

## DEBUNKING SENSE ABOUT SCIENCE'S STAND ON DETOX

[Sense About Science](#), with the aid of the [Voice of Young Science \(VoYS\)](#) network of over 300 eager, early career scientific researchers, have launched a nationwide campaign to debunk what they call the detox myth. They argue that there is no evidence that any of the so-called detox products on the market do anything that our detox organs—our liver and kidneys—are not already doing. Many of the scientists involved, says the Sense About Science website, will be distributing their own leaflet, entitled [Debunking Detox](#) to the public outside high street retailers in central London. The leaflet has apparently been authored by 38 of these young scientists.

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Following, the reader will find two different perspectives on Sense About Science's recent attack on detox products.

The first is from a doctor, Dr Damien Downing, a clinician who has worked in the field of nutritional and environmental medicine for over 25 years, is the Medical Director of the Alliance for Natural Health (ANH), the President of the British Society for Ecological Medicine and Editor-in-Chief of a peer reviewed journal, the Journal for Nutritional and Environmental Medicine.

The second perspective is from a scientist with over 20 years of experience in various fields including environmental science, sustainable agriculture, side effects of agrochemicals, phytochemistry and nutritional science, Robert Verkerk PhD, Executive and Scientific Director of the ANH, who has taken soundings on this issue from other scientists engaged in the natural health field, who are also members of the ANH's Expert Committee.

## PERSPECTIVE 1: FROM A DOCTOR

It's interesting to see that Sense about Science has managed to get a second round of publicity for its 2006 publication *Making Sense of Chemical Stories*. This time they managed to throw in a bit of brainwashing by getting 'young researchers' in their subsidiary, *Voice of Young Science*, to hand out leaflets called *Debunking Detox*. (At least they didn't describe them as "leading researchers", which is what happened in the press with their last outing, a "patient guide" to information on the internet which was actually written by a couple of twenty-something PhDs.)

Now it cannot be denied that there are adverts out there that hype up the merits of beauty products of dubious/variable merit, but it is the Sense about Science core statement to which I first take exception; *'Detox' has no meaning outside of the clinical treatment for drug addiction or poisoning.*

As a doctor who spends a major part of his time treating patients suffering from chemical toxicity — and sensitivity — I can tell you this is untrue. Granted, 25 years ago when I started dealing with allergies and nutrition, I thought that this was all implausible American nonsense, but for the past decade at least it has been impossible for anyone who actually listens to patients, and does the right tests on them, to deny that it is fact — and indeed for anyone who follows the literature to fail to notice that scientists (yes, them) are investigating it in increasing numbers. We are all exposed to an accumulating level of multiple toxins from the environment via our food, water, air, even indoor surfaces, and the vulnerable ones are starting to show the health consequences.

In the last few years genomics — the new, very detailed genetics — has started to explain why some of us suffer from chemical overload and others don't. For instance, one of the most important Phase 1 detoxifying enzymes in the liver is coded for by a gene known as CYP1A2, and around 50% of us carry a variation (a "polymorphism") of this gene which can greatly increase the activity of the enzyme. This can lead to the production of more free radicals than the body can cope with, particularly if there is also a reduction in the most important single Phase 2 enzyme, known as glutathione S-transferase, which does the final inactivation and removal of these chemicals from the body. Having a common polymorphism in one of the several genes for this latter enzyme will greatly reduce your ability to inactivate and remove a range of molecules; pesticides, toxic metals, petrochemicals, antibiotics, hormones, even alcohol. It is no great surprise that this will make you at least twice as likely to suffer allergic reactions — both to "conventional" inhalants like pollen and to chemicals like secondhand tobacco smoke and exhaust fumes.[1] Then imagine the impact of having polymorphisms in both these enzymes — which a significant percentage of the population do have — on your ability to handle chemicals.

Thankfully, science, or rather laboratory technology, has been catching up with grim reality, and there are now ways of identifying the precise chemicals lurking in your system as well as the genes that make you vulnerable to them. And make no mistake, they do lurk. There is not a person in this country who does not have traces of DDT or its breakdown products in their body, although it was banned in the UK in 1984. It can't be found in the bloodstream, but DDT metabolites and many other chemicals do deposit in fat, or more precisely in the lipid compartment of the body, and can stay there for decades.

What are these chemicals? They include old groups of pesticides such as the organochlorines (DDT, lindane, chlordane, aldrin), some of which are still widely used outside the UK for head lice, termite and mosquito control) and the older organophosphates (malathion, parathion), flame retardants (PCBs, PBBs or PBDEs), azo dyes and other colourants (sometimes derived from hair dye, thought to be inert and harmless) and of course those toxic metals, mercury, cadmium, lead and so on. Plus any other synthetic chemical you care to name, and there are over a million of them out there.

Having identified the toxins, there are a limited number of things you can do about them, of which the most obvious are 1. avoid further exposures, and 2. remove what is inside you. This is detoxification, this is what we do, which Sense about Science assert is unnecessary. Patients often do it for themselves too, by a variety of methods. Of course there are varying degrees of efficacy of removal methods, but frankly if chemicals have made you ill — and that is why many people come to us — you can do with all the help you can get in this direction, so if skin brushing or walking barefoot on the grass adds a 10 percent or even a 1 percent benefit, why should I knock it?

Many commercial detox products also include a recommendation for future avoidance of chemicals — eat organic, avoid pollution and so on — which Sense about Science also thinks is completely unnecessary. But there's an old adage that states "When you realise you're in a hole, what's the first thing you should do? Stop digging!" Stop digging in this context means avoiding further chemicals, and is the most glaringly obvious sensible thing you can do.

A couple of years ago Sense about Science produced a booklet called Science for Celebrities, in which they claimed that;  
*People in the public eye are often drawn into promoting theories, therapies, and campaigns that make no scientific sense. This leaflet shows how easily some mistakes could have been avoided. Now it's possible to check the facts before going public. It costs a phone call.*

We now say to them;

*Once again scientists under the Sense about Science umbrella, who know nothing of clinical medicine, are making dogmatic assertions that bear no relation to real life. Next time, why not check with us. It costs a phone call.*

## REFERENCE

Frank D Gilliland, Yu-Fen Li, Henry Gong, David Diaz-Sanchez. Glutathione s-transferases M1 and P1 prevent aggravation of allergic responses by secondhand smoke. *American journal of respiratory and critical care medicine*. 2006 Dec 15;174(12): 1335-41.

## PERSPECTIVE 2: FROM A SCIENTIST

The leaflet produced by VoYS researchers tackles what they seem to think are the three most common detox claims that they say cannot be substantiated.

Below, you'll find a summary of the Sense About Science position on each of the claims, followed by the view from scientists at the Alliance for Natural Health.

### **Claim 1: Toxins have built up in the body and need to be flushed/cleansed from it.**

**Sense About Science says:** that all chemicals are potentially toxins, but it depends on the dose. They indicate that most chemicals do not accumulate in the body but are excreted via the liver and kidneys. They add that most detox products act as diuretics and therefore can lead to dehydration.

**ANH scientists say:** While we fully agree that the toxicity of any chemical is always going to be dose dependent, it is wrong to think that chemicals that act in a toxic manner can't build up in the body. This is particularly the case for fat-soluble toxins, and in cases where the body's natural detoxification systems are not working optimally owing to excessive physiological or psychological stress or over-exposure. But toxins that don't build up in the body can be toxic if there is repeated exposure to them. Alcohol is probably the best known example of such a toxin.

Organochlorine pesticides like DDT, lindane, aldrin and chlordane and their breakdown products, dioxins, PCBs and various 'heavy metals', such as mercury, cadmium and lead, are among the best studied toxins that accumulate in the body. But we are exposed to a hoard of synthetic chemicals, ranging from food additives to flame retardants, from second-hand tobacco smoke to petrochemicals and pharmaceutical drugs. Any scientist who claims he or she can prove that these

combinations of exposures most definitely don't pose a risk to human health is a poor scientist given the available evidence.

Getting back to Sense About Science's claim, it is also untrue that most detox products are diuretics. The use of supplementary amino acids, such as various forms of cysteine, glutamine and glycine, which in turn provide the building blocks for glutathione, one of the body's most important antioxidant enzymes, have been shown to be very effective in assisting the body in eliminating toxins. [1] Glutathione depletion from over-exposure to chemicals has also been shown to be offset by various herbs and phytochemicals, with milk thistle (containing silymarin), garlic, turmeric and various compounds from brassicas being among the most important.

The botanicals are particularly important adjuncts given their antioxidant properties, because Phase 1 detoxification, the first stage of the liver's detoxification process that makes toxins water soluble through the action of the cytochrome P450 enzyme system, creates additional and damaging free radicals. I wonder how many of the young Sense About Science researchers who have canned detox products have bothered speaking to doctors who practice ecological medicine or environmental medicine? These doctors and practitioners have for decades helped many thousands of people, including sufferers of Multiple Chemical Sensitivities (MCS), to live normal lives following detoxification regimes and altered lifestyles—approaches that are simply not understood by the orthodox medical profession. This profession seems quite content to increase, rather than decrease, the toxic burden within the body by over-using pharmaceutical drugs. Adding insult to injury, the biotech industry, as well as increasing numbers of governments, seem intent—with no scientific justification—on exposing us to ever increasing amounts of genetically engineered foods, another important source of toxins and allergens.[2]

## **Claim 2: Your 'eliminary organs' should be detoxified.**

**Sense About Science says:** you don't have to do anything to support your eliminatory organs, namely your kidneys, liver and digestive system, unless you have consumed a dangerous dose of a substance and have been poisoned and require a stomach pump, dialysis or the like.

**ANH scientists say:** If the Sense About Science scientists were right, you would expect that no one would suffer from liver or kidney disorders, or digestive problems. This is patently not the case, and pharmacists know this only too well given the popularity of tonics and other medications designed to alleviate in particular digestive disturbances.

Around 80% of cancers are thought to originate from environmental causes (diet tobacco, alcohol, infectious agents, medical drugs, occupational exposures, ionizing

radiation) [3], while as much as 50% are thought to originate from the diet alone.[4] These environmental agents, once in the body, cause harm to it either if they build up or the body is exposed repeatedly to them. If our bodies didn't need any help detoxifying and eliminating the chemical burden we are afflicted with in this modern age, we wouldn't be seeing such high incidences of allergies and cancer, two of the body's innate responses to environmental chemical overload.

Colon cancer, which is correlated with poor diets with low phytonutrient and antioxidant levels, is also the second most important cancer in both men and women in the UK. Liver disease—an indication that a liver's life in contemporary society is not an easy one—is the fifth biggest killer disease in the UK and, as seen by readily available figures from the Office of National Statistics (1990-2006) compared with heart disease, cancer, stroke and respiratory disease. It is also the only one of these diseases that's on the rise. Two million people in the UK currently suffer from chronic kidney disease, according to the British Liver Trust. Both liver and kidney cancer incidences are on the up as well.

These sorts of disease profiles are likely indicators of the increasing environmental and chemical stress our detoxification organs are under. Okay, a good proportion of liver dysfunction is related to alcohol abuse, but alcohol is another toxin that damages the body following repeated, chronic exposures and can even kill with single acute exposures. It puts the detoxification system, along with the host of other chemicals to which we are exposed, under considerable physiological stress if we consume too much of it.

Most of us in the industrialised world continue to be exposed to an ever greater burden of synthetic, often new-to-nature chemicals, to which we have never been exposed during our evolutionary history. The issue of 'total chemical load'—the effects on human health of long-term exposure to increasingly complex mixtures of chemicals, in our food, our water, in the air we breathe and in chemicals applied and absorbed through the skin, has never been studied properly owing to its inherent complexity. But increasing numbers of scientists and doctors are suggesting that such exposure is beginning to overwhelm those of us who have been over-exposed, have been sensitised by over-exposure, or have compromised functions of our liver, kidneys or digestive systems.

As my colleague Dr Damien Downing has clearly expressed (above), there is also the important fact that significant numbers of us carry polymorphisms to key genes that code for either Phase I or Phase II detoxification enzymes. Any doctor who feels such persons don't need extra support is, in our view, either medically negligent or is perilously close to being so.

Liver, kidney and intestinal support is right at the centre of some of the longest standing medical and healthcare traditions, such as Ayurveda and Traditional Chinese Medicine. Over thousands of years, millions have benefited from the use of

herbal compounds that support liver, kidney and intestinal function, as well as digestive health. The recent popularity of these cultures in the west undoubtedly reflects the inability of western medicine to grapple with complex, multi-factorial diseases and allergies. With good basis, the public is demonstrating an increasing lack of trust in orthodox, drug-based healthcare.

The fact that the Sense About Science skeptics can't put their fingers on sufficient double-blind, randomised controlled trials (RCT) verifying this, is primarily down to the inherent limitations of their research methods and their inability to adequately evaluate what goes on in clinical practice outside of their favoured western, allopathic model.

### **Claim 3: The product will help “neutralise nasty free-radicals”.**

**Sense About Science says:** while free radicals do cause damage to DNA and other parts of the body, “the body makes its own antioxidants using the food in our normal diet. Additional antioxidants are removed by the kidney”.

**ANH scientists say:** This one would have made us laugh if it hadn't been so badly misrepresented. The skeptics and their friends in the pharmaceutical industry have long been deeply opposed to the ever increasing popularity of antioxidant supplements, ranging from fruit drinks, to a myriad of botanical extracts, vitamins, minerals and amino acids. They have great difficulty accepting that intake of these sorts of products, as has been often expressed by luminaries like Professor Bruce Ames,[5] is one of the best and cheapest ways of helping to reduce both DNA damage and subsequent disease.

When you take into account that our diets have altered dramatically in recent decades and many people struggle to consume just 3 portions of fruits and vegetables daily, [6] when scientists suggest we might need in excess of 9 portions daily to get sufficient antioxidants to reduce our risk of certain cancers,[7] the Sense About Science statement could be seen as irresponsible or even unethical. What on earth is the “normal diet” to which they refer? Our diet isn't normal anymore—it bears ever less resemblance to the diets with which we have evolved over the last 500,000 or so years—as evidenced by sky rocketing obesity, diabetes and other chronic disease rates!

You could argue—as we do at the ANH—that the concept of supplementing our diets with additional, concentrated sources of nutrients and plant materials, is a behavioural adaptation to our depleted contemporary diets. Our diets, by and large, contain chemistries that are substantially altered and simplified compared with those of our pre-industrial ancestors.

The VoYS researchers make the point that the body makes its own antioxidants (such as glutathione), but in addition, there are a great diversity of botanical compounds

found in fruits and vegetables that have antioxidant activities that influence detoxification mechanisms. Dr Paul Talalay and his colleagues at Johns Hopkins University School of Medicine have studied this area for the last 40 years, and have elucidated a host of mechanisms by which phytochemicals modify the activity of Phase I and II enzyme systems. Flavonoids, monoterpenoids, cucumin and isothiocyanates/glucosinolates (in brassicas) are among the best studied. [8.9.10] It seems that natural health advocates might know rather more about these than the young scientists associated with Sense About Science scientists, but hopefully, over time they will learn more. To facilitate this process of learning, we'd like to recommend as a starting point a good database for scientific, thoroughly referenced data on botanicals. The database can be accessed at [www.naturalstandard.com](http://www.naturalstandard.com) and can be accessed via [Medline Plus](#) (US National Library of Medicine and National Institutes of Health). The database has been compiled by over 500 scientists that have an interest in—rather than a skeptical attitude towards—botanicals as used for healthcare purposes.

### **Final comment from the Alliance for Natural Health**

Sense About Science appears to suggest that the natural health sector has run amok in a completely unregulated fashion, selling people poisonous and ineffective pills and potions that waste their money. This couldn't be further from the truth. The natural products industry is submerged in regulations, some of it reasonable, some of it definitely not.

The regulatory frameworks have been spawned primarily from Europe and seem set to prefer the largest corporations on the planet, which sell the least efficacious and lowest quality products. This phenomenon is far from restricted to the natural health field, but it ultimately works against the consumer getting the best natural health products.

As for the European laws that govern pharmaceutical products, their scope and definition is so broad that it prevents the vast majority of companies expressing anything about the mode of action of their products on the label—to do this would bring in the 'police' from the UK's medicines licensing authority, the MHRA, who would classify the product as an unlicensed medicine and have it immediately withdrawn from the market. Reporting on the known, published science relating to the health benefits of watercress, broccoli or grapes and recounting these on the packaging of these products would have the same effects.

So please—Sense About Science scientists—appreciate how your friends in the pharmaceutical lobby have stitched up the natural products industry and our freedom of speech in areas as fundamental as the relationship between nature and the human body. Fortunately, some of us are not willing to take this lying down.



## REFERENCES

1. Lyon M, Bland J, Jones DS. Genetic and Environmental Influences on Detoxification (Chapter 31: Clinical Approaches to Detoxification and Biotransformation). In: *Textbook on Functional Medicine*. (Ed. By Jones DS). 2006. Institute for Functional Medicine, Gig Harbor WA, USA.
2. Smith JS. 2007. *Genetic Roulette: The Documented health Risks of Genetically Engineered Foods*. Yes! Book, Fairfield, USA.
3. Nelson N. The Majority of Cancers Are Linked to the Environment. *Benchmark* 4(3). National Cancer Institute, USA. Available at: <http://www.cancer.gov/newscenter/benchmarks-vol4-issue3/page1>.
4. Doll R. Epidemiological evidence of the effects of behavior and the environment on the risk of human cancer. *Recent Results in Cancer Research* 1998; 154: 3-21.
5. Ames BN. The metabolic tune-up: metabolic harmony and disease prevention. *J Nutr*. 2003; 133(5 Suppl 1): 1544S-8S.
6. The National Diet & Nutrition Survey: adults aged 19 to 64 years. Summary Report. Volume 5. 2004. Food Standards Agency, London.
7. Gottlieb S. Men should eat nine servings of fruit and vegetables a day. *BMJ*. 2003; 326(7397): 1003.
8. Fahey JW, Stephenson KK, Dinkova-Kostova AT, Egner PA, Kensler TW, Talalay P. Chlorophyll, chlorophyllin and related tetrapyrroles are significant inducers of mammalian phase 2 cytoprotective genes. *Carcinogenesis*. 2005; 26(7): 1247-55.
9. Zhang Y, Talalay P, Cho CG, Posner GH. A major inducer of anticarcinogenic protective enzymes from broccoli: isolation and elucidation of structure. *Proc Natl Acad Sci U S A*. 1992; 89(6): 2399-403.
10. Shapiro TA, Fahey JW, Dinkova-Kostova AT, Holtzclaw WD, Stephenson KK, Wade KL, Ye L, Talalay P. Safety, tolerance, and metabolism of broccoli sprout glucosinolates and isothiocyanates: a clinical phase I study. *Nutr Cancer*. 2006; 55(1): 53-62.