

## New Diseases for old

Hardly a year goes past without some new scare over some newly emerging high virulent virus or bacteria that seems set to cause mayhem and havoc yet again amongst the population. Some of the concern raised in relation to these new diseases is generated or at least encouraged by sensationalist journalism. A recent example of that would be the widespread scares in the UK over the new flesh-eating bug. This particular organism (*Streptococcus pyogenes*) has long been recognised as causing a necrotising fasciitis (severe infection of tissues underneath the skin). However, once a couple of clusters were reported sensationally, it became news and multiple outbreaks were being described. The condition still occurs with the same frequency, but it is interesting to note that the newspapers have lost interest in it, and it's no longer reported. Other diseases then,

are genuinely new. For example, the new strain of BSE capable of infecting humans. The HIV virus could also be considered in this category, although there is convincing evidence that it has been around for at least 20 years before it became so widespread.

It is well known that organisms like bacteria viruses and parasites do mutate and change as they go through life cycles. Many of these mutations and changes are actually harmful to the organism and they die or fail to compete. On rare occasions, however, conditions may prevail that allow a particular variant to have an advantage over the non mutant strains and therefore they can thrive, and actually predominate. This phenomenon is called selection pressure. It can be caused by the actual physical environment the organism is in, eg heat or cold, but more often it is due to chemicals in the environment, either anti-virals or antibiotics, or anti-parasitic agents. Obviously, in the presence of these agents, only bacteria

that can mutate and overcome them actually grow and thrive. One can see that by using antibiotics in less than optimal doses for example, one can easily encourage bacteria to mutate to overcome the antibiotic and gradually replace all the infecting organisms with ones that are now resistant to that particular antibiotic.

Under other circumstances, chance mutations in bacteria viruses can allow them to adopt to new hosts in which they previously would not have survived. This is probably likely to be what happened with the HIV virus. It is now established that there is a Simian (monkey) form of HIV virus, which can actually cause Simian AIDS. Transmission of this virus to humans would readily have occurred from monkey bites, etc. In fact, a similar situation is well known to exist with a virus called Marburg virus which has been transmitted from monkeys to humans and caused fatalities in the past through monkey bites. Luckily, however, this Marburg virus is not transmitted onwards from human to human

and, therefore, an epidemic similar to the HIV virus could not occur. Mutations that allowed HIV to grow in the human body obviously permitted the HIV to be transmitted through close contact in the ways that have been adequately described. Its dissemination was also further spread by other factors prevailing in this century, ie increased world travel, the use of human products like blood transfusions, and cryoprecipitate for hemophiliacs, etc.

Other viruses have also managed to jump on the bandwagon of coincidence generated by advances in medicine. Perhaps an example of this would be numerous outbreaks of Hepatitis C that have occurred after simple injections of immunoglobulin to prevent rhesus antibody formation in rhesus negative women who had just delivered a baby. An unfortunate outbreak has been described in detail which occurred in Dublin in the 70's, where several hundred women are now suffering from chronic Hepatitis B liver disease after having been injected with anti-rhesus

that contained significant amounts of Hepatitis C virus. A similar situation occurred with the development of growth hormone from ground up pituitary glands, that was used for treatment of children who had a deficiency of growth hormone. Again, unknown to the medical profession, a virus called the Jakob-Creutzfeld virus does grow in the pituitary gland and was not inactivated by the purification process. Therefore, some of the growth hormone, was obviously contaminated with live JC virus and this form of dementia has now developed in many of the recipients.

So, although we appear to see new diseases emerging, it is more often unfortunate coincidences that happen to suit opportunistic viruses. However, it could be suggested that modern lifestyle and methods of food production favour the emergence of new diseases and their spread. An example could possibly be the new variant of BSE. The practice of feeding ground up animal tissue to animals might now be considered a risky form of new food generation. The prob-

lem realistically is that many carcasses are ground and mixed to produce animal feed and therefore one infected animal can potentially pass on the infection to a multitude of other animals through the food. This compares with where one animal might kill another and eat it, there is only one-to-one transmission, not multiple and widespread contamination.

There is also the fact that the population is living longer. All of us have a host of bacteria and viruses within our bodies, that one could say are living in tolerance with each other if not quite in harmony. Almost all of us get infected with chickenpox at an early age and this virus lives in our nerve cells for ever. This can, of course, manifest itself as shingles in later life, if the immune system wanes somewhat or during some period of stress or other disease that weakens the immune system. Herpes viruses, also live in a similar fashion, often causing chronic or recurrent orofacial or even genital herpes infections. Other less obvious viruses are Epstein-Barr

virus. This is the virus that causes glandular fever syndrome. Of a somewhat higher profile, the cytomegalovirus (CMV) also lives within our body systems and has become a deadly threat in the emerging AIDS epidemic. Again, many of our bodies contain cytomegalovirus, but it's only when the immune system becomes severely suppressed that it emerges, causing widespread disease, but particularly causing a cytomegalovirus retinitis, which can and usually does lead to blindness. The phenomenon of AIDS has unmasked many of these latent infections and they are not all viruses. For example, the parasitic infection toxoplasma, which is contracted by eating undercooked meat, is prevalent throughout Europe. This infection causes small cysts to develop within our body, particularly within the brain and these again cause no problem unless there is severe immunosuppression which allows them to re-emerge. This again, is a major cause of morbidity and mortality in AIDS.

In summary, new diseases are indeed a true rarity and most of the apparent new conditions are more a natural adaptation of these micro-organisms to the environments that we create for them - either knowingly or unknowingly, but often inevitably to our detriment.

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