

NMDA sensitization and stimulation by peroxyxynitrite, nitric oxide, and organic solvents as the mechanism of chemical sensitivity in multiple chemical sensitivity.[\[Related Titles\]](#)

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Multiple chemical sensitivity (MCS) is a condition where previous exposure to hydrophobic organic solvents or pesticides appears to render people hypersensitive to a wide range of chemicals, including organic solvents. The hypersensitivity is often exquisite, with MCS individuals showing sensitivity that appears to be at least two orders of magnitude greater than that of normal individuals. This paper presents a plausible set of interacting mechanisms to explain such heightened sensitivity. It is based on two earlier theories of MCS: the elevated nitric oxide/ peroxyxynitrite theory and the neural sensitization theory. It is also based on evidence implicating excessive NMDA activity in MCS. Four sensitization mechanisms are proposed to act synergistically, each based on known physiological mechanisms: Nitric oxide-mediated stimulation of neurotransmitter (glutamate) release; peroxyxynitrite-mediated ATP depletion and consequent hypersensitivity of NMDA receptors; peroxyxynitrite-mediated increased permeability of the blood-brain barrier, producing increased accessibility of organic chemicals to the central nervous system; and nitric oxide inhibition of cytochrome P450 metabolism. Evidence for each of these mechanisms, which may also be involved in Parkinson's disease, is reviewed. These interacting mechanisms provide explanations for diverse aspects of MCS and a framework for hypothesis-driven MCS research.

psychophysiological functions of subjects with self-reported multiple chemical sensitivity (sMCS) during experimental solvent exposure.[\[Related Titles\]](#)

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The study examined the assumption of a higher sensitivity of autonomic functions of subjects with self-reported multiple chemical sensitivity (sMCS) during environmental exposure. The hypothesis was tested in a laboratory study with standardized exposures. Twelve healthy male subjects (26.4 +/- 5.4 y) with and 12 male control subjects (25.7 +/- 3.8 y) without self-reported multiple chemical sensitivity (sMCS), selected by a questionnaire, were included in the experimental study. At four different days the subjects were exposed in a random order to solvents for four hours: 10 ppm or 98 ppm ethyl benzene, 10 ppm or 189 ppm 2-butanone.

Heart rate and breathing rate were analysed for two 30-minute periods of vigilance testing at the beginning and end of exposure. In sMCS-subjects both functions were elevated at the beginning of the testing periods with a tendency to decrease over the 30-minute periods. Control subjects revealed a relatively constant level (breathing rate) and a small increase (heart rate) during the periods. These group differences were obvious for all experimental conditions across substances and levels of exposures. Furthermore, the mean of the breathing rate of sMCS-subjects was generally higher compared to the control subjects. While the assumption of a generally altered sensitivity of autonomic functions of sMCS-subjects to environmental changes seems to be supported, no specific reactions to the type or level of the chemical exposure were found.

A multiple center study of multiple chemical sensitivity syndrome. [\[Related Titles\]](#)

Arch Environ Health 2001 May-Jun;56(3):196-207 (ISSN: 0003-9896)
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The lack of widely accepted, standardized, clinical and epidemiologic criteria for Multiple Chemical Sensitivity syndrome has led to confusion about the identification of the condition and has slowed pertinent research. In this article, the authors evaluated the psychometric properties of 2 sets of clinical/epidemiologic criteria for Multiple Chemical Sensitivity syndrome. In this cross-sectional survey of 1,166 patients who visited outpatient occupational, otolaryngology, allergy, and clinical ecological clinics, the authors used the aforementioned sets of criteria to (a) estimate the prevalence of the syndrome in these varied samples and (b) compare the current diagnostic practices of traditional physician specialists with those of clinical ecologists. The authors used a patient-completed questionnaire to assess the medical, psychosocial, and psychological status of patients who reported multiple chemical sensitivities. This approach enabled the formulation of 6 domains, which represented commonly observed characteristics of the syndrome. The authors used a physician-completed questionnaire to collect diagnoses of Multiple Chemical Sensitivity syndrome and other medical conditions. Domains, which were operationalized by the questionnaire and comprised the 2 sets of criteria for identification of the Multiple Chemical Sensitivity syndrome, had test-retest reliabilities that exceeded .75 and estimates of internal consistency that ranged between .59 and .94. Evidence of construct and face validity was considered acceptable. The overall clinic-based prevalences of Multiple Chemical Sensitivity syndrome, based on 6 and 4 domains, were 7% and 23%, respectively. Regardless of the identifying set of criteria used, physicians' diagnoses had relatively low sensitivities (range = 6-50%) and relatively high specificities (range = 82-99%). The

study data suggested that the domains operationalized by the questionnaire had reasonable psychometric characteristics. Study data also support the fact that Multiple Chemical Sensitivity syndrome is often overlooked--even by those physicians who treat it most frequently--and that use of both sets of objective criteria for identifying the syndrome would greatly improve the sensitivity of physician diagnoses.

Immunologic parameters of multiple chemical sensitivity.[\[Related Titles\]](#)

Occup Med 2000 Jul-Sep;15(3):647-65 (ISSN: 0885-114X)

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Immunologic abnormalities have long been advanced as a potential mechanism for multiple chemical sensitivity (MCS). An immunologic mechanism is supported in part by the systemic nature of the symptoms reported, the complex interactions known to exist between the immune system and other systems, and limited experimental evidence. However, there are both theoretical grounds for doubting an immunologic mechanism in MCS and methodological constraints in many of the studies that have been conducted in humans. The authors discuss the structure and function of the immune system as it potentially applies to MCS, the uses and limitations of immunologic testing, and the evidence for immunologic theories of MCS. They describe recent work to validate some of the immunologic tests used in MCS and consider opportunities for further research.

Occup Med 2000 Jul-Sep;15(3):611-6 (ISSN: 0885-114X)

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The author provides a brief overview of single photon emission computed tomography in the assessment of multiple chemical sensitivities.