Dr Bruce Ames

John Hyde

Obviously, not all of the substances said by the various scare-mongers to be killing us, are very efficient poisons. If they were, then life expectancy would not be rising: indeed most of us would have been dead long ago. Even the most ignorant layman can work out that much. Not being a complete damn fool, he, therefore, knows that much of the pop science he hears on the current-affairs soap-operas (Four Corners, The 7.30) Report, 60 Minutes and the like) is nonsense. It simply does not add up. But faced with terms he has never heard of, measurements whose relevance is not explained, and scientific and mathematical procedures he has never mastered, he has difficulty saying which claims are nonsense and which are not.

Dr Bruce Ames is a scientist who has specialised in carcinogens---i.e. cancer-causing substances. He is a professor in the department of Biochemistry and Director of The Environmental Health Sciences Centre at the University of California, Berkley, USA. I can't say from my own knowledge whether he is a good scientist or a sloppy one, but his peers have heaped honours upon him. He has some advice for us.

Far from telling us that very few substances cause cancer and therefore not to worry, he tells us not to worry because about half of the man-made substances and about half of all natural substances cause cancer. These common foods, and most others, contain deadly carcinogens: celery, tomatoes, cabbages, oranges, mushrooms, coffee, potatoes and beer. But they are dangerous only if we can find a way of consuming enough of them to make them so. Parsley has between 14,000 and 32,000 parts per billion of 8-methoxypsoralene and 5-methoxypsoralene, whatever they are. It is, therefore, deadly. Or is it?

Cabbage contains no less than 49 natural defence substances---mostly with names of more than 20 characters. Of course, no farmer could afford to spray his cabbages with 49 different chemicals so farmers are relieved that the cabbage has some defence mechanisms of its own. The cabbage even has a group of substances that break down into cyanide and we all know that cyanide is dangerous---it kills wasps and separates gold from dross.

Yes, you say, but we consume only small amounts of these nasties, varying our diet to ensure that the quantity is small. Quite so, but even so, when Ames added up the amount of natural pesticides we eat it came to about 1,500 mg. This compared with only 0.09 mg of man-made pesticides---pesticides are 99.9% natural.

To save farmers the cost of chemicals and allow them to tap the 'organic foods' market, scientists breed plants for resistance to insects. What these scientists are doing is raising the levels of the plants' natural toxins. In California they developed a celery that was marvellously insect resistant. The only trouble was that people who ate the celery developed rashes---the new plant had 10 times the level of the before-mentioned psoralen carcinogens.

About 5% of a plant's dry matter is comprised of toxic chemicals. Ames says, plants spend about 5% of their GNP on defence which is about the same as the United States. It is about double what Australia spends on defence. But probably plants, which thanks to farmers and chemical companies no longer have to kill their own insects, and which are selected for yield, will in time become less toxic. Artificial insecticides will be doing for plants what the US defence umbrella is doing for Australia---saving us a lot of expensive effort.

But what about the real nasties, such as dioxins which in quite small quantities can cause birth defects in babies. Alcohol also causes birth defects in babies and the amount of alcohol that people are likely to consume is of an altogether higher order than the amount of dioxin. The Environmental protection Authority in the United States is trying to regulate the dioxin level down to one that is the equivalent of drinking one glass of beer every 8000 years. Is ours being as silly?

In terms of carcinogens, Ames claims that the most polluted water in the US is no more dangerous than tap water which has been chlorinated. Chlorinated tap water contains 83 parts per billion of chloroform and chloroform causes cancer in rats. Of course, we chlorinate because bacteria in unchlorinated water is the greater risk.

The fact is that, in the US at least, the incidences of cancers in most parts of our bodies are not changing. The exceptions are uterine and stomach cancers which are falling and lung cancers which are rising. Ames suggests that the preference for cigarettes over pipes and cigars might account for the latter, while the tendency to consume less salt might account for declining stomach cancers. He, however, warns against reading too much into mere correlation. In Germany there is a 0.96 correlation between the number of storks and the number of babies. What should one conclude?

There is, however, one exceptionally high correlation: that of humanity and mortality. Omar Khayyam asked a question like this: Some we loved have drunk their cup a round or two

before and one by one crept silently to rest, and we that now make merry in the room they left, must we beneath the couch of earth descend, ourselves to make a couch---for whom? The answer, of course, is yes!

We are in a war, Ames says, between the plants and the animals. The plants are full of toxins and we animals have our very effective defences. But, it seems, there comes a time when we are good for nothing but spoiling the grandchildren---that is when we get a lot of cancers.

In the meantime it makes little sense to worry ourselves sick over massive-dose tests conducted on rats, or to run in terror from minute doses of man-made carcinogens. Should we look like coming in contact with a massive dose, then that would be different. The farmers and the manufacturers who handle enough chemical in a bucket to spray thousands of acres have reason to be careful lest they demonstrate their mortality prematurely.

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