# DISEASE WATCH | IN THE NEWS

## Autophagy inhibitor foils H5N1

A recent study has revealed that reagents which block autophagic signalling can reduce lung injury and increase the survival rate of mice infected with the H5N1 strain of avian influenza virus. Compared with seasonal H1N1 influenza, H5N1 influenza has a much higher case fatality rate, which is believed to result predominantly from lung injury and respiratory failure. Sun *et al.* found an accumulation of autophagosomes in H5N1-infected lungs from human cadavers and mice, and observed that H5N1 but not H1N1 viruses induced autophagic cell death in alveolar epithelial cells. Importantly, they also observed that prophylactic and therapeutic treatment of mice with the autophagy inhibitor 3-methyladenine ameliorated lung inflammation and improved survival rates, indicating that blocking autophagy in the lungs could be an effective way to combat the threat of an H5N1 pandemic. ***Sci. Signal.***

## Resistance down on the farm

A strain of methicillin-resistant *Staphylococcus aureus* (MRSA) that regularly infects humans developed resistance when it was picked up by farm animals, according to a recent *mBio* paper. Comparison of the genome sequence of an MRSA ST398 strain with the sequences of 88 other *S. aureus* isolates revealed that it is descended from an antibiotic-sensitive strain that originally infected humans and changed rapidly after the jump into livestock, giving rise to new strains with resistance to several different antibiotics. Non-therapeutic use of antibiotics has been banned in the European Union but is still common practice in other parts of the world, including the United States, where the use of antibiotics in livestock production is thought to be driving an increase in the appearance of antibiotic resistance in bacteria. The US Food and Drug Administration caused controversy when it recently announced that it would not regulate the use of antibiotics in animal feed, a decision that may need to be reconsidered in light of these findings.

As described in a second *mBio* paper, methicillin-susceptible *S. aureus* (MSSA) ST398 strains have also emerged that are more readily transmissible among humans. The authors of this paper report that the genome of MSSA ST398 is smaller than that of its MRSA relative and contains fewer mobile genetic elements, although the isolate exhibits enhanced adhesion to human skin cells. **EurekAlert/*mBio***

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## Putting HIV on the run

According to a report from the CDC, the number of deaths caused by infection with hepatitis C virus (HCV) each year in the United States has now exceeded the number of deaths caused by AIDS. Between 1999 and 2007, the mortality rate from HCV infection increased from <3 to ~5 per 100,000 people, whereas deaths from HIV infection decreased from >6 to ~4 per 100,000 people. The decline in deaths from HIV infection probably reflects improved screening and better access to effective treatment in recent years.

Meanwhile, in the United Kingdom foreign nationals are to be offered free treatment for HIV infection through the National Health Service in an effort to limit the risk of infection to British citizens and to reduce the need for more costly later treatment. The plan will ensure that foreign nationals infected with HIV are treated in the same way as those suffering from other infectious diseases, who already receive free treatment. ***New York Times*/BBC**

## Shielding BoNT in the gut

The first crystal structure of a botulinum neurotoxin (BoNT) in complex with its clostridial non-toxic non-haemagglutinin (NTNHA) binding partner has revealed how the toxin is shielded from degradation in the human gut and provided clues for designing inhibitors against BoNT intoxication. Poisoning with BoNT often occurs through ingestion of food that is contaminated with *Clostridium botulinum;* however, it was unclear exactly how NTNHA helps BoNT to remain intact in the hostile environment of the human gut but releases the toxin on entry into the circulation. Gu *et al.* show that NTNHA provides large and multivalent binding interfaces that protect BoNT from degradation, and that this complex is regulated in a pH-dependent manner, allowing toxin release on leaving the gut. These findings will not only help to improve the design of inhibitors against BoNT, but also potentially lead to the development of better delivery vehicles for oral drug administration. **EurekAlert/*Science***

## Boning up on malaria

A chemically modified version of a drug used to treat osteoporosis could be useful in targeting malaria, according to a new study. The new drug, BPH-703, is similar to several inhibitors of geranylgeranyl diphosphate synthase (GGPPS; an enzyme involved in isoprenoid biosynthesis) that have been used to treat osteoporosis. However, unlike these other drugs, BPH-703 can enter *Plasmodium*-infected red blood cells in a mouse model of malaria and kill the parasite. Importantly, the new drug has little effect on isoprenoid biosynthesis in human or mouse cells and is effective at low concentrations in *Plasmodium*-infected mice, with no observed toxicity. Malaria killed an estimated 655,000 people in 2010, and finding new drug targets, such as GGPPS, remains a priority. ***Proc. Natl Acad. Sci. USA***

## Boy who cried outbreak

A man is to spend two years being 're-educated' in a labour camp in China after spreading a rumour that more than 50 people at a military hospital in north China's Hebei province had been confirmed as infected with severe acute respiratory syndrome (SARS). Both the hospital and the health administration of Baoding, in Hebei, denied the outbreak rumour, which was spread to boost the click rate on the man's website, according to the Xinshi District Public Security Bureau in Baoding. ***Shanghai Daily***

*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).*