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 [Volume 51](#)

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Symptoms and health status in individuals with multiple chemical sensitivities syndrome from four reported sensitizing exposures and a general population comparison group.

[Davidoff AL](#), [Keyl PM](#)

Arch Environ Health 1996 May-Jun **51:3** 201-13

Abstract

Self-reported information about health and mental health status and history on (a) three diverse samples of individuals who reported multiple chemical sensitivities syndrome (n = 60) and (b) one sample of the general population (n = 60) was collected by telephone interview. Subjects from the general population were selected randomly from the telephone directory and were matched for age, gender, and socioeconomic status with index subjects. Data on an additional 10 subjects with multiple chemical sensitivities syndrome were also available for comparison on many of the variables of interest. The four diverse groups of patients with multiple chemical sensitivities syndrome had very similar general and specific indices of illness and sensitivity to chemicals. Members of the general population reported mild sensitivity to chemicals, and even those with more sensitivity differed from the multiple chemical sensitivities syndrome groups with respect to number and types of symptoms reported, duration and frequency of response, and associated features. Multiple chemical sensitivities syndrome was associated consistently with only one psychiatric variable, elevated negative affect scores, which were correlated significantly with the presence of illness. Patients with multiple chemical sensitivities syndrome from the diverse samples had very similar characteristic features, despite whether they had or had not received treatment by clinical ecologists.

MeSH

[Adult](#) ; [Chlorine](#) ; [Comparative Study](#) ; [Drug Tolerance](#) ; [Environmental Exposure](#) ; [Female](#) ; [Hazardous Substances](#) ; [Health Status](#) ; [Human](#) ; [Insecticides, Organophosphate](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Oxides](#) ; [Psychiatric Status Rating Scales](#) ; [Sick Building Syndrome](#) ; [Solvents](#) ; [Support, Non-U.S. Gov't](#) ; [Support, U.S. Gov't, P.H.S.](#) ; [Syndrome](#) ;

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 [Volume 24](#)

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Odor aversion of multiple chemical sensitivities: recommendation for a name change and description of successful behavioral medicine treatment.

[Amundsen MA](#), [Hanson NP](#), [Bruce BK](#), [Lantz TD](#), [Schwartz MS](#), [Lukach BM](#)

Regul Toxicol Pharmacol 1996 Aug **24:1 Pt 2** S116-8

Abstract

Patients with odor-triggered symptoms, meeting the case definition of multiple chemical sensitivities (MCS), continue

to be seen in our institution and other health science centers [Amundsen, Mayo Clinic Dept. Intern. Med. Newslett. 9(1) (1986)]. The term MCS, unfortunately, feeds the thesis that symptoms are allergic-immune system in origin, a theory that has not withstood scientific scrutiny [American College of Physicians, Ann. Intern. Med. 111, 168-178 (1989); Terr, Ann. Intern. Med. 119, 163-164 (1993)]. It has been proposed that some of these cases may be examples of classical (Pavlovian) conditioning: many MCS patients meet diagnostic criteria for psychiatric illnesses, especially mood, anxiety, and somatoform disorders. Attention is turning to the complex relationship between olfactory stimulation, memory, and mood (psyche) in an attempt to understand why some individuals develop odor aversion symptoms and how to best manage these, frequently, severely disabled patients. Two subjects with typical odor-triggered symptoms have been treated, using behavioral medicine techniques, with marked improvement in both cases. The term "odor aversion" is proposed rather than MCS to describe patients with these symptoms.

MeSH

[Behavior Therapy](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ; [Neurotic Disorders](#) ; [Odors](#) ; [Smell](#) ;

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Multiple chemical sensitivities syndrome: a review [see comments]

[Brod BA](#)

Am J Contact Dermat 1996 Dec 7:4 202-11

Abstract

Multiple chemical sensitivities (MCS) syndrome is a controversial diagnosis that has arisen in the latter half of the 20th century. Clinical ecologists strongly believe that multiple common environmental chemicals assault the immune system in certain individuals, producing multisystem disease. Mainstream medicine, however, largely believes that the symptoms of MCS syndrome can be attributed to a conditioned response to the environment and psychiatric disease. This review examines the controversy surrounding MCS syndrome in regard to the etiology, diagnosis, and management.


MeSH

[Environmental Exposure](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ; [Syndrome](#) ;

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 [J Toxicol Clin Toxicol](#)

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Multiple chemical sensitivities--new paradigm needed.

[Bronstein AC](#)

J Toxicol Clin Toxicol 1995 33:2 93-4

Abstract

The current principles of toxicology, immunology and allergy do not provide a coherent explanation of a chemical sensitivity lacking reproducible and measurable physiologic or biochemical changes. A new paradigm is needed as a scientific model for multiple chemical sensitivities.

MeSH

[Human](#) ; [Multiple Chemical Sensitivity](#) ;

Author Address

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Multiple chemical sensitivities--public policy [editorial]

[Gots RE](#)

J Toxicol Clin Toxicol 1995 **33**:2 111-3

Abstract

The phenomenon of multiple chemical sensitivities is a peculiar manifestation of our technophobic and chemophobic society. It has been rejected as an established organic disease by the American Academy of Allergy and Immunology, the American Medical Association, the California Medical Association, the American College of Physicians, and the International Society of Regulatory Toxicology and Pharmacology. It may be the only ailment in existence in which the patient defines both the cause and the manifestations of his own condition. Despite this, it has achieved credibility in workmen's compensation claims, tort liability, and regulatory actions, all of which are briefly reviewed.

MeSH

[Human](#) ; [Multiple Chemical Sensitivity](#) ; [Public Policy](#) ; [United States](#) ; [Workers' Compensation](#) ;



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Multiple chemical sensitivities--a syndrome of pseudotoxicity manifest as exposure perceived symptoms.

[Kurt TL](#)

J Toxicol Clin Toxicol 1995 **33**:2 101-5

Abstract

The history of and nomenclature of the multiple chemical sensitivities are reviewed. The author's definition of multiple chemical sensitivity is a symptom complex 1) triggered by odor or a perceived exposure; 2) occurring at exposure levels below those of allergic sensitivity or irritation; 3) analogous to the symptoms of panic disorder as defined by DSM-IV-R; 4) lacking objective clinic pathologic criteria; and 5) responsive to panic disorder management.

MeSH

[Human](#) ; [Multiple Chemical Sensitivity](#) ;

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North Texas Poison Center, Dallas 75235.



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[Psychosom Med](#)

[Volume 58](#)

A controlled comparison of multiple chemical sensitivities and chronic fatigue syndrome.

Fiedler N, Kipen HM, DeLuca J, Kelly-McNeil K, Natelson B

Psychosom Med 1996 Jan-Feb **58**:1 38-49

Abstract

The present study had two objectives: 1) to determine the characteristics that differentiated subjects with multiple chemical sensitivities (MCS), chemical sensitivities (CS), and chronic fatigue syndrome (CFS); and 2) to evaluate the psychiatric and neuropsychological complaints of these groups relative to normal controls. A cross-sectional comparison was made of the following groups matched for age, sex, and education: 1) patients whose sensitivities to multiple low level chemical exposures began with a defined exposure (MCS; N = 23); 2) patients with sensitivities to multiple chemicals without a clear date of onset (CS; N = 13); 3) patients meeting CDC criteria for Chronic Fatigue Syndrome (CFS; N = 18); and 4) normal controls (N = 18). Subjects with sensitivities to chemicals (MCS and CS) reported significantly more lifestyle changes due to chemical sensitivities and significantly more chemical substances that made them ill compared with chronic fatigue and normal controls. MCS, CS, and CFS patients had significantly higher rates of current psychiatric disorders than normal controls and reported significantly more physical symptoms with no medical explanation. Seventy-four percent of MCS and 61% of CFS did not qualify for any current Axis I psychiatric diagnosis. Chemically sensitive subjects without a defined date of onset (CS) had the highest rate of Axis I psychiatric disorders (69%). On the MMPI-2, 44% of MCS, 42% of CS, 53% of CFS, and none of the controls achieved clinically significant elevations on scales associated with somatoform disorders. With the exception of one complex test of visual memory, no significant differences were noted among the groups on tests of neuropsychological function. Standardized measures of psychiatric and neuropsychological function did not differentiate subjects with sensitivities to chemicals from those with chronic fatigue. Subjects with sensitivities to chemicals and no clear date of onset had the highest rate of psychiatric morbidity. Standardized neuropsychological tests did not substantiate the cognitive impairment reported symptomatically. Cognitive deficits may become apparent under controlled exposure conditions.

MeSH

Adult ; Age of Onset ; Comparative Study ; Cross-Sectional Studies ; Fatigue Syndrome, Chronic ; Female ; Human ; Life Style ; Male ; Middle Age ; Multiple Chemical Sensitivity ; MMPI ; Neuropsychological Tests ; Psychiatric Status Rating Scales ; Somatoform Disorders ; Support, Non-U.S. Gov't ; Support, U.S. Gov't, P.H.S. ;

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 Scand J Work Environ Health

 Volume 23 Suppl 3

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Somatization and fashionable diagnoses: illness as a way of life.

Ford CV

Scand J Work Environ Health 1997 **23** Suppl 3: 7-16

Abstract

The history of "nondisease" dates back, at least 4000 years, to early descriptions of hysteria. More recently somatization became a part of the official diagnostic nomenclature by creation of the DSM III category, "somatoform disorders." Somatization can serve as a rationalization for psychosocial problems or as a coping mechanism, and for some illness, becomes a way of life. One variation of somatization can be the "fashionable diagnosis", for example, fibromyalgia, multiple chemical sensitivities, dysautonomia, and, in the past, "reactive hypoglycemia". These disorders are phenomenologically related to environmental or occupational syndromes and mass psychogenic illness. Fashionable illnesses are characterized by (i) vague, subjective multisystem complaints, (ii) a lack of objective laboratory findings, (iii) quasi-scientific explanations, (iv) overlap from one fashionable diagnosis to another, (v) symptoms consistent with depression or anxiety or both, (vi) denial of psychosocial distress or attribution of it to the illness. Fashionable diagnoses represent a heterogeneous collection of physical diseases, somatization, and anxiety or depression. They are final common symptomatic pathways for a variety of influences including environmental factors, intrapersonal distress and solutions to social problems. A fashionable diagnosis allows psychosocial distress to be comfortably hidden from both the patient and the physician, but premature labeling can also mask significant physical disease. Hysteria remains alive and well and one contemporary hiding place is fashionable illness.

MeSH

[Adaptation, Psychological](#) ; [Case Report](#) ; [Cumulative Trauma Disorders](#) ; [Depressive Disorder](#) ; [Diagnosis, Differential](#) ; [Female](#) ; [Fibromyalgia](#) ; [Human](#) ; [Hypoglycemia](#) ; [Hysteria](#) ; [Incidence](#) ; [Life Style](#) ; [Middle Age](#) ; [Psychology](#) ; [Sick Building Syndrome](#) ; [Sick Role](#) ; [Social Environment](#) ; [Somatoform Disorders](#) ;

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Report of Multiple Chemical Sensitivities (MCS) Workshop, Berlin, Germany, 21-23 February 1996. PCS/96.29 IPCS, Geneva, Switzerland.

[Lessof M](#)

Hum Exp Toxicol 1997 Apr 16:4 233-4

MeSH

[Education](#) ; [Environmental Exposure](#) ; [Hazardous Substances](#) ; [Human](#) ; [Hypersensitivity](#) ; [Multiple Chemical Sensitivity](#) ; [Nomenclature](#) ; [World Health Organization](#) ;



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[Volume 104 Suppl 2](#)

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Neuropsychological approaches for the detection and evaluation of toxic symptoms.

[Fiedler N](#)

Environ Health Perspect 1996 Apr 104 Suppl 2: 239-45

Abstract

The purpose of this paper is 3-fold: a) to review briefly the neuropsychological tests that have been used to evaluate the effects of neurotoxicants; b) to identify individual factors that may create heightened sensitivity to neurotoxicants; and c) to discuss test parameters that will increase the sensitivity of neuropsychological tests for detecting symptoms in low-level exposure situations. While the body of literature on neurobehavioral toxicology has increased dramatically during the past 10 years, it remains difficult to discern which tests are most effective in detecting behavioral effects even among workers with significant exposures. Few investigators have evaluated the interactions between individual differences, such as gender and psychiatric function, and exposure to neurotoxicants. Detection of behavioral performance decrements among uniquely susceptible populations such as those with sensitivities to low-level exposures (e.g., multiple chemical sensitivities) will require more difficult tests than are frequently used in current neuropsychological test batteries.


MeSH

[Cognition Disorders](#) ; [Evaluation Studies](#) ; [Human](#) ; [Individuality](#) ; [Nervous System Diseases](#) ; [Neuropsychological Tests](#) ; [Neurotoxins](#) ; [Psychomotor Performance](#) ;

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Multiple chemical sensitivities or idiopathic environmental intolerances: psychophysiologic foundation of knowledge for a psychogenic explanation [editorial; comment]

[Staudenmayer H](#)


J Allergy Clin Immunol 1997 Apr **99**:4 434-7

MeSH

[Human](#) ; [Multiple Chemical Sensitivity](#) ; [Psychophysiologic Disorders](#) ; [Psychophysiology](#) ;



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Patients with multiple chemical sensitivities in an occupational health clinic: presentation and follow-up.

[Lax MB](#), [Henneberger PK](#)

Arch Environ Health 1995 Nov-Dec **50**:6 425-31

Abstract

Thirty-five people with work-related Multiple Chemical Sensitivities were studied to learn about the onset and progression of illness. The subjects were selected from patients at an occupational health clinic. Individuals were identified as subjects if they fulfilled a seven-point case definition for Multiple Chemical Sensitivities and if onset of symptoms was related to workplace exposures. Three occupational exposures to solvents, poor indoor-air quality, and remodeling were associated with onset of Multiple Chemical Sensitivities in 63% of the subjects. Symptoms indicative of a nervous-system disorder topped the list of the most frequently reported symptoms. Commonalities in exposures and symptoms suggest that Multiple Chemical Sensitivities represents a distinct diagnostic category. Even with an incomplete understanding of etiology, it may be possible to limit the onset of work-related Multiple Chemical Sensitivities.

MeSH

[Adult](#) ; [Air Pollution, Indoor](#) ; [Data Collection](#) ; [Demography](#) ; [Female](#) ; [Follow-Up Studies](#) ; [Human](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Occupational Exposure](#) ; [Occupational Health Services](#) ; [Patient Education](#) ; [Workers' Compensation](#) ;

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Multiple chemical sensitivities, including iatrogenic allergic contact dermatitis, in a patient with chronic actinic dermatitis: implications for management.

[Stitt WZ](#), [Scott GA](#), [Martin RE](#), [Gaspari AA](#)

Am J Contact Dermat 1996 Sep **7**:3 166-70

Abstract

BACKGROUND: Chronic actinic dermatitis represents a spectrum of photosensitive dermatoses. Phototesting and photopatch testing are necessary to elucidate the specific subtype. Such patients may have multiple cutaneous allergies and photoallergies. **OBJECTIVE:** This is a case report of a patient with chronic actinic dermatitis whose condition was worsened by certain sunscreens and corticosteroids. Our purpose was to identify the specific subtype of chronic actinic dermatitis and cutaneous allergens. **METHODS:** Phototesting to UVB and UVA was performed. Photopatch testings to standard photoallergens and to Photoplex sunscreen ingredients was performed. Patch testing to standard allergens and proprietary corticosteroids was performed. **RESULTS:** Positive photoallergies to Photoplex sunscreen and the UVA screen within Photoplex, Parsol 1789 (4-tert-butyl-4'-methoxydibenzoyl-methane), were identified. Positive allergies to Aclovate (aclometasone dipropionate) cream and ointment and Locoid (hydrocortisone butyrate) ointment were identified. The patient showed increased UVB sensitivity. **CONCLUSION:** This is a case report of a patient with chronic actinic dermatitis. A relevant photoallergy to Parsol 1789 and corticosteroid sensitivities to aclometasone and hydrocortisone butyrate were identified. Multiple cutaneous allergens may be identified in patients with chronic actinic dermatoses, and avoidance of known allergens may result in significant improvement of the chronic dermatitis.


MeSH

[Adrenal Cortex Hormones](#) ; [Aged](#) ; [Case Report](#) ; [Chronic Disease](#) ; [Cross Reactions](#) ; [Dermatitis, Photoallergic](#) ; [Human](#) ; [Iatrogenic Disease](#) ; [Male](#) ; [Patch Tests](#) ; [Sunscreening Agents](#) ;

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Understanding clinical immunological testing in alleged chemically induced environmental illnesses.

[Salvaggio JE](#)

Regul Toxicol Pharmacol 1996 Aug **24:1 Pt 2** S16-27

Abstract

Some believe that an abnormal immunoregulatory response based on environmental damage to T cells is fundamental to the production of symptoms in patients with alleged "multiple chemical sensitivity" and/or "environmental illness." According to this theory stimulation of T cells or T cell phenotypic subsets by environmental chemicals results in release of cytokines that can effect appropriate target cells of multiple organ systems, resulting in a wide range of symptoms. This concept is reinforced by frequent media reporting of pollution incidents and environmental disasters plus continued isolated reports of immunologic abnormalities in patients with various forms of alleged environmental illness, multiple chemical sensitivities, or other related syndromes. These include reports of slight perturbations in quantity and function of immunoglobulins, complement and its components, B cells, natural killer cells, T cells, phenotypic T cell subsets, and helper suppressor T cell ratios. There are also reports of increased or decreased interleukin levels including IL-1 and IL-2 or their receptors (IL-2R) in these patients. Such assays are not infrequently performed even though there is no evidence for their diagnostic efficacy in these alleged conditions. It is reasonable, however, to anticipate that with the wide development of assays for many of the interleukins and their receptors, these assays may become important in the future diagnosis of many autoimmune, allergic, neoplastic, and infectious diseases. At this time, however, the induction of environmental illness or multiple chemical sensitivity by exposure to trace levels of environmental "immunotoxins" is unproven and remains a matter of speculation. The reproducibility of immunologic test abnormalities reported under these conditions has not been documented, and the data have often not been analyzed statistically. Appropriate controls also have not usually been employed, nor have control values been provided in many cases. Without consideration of these factors, a patient might be erroneously diagnosed as having some form of "immune dysregulation," "environmental immune dysfunction," or "immunotoxic" syndrome on the basis of only a single panel of cellular immunologic profiles or related immunologic tests illustrating slight deviations from the norm and in the absence of overt disease on physical examination. Consideration must also be given to an understanding of biologic variability and diurnal variations in lymphoid cell numbers in interpreting cellular immunologic profiles. For example, the necessity for age and sex-matched controls, test reproducibility, quantitative versus functional assays, and the significance of major versus minor deviations from the norm must be appreciated. In addition, many other conditions can effect immunologic tests, such as medications, psychological factors, cigarette smoking, and the presence of concurrent disease, including minor viral infections. All of these variables should be appreciated in test interpretation. Certain clinical indications for analysis of cellular components of the immune system, using flow cytometry, have been provided as guidelines although they are by no means accepted by all groups due to their current incomplete evaluation by the clinical immunology community. These suggested indications are discussed.

In this article, attempts are made to outline the various quantitative and functional tests used to assess the immune system, with emphasis on "biomarker" tests to detect possible immune system "damage." Dangers involved in attempting to make clinical evaluations based on results of isolated in vitro assessment of quantity or function of immune system cellular and humoral components without considering the results of a good medical history and physical examination, the many pitfalls involved in the tests, and the many confounding variables that affect the tests are emphasized, as well as the need for proper controls...


MeSH

[Autoantibodies](#) ; [B-Lymphocytes](#) ; [Biological Markers](#) ; [Environmental Illness](#) ; [Guidelines](#) ; [Human](#) ; [Immunologic Tests](#) ; [Immunophenotyping](#) ; [Lymphocyte Transformation](#) ; [Monocytes](#) ; [Multiple Chemical Sensitivity](#) ; [T-Lymphocytes](#) ;

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Chemical sensitivities and the Gulf War: Department of Veterans Affairs Research Center in basic and clinical science studies of environmental hazards.

[Fiedler N](#), [Kipen H](#), [Natelson B](#), [Ottenweller J](#)

Regul Toxicol Pharmacol 1996 Aug **24**:1 Pt 2 S129-38

Abstract

The purpose of the New Jersey Center for Environmental Hazards Research is to define the illness referred to as Persian Gulf Syndrome (PGS). Our preliminary data indicated that more than half of the Persian Gulf Registry (PGR) veterans reported illness characterized by severe fatigue and symptoms consistent with chemical sensitivities. Therefore, our research approach focuses on investigations of veterans with chronic fatigue syndrome (CFS) and multiple chemical sensitivities (MCS). Project 1 is an epidemiological study of 2800 PGR veterans. Symptoms, indices of Chronic Fatigue (CF) and Chemical Sensitivity (CS), and risk factors will be surveyed with mailed questionnaires. Risk factors include demographics, past medical history, psychosocial variables, Gulf War experiences such as prophylactic medication use, occupational and environmental exposures, and pesticide exposures. Symptoms will be clustered to define Gulf War Syndromes. Significant associations between risk factors and these symptom clusters will also be investigated. Subjects identified as CF, CS, or both will be recruited into Projects 2 and 3. In Project 2, healthy veterans will be compared to veterans with CF, CS, and CF concurrent with CS. Veterans will undergo four studies: (1) viral-immunological, (2) psychiatric, psychological, behavioral, and neuropsychological, (3) autonomic dysregulation, and (4) marker of P4501A2 induction resulting from exposure to combusting material. The purpose of Project 3 is to test the autonomic, immunologic, neuropsychologic, and psychologic responses of veterans with CS or CF to two stressors: controlled chemical exposure and exercise. CS subjects will undergo chemical exposures in our Controlled Environment Facility (CEF) to assess their biologic and psychologic response to low-level exposure. CF subjects will undergo a maximal treadmill exercise test. Circadian patterns of catecholamines and axillary temperature, viral burden, and cardiovascular and endocrine reactivity will be measured in response to this physical stressor. Project 4 is an animal study evaluating the interaction between stress and pathology/physiology when rats are predisposed to disease by exposure to Soman or to Dioxin. Two strains of rats that differ in stress reactivity will be used to determine the interaction of hereditary factors and chemical exposure.


MeSH


[Comorbidity](#) ; [Fatigue Syndrome, Chronic](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ; [Persian Gulf Syndrome](#) ; [Registries](#) ; [Research Design](#) ; [Support, Non-U.S. Gov't](#) ; [Support, U.S. Gov't, Non-P.H.S.](#) ; [United States](#) ; [Veterans](#) ;

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Annals of Multiple Chemical Sensitivities: State-of-the-Science Symposium. Proceedings. Baltimore, Maryland, October 30-November 1, 1995.

Anonymous

Regul Toxicol Pharmacol 1996 Aug **24**:1 Pt 2 S1-189

MeSH

[Animal](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ;



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Whither multiple chemical sensitivities? [editorial; comment]


[Nethercott JR](#)

Am J Contact Dermat 1996 Dec **7**:4 199-201

MeSH

[Environmental Exposure](#) ; [Human](#) ; [Hypersensitivity](#) ; [Multiple Chemical Sensitivity](#) ; [Syndrome](#) ;



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Multiple chemical sensitivity multiorgan dysesthesia, multiple symptom complex, and multiple confusion: problems in diagnosing the patient presenting with unexplained multisystemic symptoms.

[Salvaggio JE](#), [Terr AI](#)

Crit Rev Toxicol 1996 Nov **26**:6 617-31

Abstract

Patients are presenting in increasing numbers with multiorgan symptoms allegedly resulting from exposure to environmental chemicals. Among the symptoms expressed by patients with alleged multiple chemical sensitivities (MCS) are profound fatigue, mental confusion, myalgia, depression, anxiety, dizziness, headache, insomnia, loss of appetite, and numbness of the extremities, all in the absence of objective physical signs. Diagnostic criteria to assess the effects of environmental agents on organ systems are sorely needed because patients with MCS often have no tissue pathology or physiological abnormalities, but often do have diagnosable psychiatric illnesses. In treating patients with MCS, the physician should first perform a complete history and physical examination, including a comprehensive evaluation of chemical exposure. If the findings strongly suggest the presence of disease related to particular organ systems, further diagnostic evaluation should be undertaken. If abnormal findings are absent, psychiatric advice may be useful. The physician should keep an open mind about MCS but must also remember that a cause-effect relationship between exposure to multiple chemicals and symptoms has not been established.

MeSH

[Air Pollutants, Environmental](#) ; [Drug Hypersensitivity](#) ; [Human](#) ; [Multiple Organ Failure](#) ;

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 [N J Med](#)

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An overview of the symptoms of multiple chemical sensitivities.

[Fiedler N](#)

N J Med 1996 Jan **93**:1 39-43

MeSH

[Drug Hypersensitivity](#) ; [Human](#) ; [Solvents](#) ;

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Multiple chemical sensitivities--chemical sensitivity as a symptom of airway inflammation [editorial]

[Meggs WJ](#)

J Toxicol Clin Toxicol 1995 **33**:2 107-10

Abstract

The term multiple chemical sensitivity confuses etiology with diagnosis. Chemical sensitivity is a symptom expressed by patients. The symptoms complex is also expressed by the majority of patients with asthma reactive airway dysfunction syndrome or rhinitis following a single acute exposure, called reactive upper airway dysfunction syndrome. The chemically sensitivity patient merits evaluation for upper airway and bronchial reactivity that may cause extra-airway symptomatology.

MeSH

[Human](#) ; [Inflammation](#) ; [Multiple Chemical Sensitivity](#) ; [Respiratory Hypersensitivity](#) ;

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An overview of the symptoms of multiple chemical sensitivities.

[Fiedler N](#)

N J Med 1996 Jan **93**:1 39-43

MeSH

[Drug Hypersensitivity](#) ; [Human](#) ; [Solvents](#) ;

Author Address

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[Toxicology](#)

[Volume 111](#)

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Phenotypic variation in xenobiotic metabolism and adverse environmental response: focus on sulfur-dependent detoxification pathways.

[McFadden SA](#)

Toxicology 1996 Jul 17 **111**:1-3 43-65

Abstract

Proper bodily response to environmental toxicants presumably requires proper function of the xenobiotic (foreign chemical) detoxification pathways. Links between phenotypic variations in xenobiotic metabolism and adverse environmental response have long been sought. Metabolism of the drug S-carboxymethyl-L-cysteine (SCMC) is polymorphous in the population, having a bimodal distribution of metabolites, 2.5% of the general population are thought to be nonmetabolizers. The researchers developing this data feel this implies a polymorphism in sulfoxidation of the amino acid cysteine to sulfate. While this interpretation is somewhat controversial, these metabolic differences reflected may have significant effects. Additionally, a significant number of individuals with environmental intolerance or chronic disease have impaired sulfation of phenolic xenobiotics. This impairment is demonstrated with the probe drug acetaminophen and is presumably due to starvation of the sulfotransferases for sulfate substrate. Reduced metabolism of SCMC has been found with increased frequency in individuals with several degenerative neurological and immunological conditions and drug intolerances, including Alzheimer's disease, Parkinson's disease, motor neuron disease, rheumatoid arthritis, and delayed food sensitivity. Impaired sulfation has been found in many of these conditions, and preliminary data suggests that it may be important in multiple chemical sensitivities and diet responsive autism. In addition, impaired sulfation may be relevant to intolerance of phenol, tyramine, and phenolic food constituents, and it may be a factor in the success of the Feingold diet. These studies indicate the need for the development of genetic and functional tests of xenobiotic metabolism as tools for further research in epidemiology and risk assessment.

MeSH

[Carbocysteine](#) ; [Environmental Pollutants](#) ; [Human](#) ; [Metabolic Detoxication, Drug](#) ; [Multiple Chemical Sensitivity](#) ; [Phenotype](#) ; [Sulfur](#) ; [Variation \(Genetics\)](#) ; [Xenobiotics](#) ;

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Multiple chemical sensitivities--syndrome and solution.

[Spyker DA](#)

J Toxicol Clin Toxicol 1995 **33**:2 95-9

Abstract

After describing two patients seen by the author, we define multiple chemical sensitivities and discuss the scope of the problem and the epidemiology. Although the incidence of multiple chemical sensitivities is not known, the demographics are similar to that of agoraphobia. The classical conditioning model is proposed as a useful description of multiple chemical sensitivities. The desensitization approach to the diagnosis and treatment is proposed. Results with three patients were encouraging and the approach seems worthy of further evaluation and refinement.


MeSH

[Adult](#) ; [Case Report](#) ; [Female](#) ; [Human](#) ; [Male](#) ; [Multiple Chemical Sensitivity](#) ;

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Significance of individual sensitivity to chemicals: elucidation of host susceptibility by use of biomarkers in environmental health research.

[Cullen MR](#), [Redlich CA](#)

Clin Chem 1995 Dec **41:12 Pt 2** 1809-13

Abstract

Biomarker research has become the predominant theme for study of human dose-host-response relations to environmental chemicals. Increasing interest has been focused on identifying markers for host susceptibility, with mixed results. Efforts to identify markers for host variability in carcinogenic risk, on the basis of theoretical knowledge of carcinogen metabolism, have been disappointing. New work in the area of acquired risk modifiers, such as nutritional status, is theoretically attractive, but results have been limited. Impressive achievements have been made in the area of immunological variability, which may elucidate the molecular basis of as well as provide practical biomarkers for several diseases. The problem of multiple chemical sensitivities, on the other hand, has proved refractory to biomarker research, reflecting inadequate knowledge of the mechanism and inappropriate application of biomarker methods.

MeSH

[Biological Markers](#) ; [Carcinogens](#) ; [Disease Susceptibility](#) ; [Environmental Exposure](#) ; [Environmental Health](#) ; [Human](#) ; [Immunogenetics](#) ; [Models, Genetic](#) ; [Multiple Chemical Sensitivity](#) ; [Mutation](#) ; [Research](#) ; [Risk Factors](#) ; [Support, U.S. Gov't, P.H.S.](#) ;

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Measuring chemical sensitivity prevalence: a questionnaire for population studies.

[Kipen HM](#), [Hallman W](#), [Kelly-McNeil K](#), [Fiedler N](#)

Am J Public Health 1995 Apr **85:4** 574-7

Abstract

Because no information exists on the prevalence of chemical sensitivity syndromes such as multiple chemical sensitivities, a questionnaire for use in population studies was developed and tested to assess the presence or absence of chemical sensitivity. Seven hundred five individuals attending clinics answered a questionnaire asking whether each of 122 common substances caused symptoms. Results showed that patients with multiple chemical sensitivities and asthma had average total scores that were significantly different from each other and from those of each of the other diagnostic categories. Higher total scores were also reported by female patients. The instrument described here may facilitate meaningful prevalence studies of multiple chemical sensitivities. It will also allow study of chemically induced symptoms in other conditions such as asthma.

MeSH

[Adolescence](#) ; [Adult](#) ; [Aged](#) ; [Analysis of Variance](#) ; [Epidemiologic Methods](#) ; [Female](#) ; [Health Surveys](#) ; [Human](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Pilot Projects](#) ; [Prevalence](#) ; [Questionnaires](#) ; [Support, U.S. Gov't, P.H.S.](#) ;

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Successful use of a selective serotonin reuptake inhibitor in a patient with multiple chemical sensitivities.

[Andiné P](#), [Rönnbäck L](#), [Järholm B](#)

Acta Psychiatr Scand 1997 Jul **96**:1 82-3

Abstract

A 53-year-old man with multiple chemical sensitivities (MCS) received the selective serotonin reuptake inhibitor (SSRI) citalopram for treatment of depression. The treatment was successful and, in parallel to the remission of the depressive symptoms, all MCS symptoms vanished. This suggests that a subgroup of MCS patients may have an atypical depression, that they should be psychiatrically evaluated, and that antidepressive pharmacological treatment may be considered in cases of MCS.

MeSH

[Aerosols](#) ; [Antidepressive Agents, Second-Generation](#) ; [Case Report](#) ; [Citalopram](#) ; [Depression](#) ; [Human](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Occupational Exposure](#) ; [Serotonin Uptake Inhibitors](#) ; [Solvents](#) ;

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Clinical consequences of the EI/MCS "diagnosis": two paths.

[Staudenmayer H](#)

Regul Toxicol Pharmacol 1996 Aug **24**:1 Pt 2 S96-110

Abstract

There are two distinct paths down which patients "diagnosed" with environmental illness/multiple chemical sensitivities (EI/MCS) can travel. Along the first path, beliefs about low-level, multiple chemical sensitivities as the cause of physical and psychological symptoms are instilled and reinforced by a host of factors including toxicogenic speculation, iatrogenic influence mediated by unsubstantiated diagnostic and treatment practices, patient support/advocacy networks, and social contagion. Intrapsychic factors also reinforce this path through the motivational mechanism of factitious malingering, or unconscious primary and secondary gain, mediated through psychological defenses, particularly projection of cause of illness onto the physical environment. The second path involves restructuring distorted beliefs about chemical sensitivities. Explanations of the placebo effect, the physiology of the stress response, and the symptoms of anxiety and panic facilitate the direction of EI/MCS patients onto this path. A decision model is presented to discriminate among toxicogenic and psychogenic explanations of the EI/MCS

phenomenon, based on appraisal of reaction and physiologic and cognitive responses during provocation chamber challenges under double-blind, placebo-controlled conditions. These studies have been helpful therapeutically for some patients in selecting the path that leads to wellness. This paper suggests how various therapeutic techniques can be employed with difficult patients. Often, supportive psychotherapy establishes a therapeutic alliance which facilitates cognitive therapy to restructure distorted beliefs. In the process of finding alternative explanations to chemical sensitivities, the etiology of symptoms is related to stressful life events, including childhood experiences which may have disrupted normal personality development and coping capacity. Furthermore, biological and physiological sequelae stemming from early, chronic trauma have been identified which could explain many of the multisystem complaints. The incidence of childhood abuse reported by EI/MCS patients is strikingly high, and it is recollection of trauma that many EI/MCS patients avoid by displacing the psychologic and physiologic adults sequelae onto the physical environment. The reenactment of these experiences may be necessary in the therapy of some affected individuals. Despite the significant therapeutic effort expended, some patients who are imprisoned by a closed belief system about the harmful effects of chemical sensitivities are resigned to travel down the path which ultimately leads to despair and depression, social isolation, and even death.


MeSH

[Child](#) ; [Child Abuse](#) ; [Cognitive Therapy](#) ; [Environmental Illness](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ; [Practice Guidelines](#) ; [Psychotherapy](#) ; [Stress Disorders, Post-Traumatic](#) ; [Stress, Psychological](#) ;

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Multiple chemical sensitivities: distinguishing between psychogenic and toxicodynamic.

[Gots RE](#)

Regul Toxicol Pharmacol 1996 Aug **24:1 Pt 2** S8-15

Abstract

The fundamental issue in the multiple chemical sensitivity (MCS) debate is whether this phenomenon is primarily a psychogenic or toxicodynamic disorder, that is, whether symptoms are due to an emotional response to perceived chemical toxicity or to a pathological interaction between chemical agents and organ systems. The distinction between psychogenic or toxicodynamic is essential to the medical management of an MCS patient. A behavioral origin leads to a behavioral therapy, whereas a toxicodynamic etiology may necessitate avoidance and exposure control methodologies. Regulatory, legislative, judicial, and occupational control responses are also dependent upon the critical distinction between psychogenic and organic etiologies. If people are being poisoned by low levels of chemicals, one set of responses follows. If, on the other hand, MCS sufferers are symptomatic for emotional reasons, the response is different. Everything that is known about MCS to date strongly suggests behavioral and psychogenic explanations for symptoms. The premature use of the term multiple chemical sensitivities has hampered effective exploration of and response to this phenomenon, because it suggests, to the lay person, a physiological explanation. It is time that this disorder be properly characterized so that sufferers receive the care they need and so that new "victims" are not recruited.

MeSH

[Diagnosis, Differential](#) ; [Health Policy](#) ; [Human](#) ; [Multiple Chemical Sensitivity](#) ; [Somatoform Disorders](#) ; [United States](#) ;

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Intranasal chemoreception in patients with multiple chemical sensitivities: a double-blind investigation.

[Hummel T](#), [Roscher S](#), [Jaumann MP](#), [Kobal G](#)

Regul Toxicol Pharmacol 1996 Aug **24**:1 Pt 2 S79-86

Abstract

Multiple chemical sensitivities (MCS) has become an increasingly frequent diagnosis assigned to patients with symptoms associated with exposures to environmental chemicals. Since the characteristic symptoms of MCS are triggered by very low concentrations of chemicals, in the range of olfactory thresholds, it is widely believed that the intranasal chemoreceptive senses are involved in the pathophysiology of MCS. Thus, the present study addressed both the olfactory and trigeminal systems: using a double-blind approach we investigated whether MCS patients show differences in responses after exposure to either room air or low concentrations of a widely used chemical agent (2-propanol). A total of 23 patients participated in the experiments (mean age 47 years; 13 female, 10 male). MCS was diagnosed according to Cullen's criteria. Performance of the nasal chemical senses was established by means of chemosensory event-related potentials (CSERP) and subjective measures of olfactory function (odor discrimination, phenylethyl alcohol odor thresholds). CSERP were recorded in response to olfactory (H₂S), and trigeminal (CO₂) stimuli. The study provided three major results: (1) Approximately 20% of patients diagnosed with MCS presented symptoms regardless of the type of challenge, suggesting the susceptibility of MCS patients to unspecific experimental manipulations. (2) Changes in CSERP latencies indicated a change in the processing of both olfactory and trigeminal stimuli. (3) While odor threshold remained unchanged, the patients' ability to discriminate odors decreased after exposure to room air. In contrast, this decrease was less pronounced after exposure to 2-prop. Summarily, MCS patients respond to challenge with 2-prop with changes of chemosensory perception which might increase their susceptibility to environmentally volatile chemicals. Changes in the pattern of event-related potentials are interpreted as the possible change of the orientation of cortical generators, i.e., neuronal populations that were involved in the processing of chemosensory information. However, investigations in healthy controls are needed in order to draw further conclusions.


MeSH

[Administration, Inhalation](#) ; [Adult](#) ; [Alcohol, Propyl](#) ; [Carbon Dioxide](#) ; [Double-Blind Method](#) ; [Evoked Potentials, Somatosensory](#) ; [Female](#) ; [Human](#) ; [Hydrogen Sulfide](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Olfactory Nerve](#) ; [Sensory Thresholds](#) ; [Smell](#) ; [Trigeminal Nerve](#) ;

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Neurobehavioral performance in multiple chemical sensitivities.

[Bolla KI](#)

Regul Toxicol Pharmacol 1996 Aug **24**:1 Pt 2 S52-4

Abstract

Individuals with Multiple Chemical Sensitivities (MCS) frequently report difficulties in attention/concentration, memory and accuracy and speed of problem solving. We evaluated neurobehavioral functioning in 35 chemically exposed patients referred to our Occupational and Environmental Neurology Clinic. Of these 35 patients, 17 presented with symptoms of MCS and 16 patients reported no symptoms of MCS. In addition, we used a group of 126 healthy controls for comparison. The performance of the MCS group was not significantly different from that of the control group on tests of verbal learning and memory, executive functioning, and psychomotor functioning. The MCS group performed below the control group on a test of visual learning and memory, but this performance was similar to the group with chemical exposure and no MCS. Therefore, performance on objective neurobehavioral tests did not confirm the most frequently reported subjective complaints of patients with MCS. These results suggest that patients with symptoms of MCS do not have compromised central nervous system functioning.

MeSH

[Adult](#) ; [Age Factors](#) ; [Brain](#) ; [Comparative Study](#) ; [Female](#) ; [Human](#) ; [Male](#) ; [Middle Age](#) ; [Multiple Chemical Sensitivity](#) ; [Neuropsychological Tests](#) ; [Occupational Exposure](#) ;

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