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HEALTH EFFECTS OF INDOOR AIR POLLUTANTS ON SENSITIVE POPULATIONS

Recent surveys indicate that a number of toxic pollutants are found in higher concentrations in the indoor air than outside. Populations whose special characteristics make them unusually susceptible to the effects of toxics, such as infants and the elderly, whose resistance is either underdeveloped or declining, or people who are hypersensitive to pollutants, tend to be at increased risk from indoor air. Such individuals also tend to spend larger periods of time indoors due to immobility or illness, so that their exposure time is increased above that of other populations. Because of economic considerations, elderly persons tend to live in more confined spaces where efforts to conserve energy reduce air exchanges.

This paper searches the literature available on sensitive individuals to identify who and how many they are. It explores the effects of indoor pollutants on those individuals who may not have the physiologic tolerance seen in the adult working population. Specific effects of pollutants such

as solvents and other volatile organic compounds which are used in homes or from part of construction materials, as well as products of combustion, and radon, are considered from the viewpoint of the specific parameters which distinguish this fraction of the population.

Hypersensitive individuals are estimated to constitute between 10 and 20 percent of the overall population, while elderly adults comprise an ever-increasing group. When considered in the aggregate, the susceptible individuals mentioned represent a considerable portion of the public. If the total exposure time is factored into the equation, the risk to these people could be considerably greater than what has been calculated using primarily workplace exposure factors.

Jeffrey S. Bland, Ph.D., HealthCom, Inc., Gig Harbor, Washington

FATTY ACIDS AND INFLAMMATORY DISEASE

Considerable attention has been paid to the mechanism of inflammation and its relationship to ecological illness. Leukotrienes play a significant role in the modulation of inflammatory response. These eicosanoids are derivatives of arachidonic acid and have been synthesized through intermediates such as HETE and HPETE. The formation of these pro-inflammatory biomolecules and their associated prostaglandins is accomplished through the activity of enzymes such as hypoxygenase and cyclooxygenase. Both of these enzymes are affected by dietary modulation of fatty acids such as eicosapentaenoic acid and micronutrients such as Vitamin E and selenium.

This presentation will highlight the emergent understanding of the role that fatty acids play in mounting the inflammatory response and how nutritional therapeutics may have a role in its amelioration. The biochemistry chemistry of these activities will be discussed as well as clinical studies which have explored the relationship of nutritional modulation on osteoarthritis, chronic inflammatory bowel disease, Chron's disease, food hypersensitivities, and petrochemical reactivity.

The safety and efficacy of these nutritional therapeutic approaches will be explored with specific emphasis on the adverse effects of long-term fatty acid supplementation and dietary modification that may impact the overall nutrition quality and composition.

Miklos L. Boczko, M.D., New York Medical College, White Plains, New York

ENVIRONMENTAL AND BIOCHEMICAL CORRELATES OF NEUROLOGIC DISORDERS

Fifty-one patients were investigated. Seizures, migraine, M.S. (or similar disorder), intellectual impairment, Parkinsonism, peripheral neuropathy, lumbar radiculitis and narcolepsy comprise the series.

Environmental incitants could be determined in 44. Twenty-six were deemed to be "universal reactors". Eighteen had mild to moderate sensitivities to various triggering agents.

Some parameter of "oxidant stress" was determined for 39, its existence being documented in 19. Evidence for autoimmune disorder was found in 12 of 28 so investigated, while 24 of 30 showed other types of immunologic dysfunction.

Almost all patients had comprehensive functional vitamin tests and all had some vitamin measurements. Without exception, all had multiple abnormalities. Comprehensive analysis of mineral status yielded similar results. Amino acid metabolism was studied by quantitative urine (and plasma in many) determination in most cases. 70% had chromatographic evidence of gastrointestinal dysfunction (impaired proteolysis and/or malabsorption of amino acids). Very few had no metabolic disturbance: the most common abnormality affected the methionine pathway. Virtually every one investigated for fatty acid status had very significant deficit in one or both series of essential fatty acids, EPA being affected more frequently.

The significance of these results will be discussed and the practical value in patient management illustrated.

Dr. Jonathan Brostoff, Department of Immunology, Middlesex Hospital Medical School, London, W.1.U.K.

THE EXPANDING HORIZON OF IgE MEDIATED REACTIONS

The release of histamine from mast cells has an effector function in producing local and systemic symptoms as well as important feedback effects on cells of the immune system. The role of IgE, mast cell and allergen has been central to allergic reactions but there is an expanding horizon of IgE interactions with other cells, such as macrophages, platelets and eosinophils.

The interaction of IgE, allergen and alveolar macrophages leads to the release of enzyme and superoxide radicals. Platelet: IgE mediated reactions are very cytotoxic against schistosomules. Thus, IgE sensitization leads to inflammatory reactions in a variety of cell types.

Delayed type hypersensitivity also involves mast cells. A T cell factor (TCF) can sensitize mast cells to release mediators in a "piecemeal" rather than an "explosive" manner and increase the egress of active cells to the extravascular compartment where organisms may be located.

Thus, IgE and mast cells, or mast cells and other components such as C_3a, C_5a and TCF can mediate inflammation in a variety of hypersensitivity states.

Joel R. Butler, Ph.D., North Texas State University, Denton, Texas

INTERPERSONAL FACTORS AS PRECIPITANTS AND EFFECTS IN ECOLOGICAL ILLNESS: IDENTIFICATION AND TREATMENT

These factors as both cause and effect in ecological illness can be better understood in the context of these concepts: A. Body mind as an integrated unit as opposed to the dualistic model proposed by Decarte in the 17th century and followed faithfully in the fractionation of medicine. B. The Interaction Effect referring to the constant interplay between psyche and soma and soma

and psyche or between thought and action or between physical discomfort/dysfunction and emotions of anxiety/depression etc. C. Total Stress Load which accumulates from stresses associated with body mind interaction usually from multiple sources, chemicals, emotions, foods, interpersonal dynamics, etc., and usually resulting in multiple effects or reaction processes. These multiple cause and response patterns can include anger, tension, negation of joy, hope, success, etc., decreased coping skills, resiliency and security, malaise, lassitude, sadness, dependency, selfishness, demanding behavior, thoughtlessness, diminished cognitive skills, etc.

For maximum beneficial treatment effect these problem interpersonal factors should be treated along with nutritional and medical therapies. Often the interpersonal strategies of the patient have become very bad habits which can be modified by counterconditioning, education, positive guided imagery with relaxation training and by alteration of the patient's perception of interpersonal problems. The perceptual change does not allow a projection of blame, guilt, anger, or other negative attacks.

Lawrence D. Dickey, M.D. Fort Collins, CO

POST-POLIO SYNDROME, ENVIRONMENTALLY TRIGGERED

Post-polio syndrome, environmentally triggered, refers to the recurrence, even years later, of the original manifestations of polio myelitis due to an environmental excitant other than the polio virus. The author observed this phenomenon in 1965 more than 15 years after the original attack of polio in a patient who developed a chemical hypersensitivity problem to utility gas and tobacco smoke. This was recorded in 1971. This suggests that the pattern of ecologic illness, at least in some cases, may be determined by damage to a target organ by a previous reaction to a different environmental excitant. This case, and others, will be discussed by the authors.

Nancy A Didriksen, Ph.D. Environmental Health Psychologists, Denton, Texas

PSYCHOLOGICAL STRESS: EFFECT ON HUMORAL IMMUNE FUNCTIONING AS MEASURED BY IMMUNOGLOBULIN LEVELS

The purpose of the present study was to determine if psychological stress, defined as academic examination stress, would systematically produce changes in immune parameters (immunoglobulin concentration) and psychological functioning. It was hypothesized that as examination stress occurred there would be an effect on immunological function consistent with heightened psychological activity/stress.

Subjects were 23 master's and doctoral students in psychology who volunteered for the research project. All subjects were administered a series of psychological tests to measure stress, personality factors, emotional states and anxiety levels. All tests were administered and blood samples drawn over a period of 15 months across two low-stress and two high-stress periods. Immunological tests included white blood cell (WBC) differential count and radial

immunodiffusion (RID) for the determination of concentration of different immunoglobulin classes (IgA, IgG, IgM) in serum.

Data were treated to a one-way analysis of variance (ANOVA) with repeated measures, t test for correlated samples correlational matrix between variables across assessments and discriminant function analysis.

Results showed (1) increased immunoglobulin levels during periods of stress; (2) immunoglobulin G most consistently related to stress and probably most indicative of the stressed condition and biological resistance to stress; (3) anxiety related to external events; (4) increase in anxiety under stress; (5) anxiety inversely correlated with emotional stability and coping skills while positively related to ension, increased number of somatic complaints and obsessive-compulsive trends.

Firm support was provided for the hypothesis that as stress occurred, there would be consistent changes in immunological functioning associated with heightened psychological activity/stress. It was concluded that a response pattern to stress was adaptive along both psychological and immunological dimensions and that the concept of body mind interaction was the most realistic approach to understanding the total response patterns.

Stanley J. Dudrick, M.D. Diagnostic Center Hospital, Houston, Texas

ARREST AND REGRESSION OF ATHEROSCLEROSIS WITH INFUSION OF SPECIAL NUTRIENT SUBSTRATES

Preliminary studies in 400 New Zealand albino rabbits produced a reliable animal model of diet induced atherosclerosis which simulated that observed in humans. The atherogenic diet (Teklad T.D. 82135 and high fiber Purina Labchow 5326 fortified with 8% peanut oil and 2% crystalline cholesterol) was fed to 1600 animals. In each study group of 40 animals, plasma cholesterol rose above 1000 mg/dl and was maintained between 1000 and 2000 mg/dl for 6 weeks. Ten control rabbits were killed to document baseline atherosclerosis. The remaining 30 rabbits were assigned randomly to one of 3 groups of 10. For the next 6 weeks, Group I continued eating the atherogenic diet; Group II received standard laboratory rabbit pellets; Group III were infused continuously with specially formulated anticholesterol solutions via central venous catheters. All animals were then killed and autopsies. In Group I complex atherosclerotic lesions consistently involved 85-95% of the aorta. In Group II atherosclerosis was comparable to that in the control group, with no regression. In Group III regression of atherosclerosis by 90-95% of baseline was consistently documents.

Within 10 days of infusion the amino acid solution into a 40 year old Type IIB hyperlipidemic man with debilitating angina, claudication and carotid insufficienty, his plasma cholesterol declined from 508 to 220 mg/dl. His symptoms disappeared completely in less than 2 weeks; he could walk 3.5 miles in one hour within 3 months; Doppler flow increased 250% in his left leg and 300% in his right leg; and the diffusely narrowed left coronary arteries showed virtually complete clearing of the atherosclerosis angiographically within 6 months. Studies in 35

consecutive patients have demonstrated prompt reduction in plasma cholesterol by 40-60% regardless of the initial value with a 100% positive response rate to the therapy.

Christer Edling, M.D., Ph.D. Dept of Occupational Medicine, University Hospital, Uppsala, Sweden

RADON DAUGHTER EXPOSURE AND LUNG CANCER

Radon, a radioactive noble gas, is created by the decay of radium. When radon decays in the air, it's short-lived radioactive daughters, i.e. isotopes of polonium, bismuth and lead tend to attach to surfaces and also to dust particles. Hence, through inhalation of attached and unattached daughters, the epithelium is radiated, most intensely at places where dust is deposited.

The epidemiologic studies regarding radon daughter exposure and lung cancer refer mainly to miners and suggest that about 70-90% of the lung cancers among underground miners might be due to occupational exposure to radon and it's daughters.

Since the inhalation of radon is a considerable part of the natural radiation dose to man a possible lung cancer risk to the general population has become a matter of concern in many countries. Some epidemiological studies have suggested a relation between radon daughter exposure in dwellings and lung cancer and indicate that about 30% of the lung cancers in the studied population might be attributable to exposure to radon and radon daughters.

Smoking is a strong risk factor for lung cancer and must be taken into account when estimating the risk of radon daughter exposure. This paper discusses some of the data regarding lung cancer and radon daughter exposure and smoking and suggest a more or less additive interaction for radon daughter exposure and smoking in mines and a multiplicative in dwellings.

Ervin J. Fenyves, Ph.D. and Roy H. Kinslow, M.S., University of Texas at Dallas, Texas

HEALTH HAZARDS OF RADON EXPOSURE TO THE U.S. POPULATION

High levels of indoor radon found particularly in energy savings homes and buildings have caused serious concern in respect to their public health hazard. Recent estimates by the EPA state that the exposure of millions of Americans to higher-than-recommended levels of radon may be responsible for as many as 30,000 lung cancer deaths per year.

Radon is a naturally-occurring radioactive gas that emanates from the ground into the atmosphere in varying amounts everywhere in the world. Outdoors radon presents a minimal risk due to the diluting effects of mixing with large volumes of air.

The health hazard of radon arises from its production of a chain of radioactive isotopes called radon progeny. Indoors the progeny can reach large concentrations due to inadequate air

exchange. Upon inhalation, the radon progeny can lodge in the lungs and expose the lung tissue to energetic alpha particles, thereby substantially increasing the risk of lung cancer.

Indoor radon concentrations have been measured in several buildings and residences in the Dallas-Ft. Worth metroplex area. Variations of the radon levels from basements to upper floors, in offices, laboratories, storage rooms, corridors and other locations have been detected. Dependence of these concentrations on the location and ventilation rates within buildings has been studied.

Ronald Finn, M.D., Royal Liverpool Hospital, Liverpool, England

THERAPEUTIC ASPECTS OF ENVIRONMENTAL DISEASE

Hippocrates was the first to emphasize the importance of environment in human disease. It is now established that some individuals can be uniquely sensitive to environmental agents and this observation forms the basis of the new discipline of environmental medicine. Environmental agents act over varying time spans from immediate reactions as in pollen allergy, to cigarette smoking and lung cancer in which the latent period can be more than 20 years. The mechanism of the sensitivity can be immunological or chemical and the concept of allergic disease has been expanded to include non-IgE mechanisms. The growth of environmental medicine as a speciality will depend on its therapeutic success. Therapy is based on exclusion and neutralization. These modes of therapy were assessed in 53 patients with a variety of conditions. The overall success rate was 66% and within the group, patients who were highly allergic responded better ($p<0.01$) as did subjects with specific conditions such as eczema, asthma and urticaria ($p<0.05$). These results are incompatible with a placebo effect or natural remission of the disease, and indicate that the overall success rate is due to a genuine effect of the treatment regime.

John W. Gerrard, D.M., L. Perelmutter, Ph.D., University of Saskatchewan, Saskatoon, Saskatchewan, Canada

DESENSITIZATION TO PEANUT

The purpose of the study was to determine whether patients who have had life-threatening reactions to peanut (PN) can be safely desensitized. Of six subjects who entered the program, all had experienced severe reactions, five had had life-threatening reactions to PN.

The strongest dilution which on prick testing caused no erythema was first determined. This ranged from a concentration of $1:10^{-3}$ to $1:10^{-9}$ of a 1:10 weight/volume dilution. 0.05 ml of this strength was given first SC and then sublingually, the amount was increased every 20 minutes until a little local reaction was observed. The amount and strength was then increased more slowly until a 1:10 dilution was reached. The patient was then given the equivalent concentration of PN butter, and the amount and strength increased until PN was tolerated. Four now tolerate PN daily, two have not completed the program.

PN anaphylaxis can be life-threatening, and has caused 2 deaths in Saskatchewan. PN is hidden in many foods and cannot always be avoided. Oral desensitization is a safe alternative to dependence on adrenalin.

IgE RAST and IgG_4 RAST data before and on completion of program will be presented.

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CHRONIC TOXICITY OF ORGANIC SOLVENT ON THE NERVOUS SYSTEM

Chronic toxic manifestations of the nervous system in 20 glue sniffers and of 5 environmentally exposed patients to toluene will be introduced. Glue sniffers manifested the following features: 5 ocular involvements, 14 neurological symptoms and 1 with histopathologically confirmed case. The whole clinical picture could be summarized as "optico-cerebral-cerebellar-peripheral neuropathy". The findings were also confirmed by animal study using rats and Beagle dogs. Inhalation of Toluen seemed to be mainly responsible for ocular toxicity, while other solvents e.g. n-hexane did not seem to induce optic neuropathy. Ocular lesions, including optic neuropathy in particular, were liable to occur after sniffing 11.3 grams for 5 hours a day over a duration of 4 years. On the other hand, 5 patients exposed environmentally to organic solvent showed somewhat different clinical manifestations. They are: oral aphtha, genital ulcer, skin eruption and uveitis simulating clinically as Behcet disease. Clinical manifestations of these cases including HLA-Antigen-analysis will be mentioned.

George J. Juetersonke, D.O., Dept of PHPM, Texas College of Osteopathic Medicine Ft. Worth, Texas

CASE PRESENTATION: Effects of Influenza Virus on Theophylline Levels

The effects of influenza virus neutralization on the theophylline levels of a 50-year old asthmatic will be presented. Also discussed will be how viruses may affect the metabolism of other chemicals and could lead to the development of multiple chemical sensitivities.

Reference: Meredith, Christopher, G., et al, "Effects of Influenza Virus Vaccine on Hepatic Drug Metabolism", published in Clin. Pharmacol. Ther., Volume 37, Page 396-401, 1985.

J, Krop, M.D., J. Swierczek, M.D., Toronto, Ontario, Canada

APPLICATION OF SAUNA THERAPY IN AN ASTHMATIC PATIENT INTOXICATED WITH GENERAL VOLATILES

S.M. is a 19 yr old girl whose chronic illness began at age 2 ½ . Since that time she has been suffering from recurrent URI, severe asthma, recurrent UTI, irritable bowel syndrome, depressions, and PMS. Sensitivities developed to all antiasthmatic medications. Attacks of asthma, brought on premenstrually, could only be controlled by Solumedrol or 15 gm of Vit. C., I.V. She had been exposed to general volatile (GV) and pesticides throughout her life. Environmental control, desensitization for inhalants, chemicals, foods and therapy for candidiasis and PMS did not bring expected results. Sauna was used in an attempt to detoxify the patient. After 21 daily applications of sauna therapy the patient was free from the majority of symptoms. The following table presents pre- and post-treatment levels of GV.

GVST (ppb units)	**Pre-sauna**	**Post-sauna**
Toluene	0.5	0.6
Xylene	0.3	0.0
Trimethylbenzene	0.6	0.0
Chloroform	18.5	0.0
Dichloromethane	0.7	0.0
Tetrachloroethylene	0.7	0.5
1,1,1-Trichloroethane	0.0	0.3 (new)

We conclude that the variety of symptoms related to GV intoxification cleared up after blood levels of most of the GV were not detectable. Thus, sauna therapy appears to be an effective method for GV detoxification.

John L. Laseter, Ph.D. Enviro-Health Laboratories, Richardson, Texas

HEALTH EFFECTS AND MONITORING OF PATIENTS EXPOSED TO SELECTED VOLATILE ORGANICS

Volatile organics may originate from a variety of sources such as common household products, chlorination of potable water, paint and paint thinners, degreasers, dry cleaning operations, petroleum products, plastics and emissions from chemical manufacturing operations. To date, approximately 100 volatile organics have been characterized in blood from patients. Many of these components are of anthropogenic origin such as halogenated and aromatic hydrocarbons.

Specific cases involving patient exposure to tetrachlorethylene (perchlor) and the aromatic hydrocarbon toluene will be discussed. Clinical symptoms and preferred methods to assess exposure using body fluids will be presented along with information on metabolism, pharmacokinetics and indices of exposure.

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ORGANIC ANTITHYROID POLLUTANIS FROM COAL-CONVERSION PROCESS

Endemic goiter affects over 400 million people worldwide. Iodide deficiency is the primary cause of this problem, but high goiter prevalence persists in certain geographical areas despite adequate iodide intake presumably due to the ingestion of goitrogens present in food and/or water. Several findings sugggest that coal and shale may be the source of environmental goitrogens in water supplies which have been linked to goiter endemias in certain coal-rich areas of the U.S. and Columbia, S.A. In this report the potential antithyroid activities of compounds identified in aqueous effluents from coal conversion processes were assayed in thyroid peroxidase (TPO) and thyroid slice systems.

The most abundant water soluble compounds derived from coal are dihydroxyphenols, thiocyanate, disulfide and hydroxypyridines. The dihydroxyphenols resorcinol, 2-methylresorcinol and 5-methylresorcinol (orcinol) were 26.7, 22.5, and 7.2 times more potent, respectively than the antithyroid drug 6-propylthiouracil (PIU). Other dihydroxyphenols and thiocyanate were less potent but comparable in activity to PIU. All dihydroxypyridines and 3-hydroxypyridine produced inhibitory effects comparable to PIU. None of the disulfides inhibited TPO. The net antiperoxidase effects of mixtures of coal-derived goitrogens were equivalent to or greater than the sum of the effects produced by individual compounds. The results presented demonstrate that many of the major water-soluble compounds present in coal and shale exert potent antithyroid effects and the true goitrogenic potential of these pollutants appears to be due to the combined effects of the component compounds rather than to any single shale compound. The results support the hypothesis that coal and shale may be the source of organic antithyroid contaminants in water supplies and that these contaminants may be a major contributing factor to the high goiter prevalence observed in certain areas with watersheds rich in coal and shale.

D. Jonathan Maberly, M.D., Airdale General Hospital, West Yorkshire, UK

A PURPOSE-BUILT COMPREHENSIVE ENVIRONMENTALLY CONTROLLED UNIT

In 1982, having worked in the field of Clinical Ecology for five years, it became increasingly apparent that I needed an ECU, so I decided to set one up. Because patients often have to rethink their entire environment it was felt that it would be useful to start from scratch and build a new, environmentally safe Unit which would then be functional on two levels: 1.) As an allergy assessment unit and 2.) As a demonstration of ecologically safe building methods. To this end

we found a pleasant, semi-rural site near the hospital in which I am an Internist, and proceeded to design and then construct a twelve-bed unit with housekeeping facilities large enough to accommodate a further twelve-bed extension if needed.

We finally opened in April, 1985 and since then have treated some 130 patients, producing very similar results as those attained by the ECU centers in the U.S.A.

Allan Magaziner, D.O., Center for Nutritional Medicine, Cherry Hill, New Jersey

VITAMIN C AND HEPATITIS: A Case Report

This patient was a 35 year old male who was suffering from acute Type A viral hepatitis. He presented after 2 months duration of the present illness, in which he did not respond to traditional medical therapy. He was experiencing the classical signs and symptoms of hepatitis, including extreme fatigue, "white" colored stools, muscle wasting, a 48 pound weight loss, marked scleral icterus, and jaundiced skin.

Total bilirubin had reached peak of 34.4 mg/dl (normal .2-1.6) and other liver enzymes were significantly elevated (alk phos, LDH, SGOT, and GGPT).

Upon presenting in the aforementioned clinical condition, this patient was given large doses of intravenous nutrients, including 60 grams of vitamin C, 3 days per week.

He began to benefit after only 1 treatment. There was immediate improvement in the color of his sclera, skin, and stool. After just 2 days of therapy, the total bilirubin had decreased to ½ of the pretreatment level. Energy levels gradually improved. After 1 week of treatment, the patient had gained back 18 pounds.

At 5 weeks, his weight gain reached 25 ½ pounds. His bilirubin was normal at 1.2 and all liver enzymes were within normal limits. Energy levels were better than ever and other health improvements were noted as well.

This case report emphasizes and reinforces the therapeutic potential of ascorbic acid as an antiviral agent and its role in the treatment of hepatitis.

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POST "VIRAL" FATIGUE SYNDROME

From 1978 to June 1986 we studied 73 patients (48 females and 25 males) with a multi-symptom illness that persisted for more than 2 months following a presumed viral infection. 46 (63%) of the patients were seen in the last 18 months of the study. Fatigue was the predominant symptom occurring in 92%. 23% had fatigue on awakening, while 27% developed it later in the day; for 11% it was constant and 4% improved as the day progressed. 15% complained of muscle weakness but this could not be demonstrated on physical examination. Eleven had

electromyography carried out: 7 demonstrated brief polyplasic action potentials. Routine hematological and biochemical parameters were normal. 18 patients underwent comprehensive neuropsychological assessment (W.A.I.S.-R; MMPI; M.B.H.I., Beck depression inventory; Halstead-Reitan Neuropsychological test battery and supplemental memory tests.) The major findings were impaired concentration-61%; comprised alertness and flexibility of thought-67%; clinical profiles suggesting significant somatic complaints, mild to moderate depressive symptoms, anxiety and tension-67%. While the presence of cognitive impairment was unrelated to either severity of psychological distress or the duration of the illness, the greatest psychological disturbance was found in those patients who had been ill for 3 years or more. HLA B8 was present significantly more often among the 50 patients tested than among the control group. We carried out 24 hour holter monitoring, echocardiography, electrocardiography, and exercise testing (Bruce protocol) on 27 of these patients. All had marked limitation of exercise tolerance due to skeletal muscle fatigue. During the course of their illness 15 (20%) developed "allergies"-6 felt they were suffering from environmental hypersensitivity and were seen by clinical ecologists.

William J. Meggs, M.D., Ph.D., Washington, D.C.

ENVIRONMENTAL TRIGGERS OF MAST CELL RELATED DISEASES

Mast cells are known to play a role in a variety of disease processes, including asthma, urticaria, rhinitis, conjunctivitis, and anaphylaxis. More recently, roles for mast cells in disorders such as rheumatoid arthritis and cardiovascular disease have been appreciated. Further, recurrent idiopathic anaphylaxis and systemic mastocytosis are discussed. The mechanism by which environmental factors trigger the release of mast cell mediators, as well as the role of these mediators in disease processes, is outlined. Substances which can trigger mast cell degranulation are discussed in detail. Historically, environmental proteins including food proteins, pollens, mite debri, and molds were first recognized as triggers of mast cell diseases. Pharmaceutical agents such as penicillin and industrial chemicals including toluene diisocyanate, which is extensively used in the paint, varnish, plastics and the electronics industry, are known to trigger mast cell degranulation in sensitized subjects, sometimes at extremely low concentrations. Food additives, of which sulfites are most notable, and irritant gases such as sulfur dioxide, ozone, nitrogen dioxide, and formaldehyde have been documented to cause allergic-like reactions. Some substances, including opiates and radio contrast media, directly degranulate mast cells via processes which are non-immunological. Even endogenous substances, the most notable of which is native progesterone, can trigger allergic syndromes. The physical stimuli of cold, heat, vibration, and exercise can also effect mast cell mediator release. Exercise induced anaphylaxis has been shown to require consumption of a specific food prior to exercise in sensitized individuals. In summary, a large number of environmental factors and agents can interact with the human organism through mast cells to incite a variety of disease processes.

Jean A. Monro, M.D., The Allergy and Environmental Medicine Department, The Lister Hospital, Chelsea Bridge Road, London; Dr. Balarajan, Head of Department of Epidemiology, Surrey University, Guildford, Surrey, England

SENSITIVITY TO PESTICIDES IN PATIENTS REFERRED TO THE DEPARTMENT OF ALLERGY AND ENVIRONMENTAL MEDICINE

Patients attending our Department are asked to complete a questionnaire at the onset, amongst the questions are 4 as follows: 1.) Do traffic fumes upset you? 2.) Do crop sprays or pesticides affect you? 3.) Do gas fumes upset you? 4.) Do enclosed shopping areas upset you? The majority of patients who answered these questions in the affirmative are chemically sensitive and on direct questioning report sensitivity to a wide range of other chemicals. An analysis has been undertaken of the medical assessment of these patients and the extent of sensitivities foods, inhalants, and chemicals. Many of the patients have elimination diets followed by challenges and amongst the challenges would have been challenges of both organic and commercial foods in some cases. Chlorinated pesticide screening has been undertaken for many of the patients and also evaluations of some biochemical parameters. The epidemiology survey of a group of patients attending over a three month period has been analyzed and the data will be presented.

Björn E. W. Nordenström, Department of Radiology, Karolinska Hospital, Stockholm, Sweden

VASCULAR-INTERSTITIAL CLOSED ELECTRIC CIRCUITS (VICC) - AN ACCESSORY CIRCULATORY SYSTEM

Blood circulation transports material to and from capillaries of organs and over the capillary membranes to the interstitial tissue fluid by filtration, diffusion, and differences in colloid osmotic pressures. An electrogenous system for mass transport between blood and interstitial tissue fluid will be described. It may be regarded as an additional circulatory system powered by metabolic polarization of tissues and organs or by potential differences between injured and surrounding non-injured tissue. The potential differences induce an electric (ionic) transport between the tissues very much as is the case in ordinary electrophoresis. The necessary pathways for current consist of blood vessels, which were found to have a high electric resistance in their walls around the conducting medium of blood-the plasma. At the level of the capillaries an electric junction exists between blood and interstitial tissue fluid as the capillaries are permeable for ions and water. The interstitial tissue fluid constitutes the "internal" electric communication that closes the circuit. The VICC is an in vivo electrophoretic circuit which also contains the necessary "electrodes" for electron exchange. These consist of globular proteins with capacity to transfer electrons through the plasma membranes of the endothelial cells. The redox reactions at these sites are turned on by the superimposed electric field by induction of segmental contraction of arterial capillaries. These lead to suspension of ionic transports at the contracted segments where the electrode functions are maintained but makes it possible for ions to pass through leaking venous capillaries in the "shadow" of the segmental contractions. The VICC system represents a very powerful mechanism, involved in structural development and tissue function in normal and pathological conditions.

James A. O'Shea, M.D., O'Shea Clinic, Lawrence, MA

TOXIC IMMUNE SYNDROME "T.I.S."

Case presentation of a 58 year old man exposed to a pesticide spray, carbaryl, on 6/1/79 while fishing in Northern Maine. Immediate symptoms were 1) headache, 2) nausea, 3) diarrhea, 4) cramps, 5) fatigue, and 6) weakness. Symptoms 24 hours post exposure were 1) flushing, 2) mental confusion, and 3) memory loss.

Delayed symptoms over the next six years were 1) colitis syndrome, 2) allergic rhinitis, 3) peripheral neuropathy, and 4) poor memory recall.

The "Toxic Immune Syndrome" in this case illustrates a compromised immune system resulting from initial toxic exposure to carbaryl. His early symptoms were a toxic response and his delayed symptoms over the period of the next six years were secondary to his compromised immune system. Many toxic chemicals such as pesticides, herbicides, industrial volatile chemical compounds, polychlorinated biphenols etc. can produce this toxic immune syndrome.

I will discuss the appropriate diagnostic procedures in such cases as well as possible treatment.

A. Perez-Comas, Associate Professor of Pediatrics, Ponce School of Medicine, Mayaguez, P.R.

ANOMALOUS SEXUAL DEVELOPMENT, A PUERTORRICAN REALTY

1053 patients with abnormal sexual development have been evaluated by us in a period of 14 years. Among them were patients from Puerto Rico, mainland U.S., Latin America, and Europe.

Most frequent initial diagnoses were premature thelarche (560), gynecomastia (203), precocious puberty (153), and premature pubarche (112). Other conditions associated with increased estrogen levels were assimetry of breasts, virginal hyperplasia of breasts, hirsutism, and five patients with pseudoprecocious puberty associated with hypothyroidism and Down's Syndrome.

Females are affected more frequently. Serum total estrogen levels were increased in 85% of males and 86% of females studied. Prolactin levels were abnormal in 28% of females and 16% of males. FSH levels were increased in 32% of males and 40% of females. IH levels were high in 33% of males and 18% of females.

The years of highest incidence were 1982, 1983, and 1984. Cases diminished dramatically with a 50% drop in 1985 when a federal investigation of hormones in meat was being carried. From May 1 to October 31, 1986, fifty-three new cases have been evaluated by us. Forty-five of them present symptomatology starting in 1986.

Overall review of remission data reveals that a limited diet produces remission in 58% of males and 51% of females. Without diet, remission is observed in 6% of males and 11% of females.

Diet is free of poultry, eggs, and meat until estrogen levels get to normal. Afterwards, grain-fed poultry and birds are permitted.

Pelvic sonographic abnormalities were observed in 62% of females affected. Ovarian cysts are directly related to increased estrogen levels in 88% of patients with sonographic abnormalities.

Hormonal and clinical remission usually take three to six months on diet treated patients. Sonographic improvement of ovarian and uterine abnormalities take from six to twelve months.

Recurrence is frequent due to non-observance of diet. No adequate governmental action has been taken up to the present time.

Theron G. Randolph, M.D.

AGING AND THE APPLICATION OF CLINICAL ECOLOGY

I have practiced in the same area for over 42 years and have followed much the same diagnostic and therapeutic regimens for the past 35 years in respect to the identification and management of individual susceptibility to environmental chemicals, foods, and inhalant allergens. As a result of this prolonged clinical experience, certain generalizations have emerged which seem to be worth summarizing.

In general, those patients who have followed specific instructions in respect to their food allergy and chemical susceptibility problems most concisely and consistently over a span of several decades have tended to remain productive and in good general health between 60 and 80 years of age. In contrast, those patients who lapsed or followed their recommended programs less thoroughly and consistently have done far less well.

It is agreed that the existence of wide variations in the degree of individual susceptibility and in the extent of their environmental involvement makes generalizations of this type hazardous. It is also admitted that some persons are better able to follow instructions economically than others. Needless to say, those best able to comply with recommendations, for whatever reason, tend to do better than those less able to do so. Quite obviously, control observations in this area are impossible to come by. Perhaps, I recalled only the more striking successes and failures; nevertheless, it seems desirable to present these long-term therapeutic impressions.

Selected case reports will be cited briefly.

CHEMICAL SUSCEPTIBILITY PROBLEM: INDICATIONS FOR DETOXIFICATION

The relative recent availability of analytical techniques to determine residual levels of environmental chemicals in blood and fatty tissues and the fact that these levels may be reduced significantly as a result of detoxification techniques, prompts a discussion of the indications for detoxification in patients known to be susceptible to environmental chemicals. The detoxification program in question, first developed by Hubbard in the 1970's and reported in detail by Schnare et al in 1982, consists of the combination of strenuous physical exercise associated with profuse perspiration, interspersed with sauna exposures plus niacin intake while electrolytes, minerals and vitamin evaluations are carefully monitored. Preliminary evidence of beneficial clinical effects from the application of this detoxification program in chemically susceptible patients, reported in last year's program, has since been confirmed and extended.

General indications for this detoxification routine in persons known to be reacting adversely to environmental chemicals are as follows: 1) Specifically diagnosed and treated patients complying with recommendations who continue to present unexplained acute and/or chronic symptoms not apparently related to exogenous exposures to environmental chemicals. 2) In general, the more advanced and incapacitating the systemic manifestations the more likely that detoxification may be helpful. 3) Additional indications include a bitter or metallic sense of taste and/or evaluation of perspiration. Although observed in several patients who have responded well to detoxification, these findings are not essential indications.

It should be pointed out that individual susceptibility to and toxicity from environmental chemicals often coexist in the same patient. The extent of this overlap is difficult to evaluate initially. Preliminary evidence suggests that both conditions seem to respond favorably to this program of detoxification.

Doris Rapp, M.D., Buffalo, New York

PRACTICAL PEARLS

This presentation will share an assortment of clinical clues which may help you to more easily detect and treat ecologic illness in infants and young children.

Topics to be discussed:

- A typical fetal-infant-child patient history
- Special problems concerning infant testing & treatment:
    - The unconscious infant.
    - The drooling infant & sublingual therapy
    - The infant who stops treatment when "Well"
- The value of monitoring writing or drawing during testing:
    - To find exact treatment doses.
    - To explain erratic school or work performance.
- The value of monitoring breathing capacity:
    - To find the elusive end point.
    - To indicate need for retests.
    - To detect missed etiologic factors.
- The value of monitoring pulse:
    - To find a neutral dose-increase 15 to 30+ pts.
    - To diagnose-watch for changes after meals, after chemical exposure, in different locations, & at different times of the year.
    - To monitor treatment response-ascertain baseline pulse initially, & after treatment.
- The value of routine impedance & spirometry testing:
    - To objectively prove the value of our testing & Rx.
    - To monitor patient's improvement over time.
- Teating the patients:
    - The importance & value of the parameters being measured.

    - How to use the peak flow meter at home.
    - What observations should be made
    - General interpretation of the observations they are making
    - When to call the physician.
- The preparation of a stock insurance package for patients containing:
    - An explicit letter showing why our methods can save the insurance companies money.
    - A list of double-blinded, single-blinded, controlled, & immunologic/scientific studies for each diagnostic category.

William J. Rea, M.D. Environmental Health Center-Dallas, Texas

ELECTROMAGNET ASSESSMENT UNDER ENVIRONMENTALLY CONTROLLED CONDITIONS

Magnetic fields were measured by compass deviation, magnetic alternate fields by copper coil and build-in high frequency filter which was exposed to fields which produced a current that was read on a magnet meter with a spring. Electric alternate fields were measured by a copper ball-shaped antenna lcm in diameter attached to a standard volt meter. All were done in the porcelain area of a controlled environment. Magnetic results showed a gradual compass change starting at one foot which resulted in a 120 deviation at the wall of all rooms. Magnetic alternate field revealed all rooms to be 0 N.T. However, 2 feet from the T.V. showed 900-100 N.T., as did the local air filter. All incandescent lighted rooms were 0 N.T. but the fluorescent ones read 250 N.T. Room near a refrigeration unit were 600 N.T. Electric alternate fields were 0 V/M in the rooms 1 foot from the T.V. They were 1000 V/M while at 8-10 feet they were 0 V/M. Three feet from the thermostat they were 50 V/M, three feet from the calculator, 150 V/M and two feet from the ionizer 20 V/M. Characteristics of the electrically and magnetically sensitive patient were the following:

NEGATIVE EFFECTS:		
• Power Lines • Electric typewriters • T.V. sets-computer tubes • Electric blankets	□ Microwaves □ Weather changes □ Positive ions □ Electric hair dryer	□ Flourescent lights □ Telephone ringing □ Electric outlets □ T.E.N.S. units □ Metal sensitive
POSITIVE EFFECTS:		
• Does better in Europe or where no electric lines. • Does better with grounding, walking outside on bare feet.		

Signs the patients exhibited were muscle spasms and tetany, drop attacks and autonomic dysfunction (profuse sweating, bloating, flushing, headaches, edema). Eleven patients of 300 surveyed had blatant characteristics of electromagnet sensitivity in addition to their chemical sensitivity as measured by sign and symptom scores, volt meter measurements and frequency challenges. This group involved 11 females and one male, age 18-65. Severe tetany/catatonio was seen in eight, drop attacks in four and gross autonomic dysfunction in nine. Range of provocation was from less than one Htz to two jigger Htz. Etiology of the electromagnet sensitivity seemed to be severe chemical exposure in nine, while three appeared to be due to constant electrical-magnetic frequency exposure. Two also appeared to have massive trauma as part of the etiology. It appears that electromagnetic sensitivity exists as a definite clinical entity. Its recognition will aid in the treatment of the environmentally sensitive patient.

Sherry A. Rogers, M.D., F.A.C.A., F.A.A.E.M., F.A.A.F.P.

A CASE STUDY - ECOLOGIC CONTROL OF THE PAIN MECHANISM

A 60 year old French-Canadian woman was well 15 years ago. Three month after a hysterectomy and bladder suspension, she began having left hip pain. The last four years, the pain in both hips has become unbearable in spite of all medications. She has seen many general doctors, internists, and orthopedists. She had tried many non-steriodal anti-inflammatory drugs, analgesics, and steroid injections to no avail. She is frequently brought to tears from the pain when she tries to walk or sit.

On laboratory exam, she is normal (CBC, Profile, ESR, ANA, RF).

Radiologic exam reveals extensive osteo-arthritis of both hip joints, more on the left. There is marked narrowing of the joint space, spurring and flattening of the femoral head and degenerative changes of the pelvis and lower spine and sacroiliac joints.

All consultants recommended total hip joint replacements (cup arthroplasty) bilaterally.

Should ecologic management be contemplated in such a case and if so, what is the maximum benefit that could be anticipated?

An outline of the management as well as double blind video demonstrations of sequential and complete relief of pain in this case will illustrate two important points regarding ecologic management: 1). The mechanism of chronic pain does not appear to be related to physical deformity nor does it appear to be a necessary protective mechanism. 2) addressing the total load demonstrates sequential, cumulative, and total relief of pain is possible in cases of "purely technical pain".

Douglas B. Seba, Ph.D., Private Consultant, Washington, D.C.

MAN AND HIS ENVIRONMENT: AN UNHEALTHY RELATIONSHIP

Again in 1986, there was good and bad news in the environmental arena. However, at best, mankind's treatment of the environment is bizarre, considering that his survival is dependent upon it. This paper will focus on general environmental events that have long-term health effects, both good and bad. This will help enable health practitioners to be aware of how subtle, but significant, environmental contamination or alternation, can have profound adverse health consequences in the patient. In a world full of Chernobyls and Bophals, these types of health effects cannot be washed away by the acid rain.

Cyril W. Smith, Department of Electronic and Electrical Engineering, University of Salford, Salford; Ray Y.S. Choy and Jean A. Monroe, The Allergy Unit, The Lister Hospital, Chelsea Bridge Road, London, England

ELECTROMAGNETIC MAN AND HIS ELECTROMAGNETIC ENVIRONMENT IN HEALTH AND DISEASE

The electromagnetic aspects of the human regulatory system complement its biochemical aspects. Patients with multiple allergic responses to nutritional and environmental stimuli may show similar hypersensitivities in respect of weak environmental electro-magnetic fields. Once the patient's intensity threshold has been exceeded the reactions are frequency rather than intensity specific. For many of these patients, their responses to a frequency are evident within seconds of its being switched on in their environment and complete within about a minute. This rapid response makes possible a provocation-neutralization technique for diagnosis and therapy based on the symptoms described by the patient. However, some patients only experience their symptoms many hours after being in the electromagnetic environment, while others experience symptoms triggered by what appear to be electromagnetic resonances and reflections associated with objects and materials in their environment. Preliminary work on tackling these problems will be described.