

Does it matter?

In November 2019, norovirus infection resulted in outbreaks among Lego-lovers at the Bristol Brick Show, closure of 46 Colorado schools and ruined a wonderful ship-cruise for the passengers on-board the Norwegian Joy travelling from Miami to Los Angeles. That's because this little fellow, in the words of The Black Eyed Peas, knows "how to get it started".

According to the Centers for Disease Control (CDC) norovirus is among the leading causes of food-borne illnesses, and you may have heard about it under the names "stomach flu", "stomach bug" or "winter vomiting disease". In fact, the CDC scientist Aron Hall gave it a new nickname - "the perfect human pathogen". Why so perfect? Because it's easy to contract, but difficult to study or to treat. In other words, if viruses could talk they would probably be jealous of norovirus.

Norovirus is highly contagious yet not as deadly as Ebola or influenza. But it does make a trick. The virus can lay and wait for weeks on a doorknob, the same one you put a hand on while opening the room this morning, it can lay on the toilet seat you touched in the bar restroom yesterday, it can be even now on your hands when you are touching your laptop keyboard. Worried? If you are healthy you may experience some vomiting, diarrhea or fever and you will get better within 2-3 days. You may also miss the infection and show no symptoms at all. But you also become a carrier. For up to two weeks you will spread the virus among your friend and people you meet. Yes, you have just become a Trojan Horse, but this time Achaeans are ~25nm in diameter. Probably you should stay at home so you don't spread the virus, but let's be honest, which boss will let you stay at home when you recovered and you are fit as a fiddle, little lazybones? Indeed... Perfect pathogen, huh?

Unfortunately, norovirus is a big deal if it comes to babies, elders or people with immune system disorders. CDC estimates that about 200 million cases are among children under 5, leading to an estimated 50,000 child deaths every year. All efforts to develop vaccines or effective drugs failed thus far, despite numerous scientists trying to solve the norovirus puzzle. The cutting edge achievement is development of mini-organs mimicking our guts in the laboratory, which allow for the virus to enter and replicate. Sounds a bit futuristic, doesn't it?

But we are still at the beginning of our journey, and we do not fully understand why some strains replicate, while others are not and how to make a universal system that will enable us to understand the biology of the virus. Within this project, we will aim to understand the early stages of noroviral infection. We will try to pinpoint what is needed for the infection to become susceptible and later try to mirror this in much simpler cultures.

Thanks to the enormous progress in the field, we are now able to observe single viruses infecting the cells. We can also label selected proteins or compartments within the cells and find out which pathways are hijacked by the norovirus. The proposed project may shed some light on norovirus infections and help design antivirals in the future. You know what they say... You must know your enemy.