Research brief

Out of sink

Sink drains in hospital rooms could be a reservoir of antibiotic resistance according to scientists in Milwaukee (WI, USA). In a study of intensive care units published in *The American Journal of Infection Control*, researchers took swabs from the drains of 46 sinks. 25 (54%) of 46 samples tested were positive by PCR for the bla_{KPC} gene, which can confer resistance to carbapenems. When these 25 samples were cultured, only four grew bacteria—including *Klebsiella pneumoniae* and *Enterobacter cloacae*—all of which had non-susceptible minimum inhibitory concentrations for ertapenem, meropenem, or both. Sinks next to toilets were much more likely to contain bla_{KPC} than were those further away (20 [87%] of 23 *vs* five (22%) of 23; p<0·001). The possibility of contamination from toilets to sinks could warrant new approaches to infection control.

Antibiotic resistance: an Arctic role

We are becoming accustomed to the ever wider spread of genes conferring resistance to antibiotics, but results of a study done in the far north of Norway will chill any microbiologist to the core. Investigators examined 40 soil samples taken in 2013 from eight sites in Svalbard. When DNA sequencing was done, they found 131 genes associated with antibiotic-resistance for nine different classes, including aminoglycosides and β-lactams. bla_{NDM-1} was present at five sites, even though it was only first identified in India in 2010, showing just how quickly such genes can spread globally. The investigators suspect that the genes came from people at a nearby research facility, or else were carried there by migratory birds.

Strep search

Strep throat is common enough in children; around 600 million cases occur each year. Infection with *Streptococcus pyogenes* causes fever, swollen lymph nodes and tonsils, and a sore throat. But a subset will develop recurrent tonsillitis, leading to school absences and often requiring tonsillectomy. Scientists, led by Shane Crotty (University of California, San Diego, La Jolla, CA, USA), now have some insights into why only some children are repeatedly affected. They compared tonsils from 146 patients, half with recurrent tonsillitis and half with sleep apnoea, which also often necessitates removal. Children who'd had recurrent tonsillitis had smaller germinal centres and lower antibody responses to SpeA, an *S pyogenes* virulence factor. They also identified variations in the human leucocyte antigen class II alleles, suggesting the possibility of a genetic component to susceptibility. The authors hope that SpeA could be a target for vaccine development.

Lamivudine: avoiding inflammation overload

Research in mice suggests that common HIV drugs such as lamivudine might slow age-related inflammation, which is associated with a host of diseases including Alzheimer's disease, macular degeneration, and type 2 diabetes. Retrotransposons are genetic elements found throughout the human genome that can replicate and reinsert themselves at different places. This sort of behaviour isn't good for your average healthy cell and is usually supressed. However, in a paper published in *Nature*, investigators have shown that as cells age they are less able to control retrotransposons, which triggers an immune response and causes inflammation. Retrotransposons rely on reverse transcriptase for this process and so reverse transcriptase inhibitors, such as those used to treat HIV, might prevent inflammation. When aged mice were treated with lamivudine, the immune response was dampened and inflammatory damage to tissues was reduced, suggesting that these drugs could have a role against a range of common age-related illnesses.

A hearty warning against HPV

A cohort study done in South Korea has shown a link between high-risk human papillomavirus (HPV) infection and the risk of cardiovascular disease. The study, published in *Circulation Research*, used data for more than 60 000 women aged older than 30 years, with an HPV test result available, and no history of cardiovascular disease. In follow-up between 2011 and 2016, 1122 cases of new-onset cardiovascular disease were recorded, with a significantly higher risk in women with high-risk HPV infection (hazard ratio 1·25, 95% CI 1·03–1·52). This association was stronger among women who were obese and in those with metabolic syndrome. The finding raises the possibility that HPV vaccination might help to prevent cardiovascular disease.

Simian dissimilarities and HIV

An investigation of the CD4 receptor of chimpanzees and how it interacts with simian immunodeficiency viruses (SIVs) has given some insights into human susceptibility to HIV. The researchers, led by Beatrice Hahn (University of Pennsylvania, PA, USA), identified nine variants of CD4 in wild chimpanzees. The variants differ due to amino acid substitutions and the addition of glycans, which in some cases reduced the ability of SIV to infect cells. These differences have probably arisen through natural selection by protecting chimpanzees from SIVcpz and other SIVs in apes. Human CD4 lacks these protective glycans, which might account for the historical jumps of SIVs into human beings, which resulted in the HIV/AIDS pandemic.

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For more on **hospital sinks as a reservoir** see https://doi.org/10.1016/j.ajic.2018.06.021

For more on **antibiotic resistance genes in the Arctic** see https://doi.org/10.1016/j.envint.2019.01.034

For **more on the causes of strep throat** see https://doi.org/10.1126/scitranslmed.aau3776

For more on **retrotransposons and lamivudine** see https://doi.org/10.1038/s41586-018-0784-9

For more on **HPV infection and cardiovascular disease** see https://doi.org/10.1161/CIRCRESAHA.118.313779

For more on **chimps and HIV** see https://doi.org/10.1073/pnas.1821197116