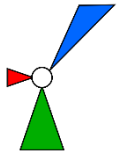
1898 H

bncdoc.id	BM1
bncdoc.author	Gamlin, Linda
bncdoc.year	1989
bncdoc.title	The complete guide to food allergy and intolerance.
bncdoc.info	The complete guide to food allergy and intolerance. Sample containing about 35892 words from a book (domain: social science)
Text availability	Worldwide rights cleared
Publication date	1985-1993
Text type	Written books and periodicals
David Lee's classification	W_non_ac_medicine

<1898/c>



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allergic reactions at all, even though they produce allergy-like symptoms. Doctors suspect that tartrazine produces symptoms in these people by directly affecting the immune response in some way - perhaps by stopping the synthesis of immune regulators called prostaglandins (see p 28), or by triggering mast cells directly. In the case of synthetic chemicals apparently causing asthma, the effect may be due to irritation rather than an allergic reaction. This is well known for metabisulphites and sulphur dioxide (see p 291). These are cases where the symptoms provoked by chemicals at least looked like allergic symptoms. In the majority of chemical-sensitive people, the symptoms are not those commonly associated with allergy. So it seems unlikely that chemical sensitivity is allergic in origin. It is possible, however, that synthetic chemicals might affect the immune response in some way. This has indeed been shown for some chemicals, but the usual effect is to lower resistance to disease, rather than to make allergies more likely. The deficiency explanation Some synthetic chemicals are excreted from our bodies unchanged - in urine, for example, or on our breath when we exhale. Some, such as DDT, are stored unchanged in the body's fatty tissues. But the vast majority are acted on by enzymes, which change them chemically in biotransformation reactions (see p 165). Ultimately, these reactions lead to the detoxification of the chemical. In recent years, minor enzyme deficiencies have been found in some people, which do not normally make them ill unless they take a particular medicinal drug. Studies of such drugs in food-intolerant patients have shown that a large proportion of them suffer from these minor enzyme deficiencies (see p 233). In one study, some of the patients also had chemical sensitivities, and when the results for these patients alone were considered, 90 per cent were found to be deficient in a particular enzyme system. Such a high percentage is unusual in medical research, and suggests strongly that there is a link between chemical sensitivity and enzyme deficiency. This result was for just one set of enzymes - and hundreds are involved in detoxification. Due to lack of resources, no further studies of this sort have been carried out as yet. In another study, described on p 233, certain artificial food colourings have been found to inhibit crucial detoxification enzymes. It is possible that enzyme inhibition by these artificial colours contributes to the problem in people whose enzymes are partially defective. This could account for the frequency with which food colourings have been identified as the source of **adverse reactions**. If enzyme deficiencies are at the root of the problem in chemical-sensitive patients then one might expect them to show

the same sort of reaction

to small amounts of a chemical as **normal people show to large amounts of that chemical.** Occupational medicine - the study of how exposures in the work-place affect workers' health - is the main source of information here. This branch of medicine studies the effects of brief high-dose exposures (as during an industrial accident) and long-term exposures at a lower level (but still much higher than most people would encounter). It is the latter which are relevant to the chemical-sensitive

	patient, and they do provide some interesting and revealing parallels. In the case of organic solvents, for example, the prime symptoms seen in workers exposed to regular 'low' doses are mental ones. For example, toluene (found in paints and glues) produces fatigue and vague feelings of malaise, while styrene (used in the manufacture, of polystyrene) produces fatigue, a sense of ill-health and irritability. Trichloroethylene (an industrial solvent that is a common contaminant of drinking water) may produce tiredness, dizziness, headache, irritability and digestive problems. White spirit, which is a mixture of solvents, produces fatigue and general feelings of ill-health. These are very much the sort of symptoms seen in many chemical-sensitive patients when they are exposed to organic solvents. (Common sources of solvents are shown in Table 3.) SHEILA Sheila was a healthy woman in her early forties, who drove a delivery van for a chemical manufacturer. Her problems began when a chemical drum in the back of her van sprang a leak, and filled the van with fumes. She never discovered what chemical it was, but the immediate effect was to produce a headache, sore throat and intense irritation of the nose and eyes. She had to continue driving the van all day, and again the following morning. By lunchtime the next day, her eyes were so sore and swollen that she could hardly see. She was also short of breath, and her whole face was beginning to swell. Despite hospital treatment, it took a long time for Sheila to recover. In fact her sight was not back to normal for three months. Even after that, she continued to have headaches almost daily and felt nauseated most of the time. A host of other problems added to her discomfort, including extreme fatigue, itching skin, pains in the stomach, constipation, and aches in her muscles and joints. These symptoms were present most of the time, but became much worse if Sheila drove the car, used certain aerosol sprays, or had to sit in the same room as someone wearing perfume or aftershave. When tested by a doctor with various synthetic chemicals