



Figure 1 Oysters, one of the many shellfish that can be contaminated by *Vibrio cholerae*

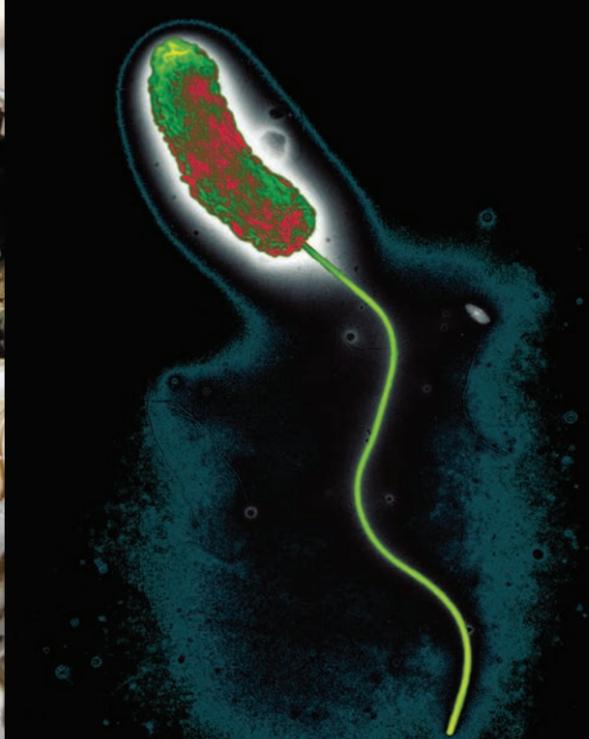


Figure 2 *Vibrio cholerae*, the bacterium that causes cholera (×15 500)

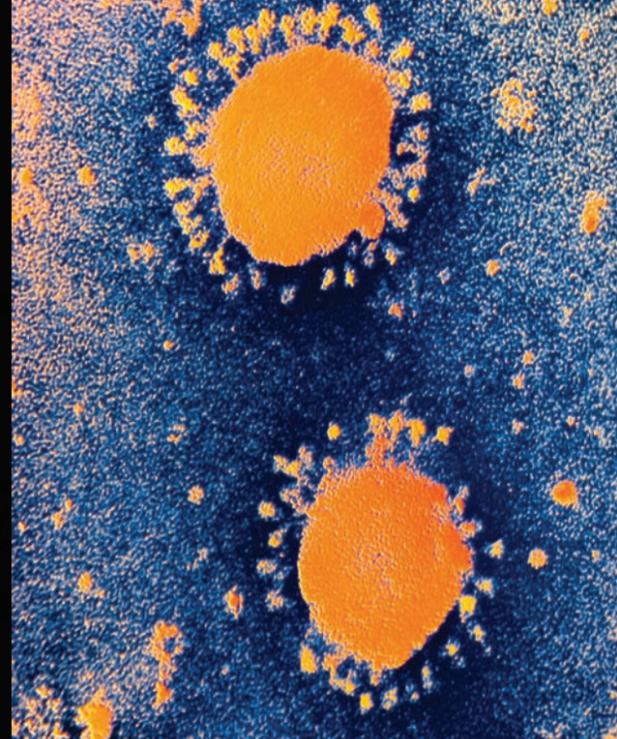


Figure 3 Coloured transmission electron micrograph of SARS virus (×200 000)



Figure 4 Vampire bats are one species that carry SARS-related viruses

Animals and the human pathogens they carry

Figure 5 Tick on human skin (×15)



Figure 6 Transmission electron micrograph of *Borrelia burgdorferi*, a bacterium that causes Lyme disease (×50 000)



Oysters (see Figure 1) are bivalve molluscs, meaning their shells consist of two hinged parts, which protect their soft bodies (*mollis* = soft). They live in marine or brackish (slightly salty) habitats. When feeding, these invertebrates draw water over their gills and filter out small particles and plankton via tiny hair-like projections called cilia. This filtering process can concentrate harmful bacteria present in the water around them. This means that eating uncooked oysters can pose the threat of transmitting diseases such as cholera. Cholera is an infectious disease transmitted by *Vibrio cholerae* (see Figure 2). This bacterium causes vomiting and diarrhoea. In developing countries, contracting cholera can lead to death owing to extreme dehydration. As a result of bad weather and flooding in the UK recently, a number of oyster farms have had to close due to contamination of the animals with harmful strains of *E. coli*.

Bats are the only living mammals that can fly. Vampire bats (see Figure 4) live up to their name by feeding on blood. Once these nimble creatures detect their bird or mammal prey by echolocation, specialised heat sensors in their noses lead them to the blood-filled regions of the animal victims. Unlike fictional 'blood-sucking' vampires, the bats then make a small incision in the prey animal with their razor-sharp teeth and lap the blood from the wound with their tongues (see <http://tinyurl.com/ntojwro>). Their saliva contains anticoagulants that prevent the blood from clotting, so the bats can feed from a wound for 20–30 minutes typically.

Unsurprisingly, these bats are a pest to farmers — they can transmit diseases such as rabies to cattle. But it's not only farm

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animals to which vampire bats pose a threat. Several viruses related to the virus responsible for severe acute respiratory syndrome (SARS) (see Figure 3) in humans are found commonly in vampire bats. Between November 2002 and July 2003, SARS reportedly affected 8273 people, eventually killing 775 in southern China. The virus causes flu-like symptoms, and a very high body temperature. In sick or elderly patients, infection can lead to shortness of breath, fluid in the lungs and sometimes death.

In countries where vampire bats are widespread, they may also feed on human blood. This poses a health risk, especially in rural areas where lack of medicine is a problem. Outbreaks of human rabies in Brazil and Peru have been traced to vampire bat bites.

Ticks (see Figure 5) are small parasites that belong to the same family as spiders (arachnids). They live off the blood of mammals, birds, reptiles and amphibians. Ticks insert their mouthparts into the skin and inject the prey with anti-inflammatories and anti-coagulants so that they remain undetected while feeding. They can also inject and so transmit various pathogens. This is mainly a problem for livestock, but humans should also be wary of ticks as some carry *Borrelia* (see Figure 6). This bacterium causes Lyme disease. The disease begins with mild flu-like symptoms but can progress to debilitating illness if not treated.

Joyce Tyldesley's article in this issue (pp. 10–14) describes another disease, schistosomiasis, carried by a freshwater aquatic snail, *Bulinus globosus*. This snail is the intermediate host for the flatworm *Schistosoma*.

Further reading

- Arnold, C. (2014) 'Reservoir bats — spreading contagion on night's wings', *New Scientist*, 8 February, pp. 44–46.
- Weston-Davies, W. (2002) 'Ticks, tricks and treatments', *BIOLOGICAL SCIENCES REVIEW*, Vol. 14, No. 3, pp. 2–5.

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