizations.

NTIS

Virtual Reality; Visual Perception; Space Perception

19980017586 Essex Corp., Goleta, CA USA

Commercial Motor Vehicle Driver Fatigue and Alertness Study: Technical Summary

Wylie, C. D., Essex Corp., USA; Shultz, T., Essex Corp., USA; Miller, J. C., Essex Corp., USA; Mitler, M. M., Essex Corp., USA; Mackie, R. R., Essex Corp., USA; Nov. 1996; 70p; In English

Contract(s)/Grant(s): DTFH61-89-C-096; DTFH61-90-C-053; T8200-3-3531/01-XSD

Report No.(s): PB97-129688; FHWA-MC-97-001; TP-12876E; ZCD1450-110-9; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This is the largest and most comprehensive over-the-road study on this subject ever conducted in North America. The data collected involved eighty drivers in the U.S. and Canada who were monitored over a period of sixteen weeks. A number of work-related factors thought to influence the development of fatigue, loss of alertness, and degraded driving performance in commercial motor vehicle drivers was studied within an operational setting of real-life, revenue-generating trips. These included the amount of time spent driving during a work period; the number of consecutive days of driving; the time of day when driving took place; and schedule regularity. For the amount of sleep and the four to five days of driving observed for each driver in the study, it was

found that the strongest and most consistent factor influencing driver fatigue and alertness was time of day; drowsiness, as observed in video recordings of the driver's face, was markedly greater during night driving than during daytime driving. The number of hours of driving (time-on-task) and cumulative number of days were not strong or consistent predictors of observed fatigue. Numerous other findings are provided relating to scientific methodologies and fatigue.

NTIS

Alertness; Daytime; Wakefulness; Fatigue (Biology); Trucks; Operator Performance; Performance Tests

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19980016965 Ohio State Univ., Cognitive Systems Engineering Lab., Columbus, OH USA

Learning from Automation Surprises and "Going Sour" Accidents: Progress on Human-Centered Automation *Final Report*

Woods, David D., Ohio State Univ., USA; Sarter, Nadine B., Illinois Univ., USA; Jan. 19, 1998; 42p; In English

Contract(s)/Grant(s): NCC2-592; NCC1-209

Report No.(s): NASA/CR-1998-207061; NAS 1.26:207061; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Advances in technology and new levels of automation on commercial jet transports has had many effects. There have been positive effects from both an economic and a safety point of view. The technology changes on the flight deck also have had reverberating effects on many other aspects of the aviation system and different aspects of human performance. Operational experience, research investigations, incidents, and occasionally accidents have shown that new and sometimes surprising problems have arisen as well. What are these problems with cockpit automation, and what should we learn from them? Do they represent over-automation or human error? Or instead perhaps there is a third possibility - they represent coordination breakdowns between operators and the automation? Are the problems just a series of small independent glitches revealed by specific accidents or near misses? Do these glitches represent a few small areas where there are cracks to be patched in what is otherwise a record of outstanding designs and systems? Or do these problems provide us with evidence about deeper factors that we need to address if we are to maintain and improve aviation safety in a changing world? How do the reverberations of technology change on the flight deck provide insight into generic issues about developing human-centered technologies and systems (Winograd and Woods, 1997)? Based on a series of investigations of pilot interaction with cockpit automation (Sarter and Woods, 1992; 1994; 1995; 1997a, 1997 b), supplemented by surveys, operational experience and incident data from other studies (e.g., Degani et al., 1995; Eldredge et al., 1991; Tenney et al., 1995; Wiener, 1989), we too have found that the problems that surround crew interaction with automation are more than a series of individual glitches. These difficulties are symptoms that indicate deeper patterns and phenomena concerning human-machine cooperation and paths towards disaster. In addition, we find the same kinds of patterns behind results from studies of physician interaction with computer-based systems in critical care medicine (e.g., Moll van Charante et al., 1993; Obradovich and Woods, 1996; Cook and Woods, 1996). Many of the results and implications of this kind of research are synthesized and discussed in two comprehensive volumes, Billings (1996) and Woods et al. (1994). This paper summarizes the pattern that has emerged from our research, related research, incident reports, and accident investigations. It uses this new understanding of why problems arise to point to new investment strategies that can help us deal with the perceived "human error" problem, make automation more of a team player, and maintain and improve safety.

Author

Aircraft Safety; Flight Safety; Human Performance; Man Machine Systems; Pilot Performance; Human Factors Engineering; Automatic Control; Pilot Support Systems; Transport Aircraft

19980016981 Minnesota Univ., Human Factors Research Lab., Minneapolis, MN USA

Human Factors Evaluation of Driver Multitasking and Genesis Message Formats *Final Report, 1995-1996*

Stackhouse, S. P., Minnesota Univ., USA; Burrus, M., Minnesota Univ., USA; Feb. 1996; 64p; In English

Report No.(s): PB96-183298; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The research established a concise set of human factors guidelines for evaluating devices and also assessed the Genesis project's message format suitability. It provides a literature review and synthesis of human factors relating to the use of devices, such as cellular phones, pagers, and car radios, and to other tasks that drivers may undertake while driving. The work revealed that the use of information-providing devices such as pagers or PDAs will increase information processing workload; that the findings from the use of a particular device under particular conditions cannot be generalized to other devices or conditions; and that only

empirical findings will show whether and under what conditions reading traffic information displayed on pagers or PDAs will seriously degrade driving performance. Work on message format evaluation showed that message formats could be improved and that improvement would result in better legibility and comprehension and decrease the time a driver would attend to the display.
NTIS

Human Factors Engineering; Communication; Evaluation; Radio Equipment; Highways; Traffic Control; Symbols

19980017043 National Inst. of Standards and Technology, Building Materials Div., Gaithersburg, MD USA

Seeking Validation and Consensus on Slip-Resistance Measurements and Standards. Report from the Workshop on Evolution of Slip-Resistance Standards

Frohnsdorff, G. J., National Inst. of Standards and Technology, USA; Martin, J. W., National Inst. of Standards and Technology, USA; Mar. 1997; 36p; In English

Report No.(s): PB97-152979; NISTIR-5988; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In view of widespread confusion about slip-resistance measurements, standards and criteria, a workshop on 'Evolution of Slip-Resistance Standards' was held at the National Institute of Standards and Technology on November 21 and 22, 1996. The workshop objectives were: to decide if there is a need for either or both of improvement and harmonization of standards for the performance--specifically relating to slip-resistance--of floors and other surfaces in buildings; to decide if there is a need for consensus performance criteria for slip-resistance of floors and other surfaces; and if there is agreement that there is a need for improved or hamonized standard test methods and performance criteria for slip-resistance, to identify ways in which the desired result could be achieved and recommend actions to be taken.

NTIS

Floors; Sliding; Conferences; Friction Measurement; Proving

19980017145 NASA Johnson Space Center, Houston, TX USA

Multimodal Perception and Multicriterion Control of Nested Systems, 1, Coordination of Postural Control and Vehicular Control

Riccio, Gary E., Nascent Technologies Ltd., USA; McDonald, P. Vernon, National Space Biomedical Research Inst., USA; Jan. 1998; 74p; In English

Report No.(s): NASA/TP-3703; S-835; NAS 1.60:3703; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of this report is to identify the essential characteristics of goal-directed whole-body motion. The report is organized into three major sections (Sections 2, 3, and 4). Section 2 reviews general themes from ecological psychology and control-systems engineering that are relevant to the perception and control of whole-body motion. These themes provide an organizational framework for analyzing the complex and interrelated phenomena that are the defining characteristics of whole-body motion. Section 3 of this report applies the organization framework from the first section to the problem of perception and control of aircraft motion. This is a familiar problem in control-systems engineering and ecological psychology. Section 4 examines an essential but generally neglected aspect of vehicular control: coordination of postural control and vehicular control. to facilitate presentation of this new idea, postural control and its coordination with vehicular control are analyzed in terms of conceptual categories that are familiar in the analysis of vehicular control.

Author

Aircraft Control; Systems Engineering; Posture; Coordination

19980017239 Scientex Corp., Lansdale, PA USA

Human Factors Aspects of Using Head Up Displays in Automobiles: A Review of the Literature Interim Report

Gish, K. W., Scientex Corp., USA; Staplin, L., Scientex Corp., USA; Aug. 1995; 88p; In English

Contract(s)/Grant(s): P50-AG11684-01

Report No.(s): PB96-126149; DOT-HS-808-320; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This document provides an overview of studies investigating the use of HUDs by aviators and drivers, including a summary of HUD research variables, test procedures and study results. The predicted performance advantages of automotive HUDs include increased eyes-on-the-road time and reduced reaccommodation time, particularly for the older driver.

NTIS

Human Factors Engineering; Head-Up Displays; Automobiles

19980017352 Loyola Coll., Japanese Technology Evaluation Center, Baltimore, MD USA

JTEC Panel Report on Human-Computer Interaction Technologies in Japan *Final Report*

Foley, J. D., Loyola Coll., USA; Glinert, E. P., Loyola Coll., USA; Hollan, J. D., Loyola Coll., USA; Kraut, R. E., Loyola Coll., USA; Sheridan, T. B., Loyola Coll., USA; Mar. 1996; 178p; In English

Report No.(s): PB96-157490; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report reviews the status of Japanese R&D in human-computer interaction (HCI) technologies and applications. It covers fundamental HCI research; R&D and applications in computer-supported collaborative work (CSCW), information network services and infrastructure, consumer devices and entertainment interfaces, technology and tools for people with disabilities, nuclear power, robotic manufacturing and service, and transportation; as well as HCI research infrastructure, education, and human resources. Information sources for this study included a literature review; visits to 22 relevant sites in Japan; and a review of the draft report by panelists, site visit hosts, and study sponsors. The panel found that Japan lags the USA in HCI basic research and practice, CSCW research, and network infrastructure research and practice. Japan leads in digital compression technologies, HCI research and applications for people with disabilities, game platforms, nuclear power plant control applications, and fuzzy logic applications.

NTIS

Human-Computer Interface; Human Factors Engineering; Data Processing; Information Systems; Fuzzy Systems

19980017380 Klein Associates, Inc., Fairborn, OH USA

The Innovators: High-Impact Researchers at the Human Engineering Division, Armstrong Laboratory *Interim Report, 1 Jun. - 30 Jun. 1995*

Klein, Gary, Klein Associates, Inc., USA; Hutton, Rob, Klein Associates, Inc., USA; Jun. 1995; 66p; In English

Contract(s)/Grant(s): SPO900-94-D-001; AF Proj. 7184

Report No.(s): AD-A331856; AL/CF-SR-1995-0027; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

There are several ways to benefit from lessons learned. One is to ferret out mistakes and issue procedures to prevent future errors. This study used a different strategy. We examined Armstrong Laboratory projects performed by successful researchers to try to find common themes that could be used to encourage more successes. Interviews were conducted individually with eleven scientists and engineers at the Human Engineering Division Wright-Patterson Air Force Base. The participants were selected as a representative sample of the type of work the division wants to encourage. The participants were asked to describe a project that had a clear operational benefit to the Air Force. We obtained accounts of fifteen projects. Each project is described as a separate incident account tracing the factors that contributed to the outcome. We identified several themes from the projects we examined. One theme was the skill of the researchers at problem finding; the researchers were adept at taking advantage of opportunities to pick challenging problems that were solvable. Another theme was the importance of colleagues and communities particularly partnerships with user communities. Recommendations are presented for encouraging the initiative of laboratory personnel and increasing the opportunities for success.

DTIC

Airports; Errors; Human Factors Engineering; Laboratories

19980017549 NERAC, Inc., Tolland, CT USA

Anthropometry: Basic Studies and Applications (Latest Citations from the NTIS Bibliographic Database)

Nov. 1995; In English; Page count unavailable

Report No.(s): PB96-855143; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the utilization of anthropomorphic measurement techniques in the design of military and civilian clothing and equipment. Topics include motion studies, physical fitness surveys, the use of anatomical models, and gender comparisons pertaining to specific anthropometric variables. Aircraft seats and cabins, cockpit design, automobile safety equipment, and flotation devices are among the equipment types considered. Military and civilian population surveys, and recreational products are also discussed.

NTIS

Aircraft Compartments; Cockpits; Human Body; Physical Fitness; Populations; Safety Devices; Seats; Surveys

19980017718 Institut Franco-Allemand de Recherches, Saint-Louis, France

Comparison of MIRE and Artificial Head Methods for the Assessment of an Ear Muff in Impulse Noises

Franke, R., Institut Franco-Allemand de Recherches, France; Parmentier, G., Institut Franco-Allemand de Recherches, France; 1994; 29p; In English

Report No.(s): PB96-152954; ISL-PU-331/94; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Measurements of the response and of the dynamics of MIRE frames were performed using impulse noises in free field. The insertion loss (IL) of an ear muff (Willson SB 258) was determined using a typical MIRE frame mounted on the ISL artificial head (AH) in impulse noise and in steady state noise exposure, and compared to the IL obtained simultaneously from the AH itself. Additionally, these results were likened to data obtained with the subjective method (REAT) and derived from the literature.

NTIS

Ear Protectors; Noise Injuries; Noise Pollution; Noise Tolerance; Noise Reduction; Noise Intensity

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