Live dangerously – eat something

The problem of antibiotic-resistant bacteria, the so-called 'super-bugs' beloved by the tabloid press, has been in the news recently. Overprescription by the medical profession remains a major contributory factor, but at least, as individuals, we can minimize our exposure to antibiotics by keeping our visits to the doctor to a minimum. However, we all have to eat, and the risks associated with food are significant and much less well established. The problem is so important that at the First European Congress of Chemotherapy, held in May in Glasgow, UK, there was a special session entitled *Food hazards: antibiotics and the food chain*.

The drive to provide cheap and plentiful food has altered farming beyond all recognition. In the UK, the legacy of attempts to turn herbivores into carnivores was BSE. More widely, the practice of giving animals antibiotics to promote growth, and to prevent and cure disease is very common – almost universal even – and this has led to the appearance of antibiotic-resistance. Of particular concern is the appearance of multiple resistance in *Salmonella* strains, particularly *S. typhimurium* and *S. virchow*. In many European countries the use of 'human' antibiotics as growth-promoters is banned, but they can still be used to treat and prevent disease.

The problem of cross-resistance can be illustrated by the emergence of vancomycin-resistant enterococci (VRE) following feeding of avoparcin to cattle as a growth-promoter; last year the Council of Agriculture Ministers of the European Union voted to ban its use in feed for dairy cows. Another aminoglycoside, apramycin, is licensed only for veterinary use but apramycin-resistant bacteria have now been isolated from both animals and humans.

In the mid 1980s, the first quinolone antibiotic, ciprofloxacin, was launched to a fanfare of publicity, and its potency was emphasized by one clinical microbiologist who claimed that gonorrhoea could be eliminated overnight if the entire world could be persuaded to take a single tablet of ciprofloxacin on going to bed. Quinolones have proved very successful – so much so that they are also used widely in fish-farming and poultry-rearing. However, fish farmers are now reporting ciprofloxacin-resistance, and in 1993 some Spanish researchers found that 80% of *Campylobacter* strains isolated from chickens were resistant to quinolones; the incidence of aminoglycoside-resistance was lower but still substantial, ranging from 20% to 47%.

What can the individual do? At present, not much, unless we become vegetarian. However, we could begin by putting more pressure on our politicians to institute tighter monitoring of the methods used in food production. There used to be a joke 'When in the third world don't drink the water, when in the developed world don't breathe the air'. Now we should probably add 'and don't eat the food'.

David B. Jack

PDB funding

The International Protein Data Bank (PDB), located at Brookhaven National Laboratory in Upton (New York, USA), has secured a wider base of financial support from the US government. From 1 May, The National Science Foundation, the US Department of Energy, the National Institute of General Medical Sciences and the National Library of Medicine will provide, through a cooperative agreement, the yearly budget of approximately $2.5 million to maintain and operate the PDB.

In the past, the database has been funded by renewable grants from the National Science Foundation. The PDB is a unique international clearinghouse for 3D structural information about proteins, nucleic acids and other biological macromolecules. Almost all biomedical journals now require that structural information be deposited in the database as a condition of publication. The convenient access to such information is critical to scientists using rational design approaches for the discovery, or for the structural refinement, of therapeutically useful compounds. Used in concert with the Cambridge Structural Database – a 3D structural database of small chemical entities located in the UK – it is possible to perform 'virtual screening' through docking studies of large and small molecules, according to Dr Joel Sussman, Head of PDB. In the past 25 years, the PDB has grown from 300 structures to more than 5,000, and the number of structures is expected to double within the next two years. The number of users has similarly grown.

The database is available to anyone with access to the World Wide Web at http://www.pdb.bnl.gov. Because of the large demand for database access, 'mirror copies' have been created around the world. Such sites are already in operation at the Weizmann Institute of Science (Israel), Peking University (China), and at the European Bioinformatics Institute (UK).

In April, the PDB and the 18 associated staff were transferred from the Chemistry to the Biology Department. According to Sussman, this change reflects the fact that 25 years ago the database was of primary interest to chemists. Today, it is recognized that there is much biological information embedded in the 3D structure of macromolecules, and the primary users of the database are molecular biologists. The move to the new facilities also places the database staff in close physical proximity to staff involved in structural biology, molecular genetics and DNA sequencing for the Human Genome Project.

The PDB is also likely to get a new name. According to Sussman, 'While it isn't finalized yet, the new name is expected to be 3DB, for Three-Dimensional Database of Biomacromolecules, which emphasizes both the three-dimensional nature of the data, and that we archive other biomolecules besides proteins.'

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