

# Sea coral hope for fighting gastroenteritis

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Researchers discovered the potential of the sea coral molecule after it was isolated from a screen of thousands of other compounds

A molecule found in coral is effective in fighting the type of virus that causes gastroenteritis, giving hope for the development of better treatments for the illness, according to new research. At present, treatments do not fight the virus itself but instead address its symptoms, such as dehydration and diarrhoea.

The research shows that a small molecule isolated from a sea fan coral can inhibit the way noroviruses, a major cause of gastroenteritis, create proteins and replicate within cells. It was published in the *Journal of Biological Chemistry* last month by scientists at Imperial College London.

Human caliciviruses are responsible for approximately one million cases of gastroenteritis in the UK and an estimated 23 million cases in the US each year. According to the US Centre for Disease Control and Prevention, at least 50 percent of all foodborne outbreaks of gastroenteritis can be attributed to noroviruses. In this study, the researchers used similar viruses, feline calicivirus and murine norovirus, as a model system for the human caliciviruses, which are unable to grow in the laboratory.

The researchers found that these viruses make proteins using a unique mechanism which differs from that of other viruses. This mechanism relies on binding the host cell protein synthesis machinery to a viral protein attached to the genome of the virus. Other viruses which infect humans tend to use either a mechanism identical to that of the host cell, or rely on the interaction of the host cell protein synthesis machinery with the viral genome directly.

As the norovirus protein synthesis is highly dependant on a specific viral protein, it is an attractive target for antiviral intervention. The mechanism means that therapies could be developed to inhibit the way noroviruses create proteins without damaging the creation of normal proteins in healthy cells.

Dr Ian Goodfellow, from the Division of Investigative Science and lead author on the paper, said: "Our work adds to the ever growing list of natural products which have antimicrobial or antiviral activity. In a world where new viruses and drug resistant 'superbugs' are of great concern, the discovery of new molecules for the control of pathogens is very exciting.

"These particular viruses are a significant economic problem, costing the UK millions of pounds every year. Our work highlights how this critical step in the life cycle of the virus is a good target for antiviral intervention, potentially giving us a method of controlling the spread of

this virus in areas where close person to person contact or exposure to infectious material cannot be avoided," he added.

The scientists were encouraged by the success of the study as most antiviral medications use small molecules. They are attractive because they can often be taken in tablet form and the molecules can pass into cells to inhibit the virus.

The researchers discovered the potential of the compound from coral after it was isolated from a screen of thousands of other compounds during a previous study by their collaborators from McGill University, Canada. The next step for the researchers is to set up composition analyses and screens to identify other molecules which can work in a similar way to inhibit the virus without the undesirable side-effects they observed with the compound isolated from coral. Whilst the compound isolated from coral is effective in inhibiting the virus at low doses, at high doses it is toxic to normal cells.

The gastroenteritis viruses are a particular problem in areas where close person to person contact cannot be avoided such as hospitals, retirement homes, schools and cruise ships. The majority of publicity comes from outbreaks occurring on cruise ships but outbreaks of gastroenteritis are also a big problem in many hospitals.

The viruses can have a dramatic effect on a hospital's ability to operate as in order to get rid of the virus, the hospital wards are usually closed and manually decontaminated. Reports suggest that the cost to the NHS for outbreaks occurring in hospitals in 2002-2003 was approximately 80 million pounds.

Source: Imperial College London

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