

Measles is caused by measles virus. It is highly infectious and transmitted through the air.



## Prodromal

The first signs appear around 10 days after the infection. The patient develops fever and cough, and becomes contagious.



What is measles and why do we study it?

## **Symptomatic**

The symptomatic phase follows a few days later. The skin rash appears and lasts for several days.



### Recovery

The symptoms disappear as the virus is cleared from the body. The person will be protected from measles for life.



### Immune suppression

However, immunity to other infectious diseases is suppressed. This may last several years after recovery. We study how measles causes immune suppression.

# Measles around the world





# **Measles in the Netherlands**



vaccination coverage

Measles remains a global problem. In 2016, more than 85,000 measles-associated deaths were reported by the World Health Organization.

In 2017, the number of measles cases in Europe was 4 times higher than in previous years.

## **Measles vaccination in the Netherlands**



















### measles





### blood sample, nose and throat swabs

In patients with acute measles, we have investigated which cells are infected in the blood. In the nose and throat, we investigated how much virus was excreted.

### paired . blood samples

A first blood sample was collected from healthy, unvaccinated donors with no history of measles. A second blood sample was collected after the donors recovered from measles.

## **Before**

Our body is protected from diseases by our immune system. The soldiers of this system, the white blood cells, include naive and memory cells. Naive cells will fight diseases and later become memory cells too. These cells will remember previous infections and protect our bodies from getting the same diseases again.

During

When measles virus comes, the virus infects and kills a lot of our memory cells. During the infection, the virus damages our body. It goes to our lungs, spleen, intestine, eyes and even skin. However, it does not target the naive cells. This allows some naive cells to take arms against the virus and kill it.

After the attack, some memory cells survive. Some other naive cells will remember the attack and become memory cells that protect us from measles forever. However, we lost our old memory cells that could recognise past infections. This puts us at risk for getting infectious dis-

eases.

After



From our study, we learnt that measles attacks our immune system by killing our memory cells and makes us prone to other infectious diseases. This highlights that measles is not an innocent childhood disease.

We express our gratitude to all participants, parents and school staffs, and other contributors to this study.

