

No more Drugs for Superbugs. The End of the Antibiotic Age?

Dr Avison, who is senior lecturer in Microbiology at Bristol University, delivered a fascinating lecture to the Cirencester Science and Technology Society on the subject of the growing resistance of bacteria to antibiotics.

Dealing first with the threat of antibiotic resistance he listed the various sources of bacteria from the normal flora such as E.coli and C.difficile through Zoonotic bacteria (Campylobacter and Salmonella Typhimurium) to Environmental bacteria citing Vibrio Cholerae and Pseudomonas Aeruginosa. He explained that the problem is essentially that these and other bacteria get to places where they shouldn't really be and cause problems such as food poisoning and infections to blood, bones and other parts of the human anatomy. There are numerous ways that infections can be reduced without the use of antibiotics by the use of sanitation, vaccination and pasteurisation but changes to healthcare with an ageing population, more complex operations and elective surgery are leading to more antibiotic dependent procedures.

Using WHO data he demonstrated that deaths from antibiotic resistance are proportionately higher in a developing economy such as Thailand with a population of 70 million and 38,000 deaths annually than in the EU with a population of over 500 million and 25,000 deaths. Of the 4 main mechanisms of antibiotic resistance the two prime ones are reduced cell permeability and enzymatic degradation.

The driving force of resistance is antibiotic over-use which he illustrated with a diagram depicting the strong correlation between increasing antibiotic use and resistance to penicillin by S. pneumonia. Another problem is the use of antibiotic supplements in animal feedstuffs with pig isolates being the most resistant. A further interesting twist to the spread of resistance has been shown to exist in the over-use of cephalosporins used by dairy farmers. Cow dung eaten by dogs then passes cephalosporin resistant E.coli to humans through contact with their canine pets.

Research to address these problems is hampered by the lack of sufficient profit to incentivise the commercial pharmaceutical groups but progress is taking place in finding new antibiotic lead compounds, modifying failed antibiotics and improving the permeability of failed antibiotics. Lastly we can all help by using fewer biocides such as those prevalent in most cleaners and deodorants.