DISEASE WATCH | IN THE NEWS

Potential trachoma vaccine

A potential vaccine has been developed against trachoma, an ocular *Chlamydia trachomatis* infection that is responsible for about 8 million cases of blindness worldwide (3% of all cases). The researchers tested this live attenuated vaccine on six cynomolgus macaques, which were subsequently challenged with *C. trachomatis*. In contrast to unvaccinated animals, which became infected and shed infectious bacteria, three of the six vaccinated animals did not develop any symptoms and did not shed infectious bacteria. The three other vaccinated animals developed symptoms similar to those of the naive animals, but had lower levels of infectious bacteria. This led the researchers to remark that "preventing disease requires complete or near complete inhibition of bacterial growth".

The vaccine consists of a *C. trachomatis* strain that has been cured of a plasmid. The resulting strain has a growth rate similar to that of wild-type bacteria, but does not induce the strong innate immune response that is induced by wild-type bacteria. In the future, this vaccine may also be useful against sexually transmitted *C. trachomatis* infections. ***J. Exp. Med.*/ScienceNews**

Tenofovir: killing two birds with one stone

A new study has revealed how the anti-HIV compound tenofovir can also protect against infection with human herpesvirus 1 (HHV-1) and HHV-2. Tenofovir was previously shown to decrease the transmission of HIV by 39%, and in the same report it was noted that tenofovir also decreased the risk of acquiring HHV-2 by 51%, even though tenofovir had previously been shown to have no effect on herpesviruses. This new study now shows that tenofovir inhibits the replication of HHV-1 and HHV-2 only at the high levels that are obtained with a 1% topical gel; no effect was detected at the levels achieved by oral tenofovir administration. Inhibition of herpesviral replication was detected in various cells lines, including keratinocytes, in which HHVs replicate in infected hosts. Uninfected host cells were unaffected by tenofovir, even at levels several times higher than those obtained with the 1% gel. Biochemical analysis revealed that the compound is converted to tenofovir diphosphate and that this metabolite inhibits the activity of the herpesviral polymerase. ***Cell Host Microbe*/New York Times**

Filovirus's European cousin

A recent die-off of bats in caves in Spain has been linked to infection with a previously unknown filovirus, marking the first time that filoviruses have been found to circulate in a population outside of sub-Saharan Africa and the Philippines. The virus, named Lloviu virus after the cave in which the dead bats were found, was detected in several organs, with the highest levels of virus in the lung, spleen and liver. Similar to other filoviral infections, the pathology of the dead bats' lungs was consistent with viral pneumonia, and no filovirus could be detected in healthy bats from the same area, indicating that the filoviral infection was the likely cause of death. Enough DNA to cover the entire viral genome could be amplified, and this DNA revealed that the virus is most closely related to the ebolaviruses. Further phylogenetic analyses placed the time of divergence with Ebolavirus at around 68,400 years ago and the most recent common ancestor of filoviruses at around 155,500 years ago. ***PLoS Pathog.***

Infectious agent for colon cancer?

Two reports have linked colorectal cancer to the bacterium *Fusobacterium nucleatum*, which is a constituent of the oral microbiota that has previously been linked to periodontitis and appendicitis. To identify changes in the microbiota that are associated with the cancer, both studies used large-scale sequencing; the first study matched RNA extracted from 11 colorectal carcinomas to RNA from healthy tissue, and the second study investigated DNA from colorectal cancers. These analyses revealed that *F. nucleatum* was over-represented in colon cancer tissue compared with levels in colonic tissue from healthy controls. In one of the studies, the bacterium was also shown to be associated with the tumour by fluorescence microscopy. Although these studies did not show causation, the results provide intriguing insights into a possible role for a member of the gut microbiota in the induction of cancer. ***Genome Res.*/ ScienceDaily**

A new toxin in MRSA's core

Researchers have identified a superantigen encoded in the genome of methicillin-resistant *Staphylococcus aureus* (MRSA). Superantigens are toxins that hyperactivate a large number of T cells and thereby induce systemic disease. The previously identified *S. aureus* superantigens are encoded on mobile genetic elements, such as plasmids, transposons and bacteriophages. As a result, most strains of MRSA carry only a subset of the toxins, and the most common toxins are present in only about half of MRSA strains. By contrast, this newly discovered chromosomally encoded toxin, staphylococcal enterotoxin-like toxin X (SElX), was detected in 95% of the 114 strains tested, and further analysis of six strains showed that it was present in the same chromosomal location in these strains.

SElX is produced during infection of humans, cows and sheep; antibodies against the toxin were detected in the serum of 20 out of 23 individuals who had been infected with MRSA, and in only one out of 47 individuals who were not known to have been infected. Further biochemical analysis showed that the toxin is mitogenic for human T cells, indicating that it does indeed act as a superantigen, and deletion of the gene that encodes the toxin produced a strain that had reduced lethality in a rabbit model. ***PLoS Pathog.***

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 his Twitter page (@Ojcius).