

# Odor Aversion or Multiple Chemical Sensitivities: *Recommendation for a Name Change and Description of Successful Behavioral Medicine Treatment*

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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.

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Patients with odor-triggered symptoms, meeting the case definition for multiple chemical sensitivities (MCS), continue to be recognized in our institution and other health science centers and by other clinicians. Cullen's definition contains seven main diagnostic features (Cullen, 1987, 1994):

1. The syndrome is acquired, usually after occurrence of a more clearly evident (although not necessarily serious) health event caused by environmental exposure, such as solvent intoxication, respiratory tract irritation, pesticide poisoning or sick building syndrome.

2. The patient experiences multiple symptoms referable to several organ systems, almost always including the central nervous system.

3. Although there may be persistent complaints between exposures, the symptoms are characteristically and predictably precipitated by a perceived environmental exposure.

4. The agents that may precipitate the symptoms are multiple and chemically diverse.

5. The doses of these agents that may precipitate the symptoms are at least two orders of magnitude lower than the established thresholds for acute health effects.

6. No test of physiologic function can explain the symptoms. Although there may be clinical abnormalities, such as mild bronchospasm or neuropsychologic dysfunction, these are insufficient to explain the illness pattern.

7. No other organic disorder is present that can explain the pattern of symptoms.

Because we believe the term "sensitivities" can feed the thesis of an immune system disorder or other organic cause for the syndrome, something which has not withstood scientific scrutiny to date, we have avoided its use. Instead, we conclude that "odor aversion" better describes this clinical picture (Amundsen *et al.*, 1986). This conclusion is strengthened by review of a sample of 374 patients out of all referrals to Mayo's Division of Preventive and Internal Medicine for occupational-environmental medicine consultation since 1980, 34 of whom described odor-triggered symptoms for which no organic explanation could be identified.

Four theories of the etiology of MCS were thoroughly explored by Sparks *et al.* in a comprehensive review (Sparks *et al.*, 1994a, b):

1. MCS is a purely biological/physical or psycho-physiologic reaction to low-level chemical exposures (for example, immunologic, neurotoxic, behavioral conditioning, limbic kindling, etc.);

2. MCS symptoms may be elicited by low-level environmental chemical exposures, but the sensitivity is initiated by psychological stress (for example, cacosmia);

3. MCS is a misdiagnosis and chemical exposure is not the cause. The symptoms may be due to a misdiagnosed physical or psychological illness (for example, depression, anxiety, somatization, etc.) and

4. MCS is an illness belief system manifested by culturally shaped illness behavior (for example, clinical ecology, chronic fatigue syndrome, etc.).

It is clear that many MCS patients meet diagnostic criteria for mental illnesses, especially mood, anxiety, and somatoform disorders. Not all individuals have premorbid psychiatric conditions, however, although such conditions probably play an important role in predisposing many or most of these patients to develop odor aversion symptoms (Black *et al.*, 1990; Feidler *et al.*, 1992; Buchwald *et al.*, 1994). However, there are other patients without preexposure mental problems who may be examples of either (1) a stress response syndrome such as a specific adjustment disorder or posttraumatic stress disorder or (2) a classical conditioned response, with stimulus generalization, of phobic-

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anxiety and avoidance (Shusterman *et al.*, 1988; Bolla-Wilson *et al.*, 1988) (Tables 1 and 2).

Because of the crucial role that odor perception plays in producing symptoms in these patients, it seems clear that the olfactory system and how it works deserve more than our passing attention (Hirsch, 1990; Gibbons, 1986). The olfactory nerves have a more intimate or direct connection to the brain than any of the other senses, specifically with the hippocampus, amygdalus and other components of the limbic system. It is because of these connections that associations are formed between odor and other events, including their emotional context, and are subsequently retrievable. It is normal for odors to evoke, frighten and arouse us.

**TABLE 1**

**Case 1: Odor Categories and Representative Noxious Smelling Substances Listed in Order of Presentation**

Odor category	Representative Substances	
Hexane	Waste Oil	Hot asphalt
	Tar	Industrial solvents
Methyl ethyl ketone	Paint	Antifreeze
	Cleaning solutions	
Ethyl acetate	Fertilizers	Weed killers
	Pesticides	Insect repellent
Carbon disulfide	Hog barn	Cow barn
	Sulfur dioxide	Cut grass
Pyridine	Spoiled food	Dead fish
	Industrial Chemicals	
Diesel fuel	Engine exhaust	Gasoline vapor
Perfume	Shaving cream	Shaving lotion
	Cologne	Hair spray
	Air fresheners	Bathing soaps
Other aversive odors not represented during exposure	Welding smoke	Leather
	Gravel dust	Saw dust
	Burnt wood	

**TABLE 2**

**Case 2: Hierarchy of Self-Reported Substance Odors and Symptom Descriptions**

Subject's rating	Odors	Symptoms
Highly offensive	Contact cement Solvents/petroleum distillates Methyl ethyl ketons Alcohols Oil-based paints	"Confused, difficult to concentrate, stupid, forgetful, head pressure like my head is full of water, almost pressure behind the eyes, cannot read, intense anxiety lingers for days."
Moderately offensive	Vehicle exhaust Nail polish Latex Glues Paints Silicone caulking Roofing tar	Generally the same as above but with more facial tension and headaches than other symptoms. Intensity 15-20% less than above.
Least offensive	Cedar wood Mink oil Perfume Bleach Odor of floor cleaner in stores	Same symptoms but the intensity approximately 10% less than with moderately offensive odors.

We'd like to say we buried the competition. But that would mean putting an extremely inferior fertilizer in the ground.



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