DISEASE WATCH | IN THE NEWS

Drug hopes for tuberculosis?

A new class of drug that could be used to treat tuberculosis has been identified. Scientists have discovered a new pathway in *Mycobacterium tuberculosis* that leads to the metabolism of trehalose to α-glucan. They observed that inactivation or genetic loss of the maltosyltransferse GlgE, a key enzyme in this pathway, results in the accumulation of the GlgE substrate, maltose 1-phosphate. This, in turn, leads to poisoning and death of the bacteria, partly driven by a self-amplifying feedback stress response in which more maltose 1-phosphate is produced. Drugs that inactivate GlgE, which is not found in humans and can therefore be safely targeted, are under development. The effect of GlgE inactivation could possibly be amplified by the ingestion of trehalose (commonly found in the human diet), which would further increase the levels of maltose 1-phosphate.

New drugs are urgently required to treat tuberculosis according to a new report from the WHO, which shows that levels of multi-drug-resistant tuberculosis have reached a record high. Multidrug-resistant tuberculosis is caused by bacteria that are resistant to at least two of the most effective drugs, isoniazid and rifampicin, and can result either from primary infection with resistant bacteria or the development of resistance during the course of treatment. The WHO report was published just a few days before World TB Day (24 March), which aims to increase public awareness that tuberculosis remains an epidemic in many parts of the world. The highest ever level of multidrug-resistant tuberculosis was recorded in northwest Russia in 2008, where it reached 28% of newly diagnosed cases. Furthermore, the report estimates that 440,000 people had multidrug-resistant tuberculosis in 2008, and one-third of these people died. However, there are encouraging signs, as Latvia, Estonia and two regions in Russia have seen a decline in the number of cases. ***Nature Chem. Biol./The Telegraph/WHO***

Influenza goes back to basics

New studies reveal that the H1N1 influenza virus which caused the swine flu pandemic last year and the virus responsible for the 1918 'Spanish flu' pandemic have structurally similar haemagglutinin proteins. Haemagglutinin, the surface protein of the virus, mutates from strain to strain to prevent recognition and consequent neutralization by antibodies. Researchers observed 95% similarity between the haemagglutinin tips of the two strains, which are also similar in shape and lack sugars; this is in contrast to seasonal influenza strains, which have at least two glycosylation sites. Analysis of influenza strains isolated between 1933 and 2009 showed that haemagglutinin started accumulating sugars in the 1940s. On the basis of these observations, the researchers propose that influenza with 'bald' haemagglutinin reappeared because antibodies against the unglycosylated protein had waned from the population, making people susceptible to infection. These findings, and the fact that immunization with the 1918 strain generated neutralizing antibodies against the 2009 strain in mice, have led to new ideas about vaccination strategies to combat future pandemics, such as developing vaccines against viruses that caused earlier pandemics. **Nature News/*Science***

Lower immunity for men?

Evolutionary differences between the two sexes could have left men more susceptible to infection. Olivier Restif and William Amos developed a theoretical model to assess whether environmental and behavioural factors, as well as the dynamic host–pathogen relationship, could affect immunity. By taking into account extrinsic differences between the two sexes (such as risk taking, competition and hormones), their model predicts that men could have evolved a reduced ability to fight infection. Specifically, they show that if men are more exposed to infection (for example, owing to competitive behaviour), this "favours the spread of the pathogen in the whole population and therefore tends to select for higher resistance or tolerance in both sexes if the cost of immunity is constitutive." However, when exposure to pathogens exceeds a certain level, the benefit of pathogen clearance will be low because of reinfection, ultimately selecting for lower immunity. A similar trend is observed when reproductive costs are taken into account: when men have high exposure to pathogens, they trade off fast recovery rates for high sexual activity to ensure that their resources are devoted to reproduction rather than immunity. ***Proc. Biol. Sci.*/Medical News Today**

Prophylaxis for HIV patients

Treating HIV-infected individuals in the early stages of disease with the antibiotic co-trimoxazole can significantly reduce mortality according to new research. In a study published in *The Lancet*, 3,179 HIV-infected, symptomatic Africans who were starting antiretroviral therapy and had low $CD4^+$ T cell counts were treated with this inexpensive antibiotic. The scientists observed an ~ 59% decrease in mortality over the first 12 weeks of prophylactic treatment and an ~ 44% decrease between 12 and 72 weeks. Furthermore, prophylactic treatment also reduced the frequency of malaria in these patients. These findings reinforce WHO guidelines, which already recommend 72 weeks of prophylactic treatment with co-trimoxazole for HIV-infected individuals starting antiretroviral therapy. The authors said that supply of co-trimoxazole, which is currently not available in many parts of Africa, should be greatly increased, as "Tens of thousands of lives can be saved by more universal use of the drug". ***Lancet*/BBC News**

In the News was compiled with the assistance of David Ojcius, University of California, Merced, USA. David's links to infectious disease news stories can be accessed on Connotea (http://www.connotea.org), under the username NatureRevMicrobiol.