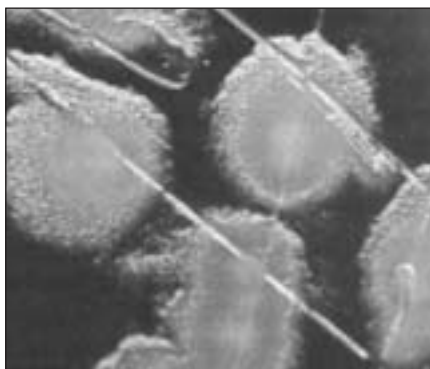


Yet more “Super Bugs”? How can we control them?

Roger Finch, Pamela Hunter, Richard Wise

The spread of bacteria with resistance to current antibacterials is a major concern. The phrase MRSA has been accepted now as common parlance even though few know that it stands for “Meticillin (methicillin) resistant *Staphylococcus aureus*”. The general public now consider MRSA to be synonymous with “superbug” and they are aware that infections caused by MRSA are difficult to treat, are resistant to many antimicrobials and that some people catch such infections in hospital.



MRSA

In recent months there have been more frightening headlines referring to the latest “superbug”, *Clostridium difficile*, which has caused outbreaks in hospitals, leading to death in some cases. Many of those in the healthcare industry believe that this latest outbreak of a novel strain of bacteria may represent the tip of the iceberg and that we will see increasing numbers of resistant organisms which will be difficult to treat. Why is this and can anything be done?

Anti-infective chemotherapy is quite unlike all other areas of medicine since the agents are not designed to affect a target in the host, as with diabetes, for example, but to attack an “alien”, the microbe, which has invaded the host. Microbes will develop resistance to virtually any

drug, eventually, even when those drugs are used in a “prudent” fashion. Although new drugs may slow up the increase and spread of resistance, they cannot avoid resistance entirely. Unfortunately, although they are needed, few new drugs are being developed to treat infectious diseases. Why is this and what can be done about it?

Lack of funding is part of the problem

An EU Intergovernmental Conference was held in Birmingham in December 2005 to discuss the situation and to suggest ways of encouraging innovative research. Major pharmaceutical companies who have been the traditional source of new drugs are now reluctant to invest in this area since it is not seen as financially viable. A major reason for this is that if you have an infection and require treatment, you will be given a short course of therapy (7 to 10 days). This is in sharp contrast to conditions such as diabetes, heart problems or epilepsy where a patient will be prescribed a drug for years or even for life. Nevertheless, to get an anti-infective drug to the market place, it will have had to clear the same hurdles as all other drugs. In addition, to reduce the chance of resistance developing, doctors are urged to use antibiotics only when absolutely necessary; this reduces the sales of the drug.

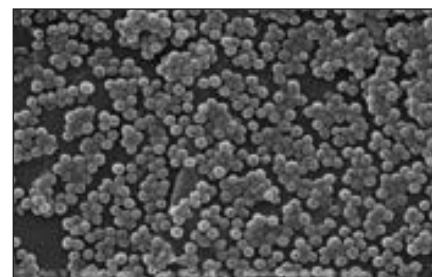
Small is Good!

Small biotechnology companies are more innovative than the large companies and are thus seen as the way forward, but while they can often get “start-up” money, they have a problem in progressing a possible lead to the stage where a large company may be prepared to invest. The in-between stage is both more expensive and carries a higher risk, which discourages potential investors.

A parallel approach, which could improve and extend the use of existing drugs, is to develop more and better diagnostic tests. Currently, initial treatment both in the GP’s surgery and in hospital is often based on symptoms alone as laboratory tests can take days to confirm what the infection is, whether the organism is susceptible to standard therapy and thus what the most appropriate treatment is. Biotechnology companies can develop suitable tests that are rapid, accurate and cost effective, and thus could reduce the current uncertainty as to whether antimicrobial treatment is required and what it should be. Funding for such work is again a problem.

Where is the Leadership?

The complex EU market means that most decisions are made at National level, with no overall strategy for controlling resistance and infection. In addition, the preventative measures taken, for example, in hospitals, vary widely. Unfortunately, **infection control costs money** and without the commitment to spend money where it is needed, we may see resistance to antimicrobial drugs spin out of control. Such commitment cannot just be the responsibility of any one nation, but needs to be throughout the EU for it to have any impact. This is a cross-cutting issue that involves health, enterprise and research – there lies the difficulty and the challenge.



MRSA colonies