



Research brief

For more on **trogocytosis** by *Entamoeba* see <https://academic.oup.com/jid/content/10/2/e00068-19>

For more on **herpes virus recombination** see <https://academic.oup.com/jid/advance-article-abstract/doi/10.1093/infdis/jiz199/5477434?redirectedFrom=fulltext>

For more on **drugs for hepatitis A** see <https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000229>

For more on **cell lines for H3N2 influenza** see <https://www.nature.com/articles/s41564-019-0433-6>

For more on **HIV transmission** see https://journals.lww.com/jaids/Abstract/publishahead/Sharing_of_Injection_Drug_Preparation_Equipment_is_96388.aspx#pdf-link

For more on **heating to prevent HIV transmission** see https://journals.lww.com/jaids/Abstract/publishahead/Heating_Injection_Drug_Preparation_Equipment_Used_96389.aspx#pdf-link

For more on **West Nile virus** see <https://jmanetwork.com/journals/jmanetworkopen/fullarticle/2731691?resultClick=3>

For more on **childhood oral infections and cardiovascular risk** see <https://jmanetwork.com/journals/jmanetworkopen/fullarticle/2731677?resultClick=3>

Gnawing me, gnawing you

Entamoeba histolytica can use human proteins to camouflage itself, according to research by scientists at the University of California (CA, USA). Hannah Miller and colleagues have shown how *E histolytica* might be able to evade the human immune system using trogocytosis—gnawing off a piece of cell membrane from another cell. They first showed that *E histolytica* can acquire proteins from the surface of human cells and present them on their own surface. The scientists then showed that such parasites were protected from lysis by human serum, which could explain how *E histolytica* is able to evade host immunity to spread through the body. This process of nibbling can also kill the host cell, which could account for *E histolytica*'s damage to the gastrointestinal system.

Complex simplex

Herpes simplex virus 1 (HSV-1) and HSV-2 are generally considered separate species. The two diverged 6 million years ago, and a handful of ancient recombinations are known to have occurred. But a study led by Amanda Casto (University of Washington, WA, USA) has shown that many such recombinations occur, even today. The group analysed the sequences of 485 HSV genomes, showing how recombinations between HSV-1 and HSV-2 have been larger and more common than previously suspected. One recombination (>5 kb) arose in the viruses' current host. These recombinations can affect recognition of the virus by T cells and could have implications for HSV vaccine development.

A hope for hep A

Neutralising antibodies against hepatitis A virus have been identified that could form the basis of the first licensed treatments for infection. In-vitro studies, led by researchers at the Chinese Academy of Medical

Sciences, generated four antibodies with neutralising activity against hepatitis A virus. Cryo-electron microscopy showed that all four bind in a similar way at a single site on the hepatitis A virus capsid protein. A search of a drug database showed that golvatinib might bind in a similar manner. Golvatinib has previously been investigated as a kinase inhibitor for treatment of head and neck cancer. In-vitro antiviral experiments showed that golvatinib can block hepatitis A virus cell entry and so might be an effective treatment for infection.

Fashioning flu

A new cell line, described in *Nature Microbiology*, could improve the efficiency and accuracy of vaccine production for H3N2 influenza viruses. Traditionally, vaccines against influenza are produced in chicken eggs; however, this process is inefficient and can cause viral mismatch, meaning that vaccines are slow to produce and not as immunogenic as needed. A research team led by Yoshihiro Kawaoka (University of Tokyo, Japan, and University of Wisconsin-Madison, IL, USA), has developed a humanised version of Madin-Darby canine kidney (MDCK) cells to grow H3N2. By using CRISPR-Cas9 gene editing, the group produced MDCK cells that overexpress human influenza receptors and underexpress avian receptors, resulting in much more efficient growth of H3N2. They also showed that the viruses maintained greater stability, reducing the likelihood of mismatch with circulating strains.

The route of the problem

Researchers in London, Ontario (Canada), have identified a new route of HIV transmission among injection drug users. The region has the largest per-person needle exchange programme, yet rates of HIV increased between 2005 and 2015, prompting public health officials to investigate. In

a pair of papers published in *J AIDS*, they first showed that people who shared filters and metal containers used to dissolve drugs (but not needles or syringes) were more likely to contract HIV. Second, they showed that briefly heating the equipment could destroy the HIV virions, prompting a new public health campaign to curb HIV transmission. Heating did not affect the drugs, which is important if the intervention is to be accepted.

Pay for delay

Most reports of West Nile virus infection in the USA take more than a month to be notified to public health authorities, according to research led by doctors in New York. Subsequent modelling analysis showed that the mean lag of 5.5 weeks (SD 2.3) hampers the predictive ability of real-time forecast models. Reporting of mosquitoes infected with West Nile virus, which is the most common mosquito-borne virus transmitted in the USA, were also delayed, by an average of 6.6 days (SD 2.6).

Hearts in mouths

Oral infections in childhood are associated with risk of cardiovascular disease later in life according to the results of a longitudinal study done in Finland. In 1980, 755 children aged 6–12 years had their mouths examined for oral infection as part of the Cardiovascular Risk in Young Finns Study. In the same participants 27 years later, researchers measured carotid artery intima-media (cIMT) thickness, a sign of atherosclerosis and a risk factor for heart attack and stroke. Participants who had caries or periodontal disease in childhood had a significantly increased risk of thickening of the cIMT. The association between oral infection and cardiovascular disease is known in adults, but this study is the first to show that the same effect applies in children.

Sean Cleghorn