Common medications alter flu virus activity

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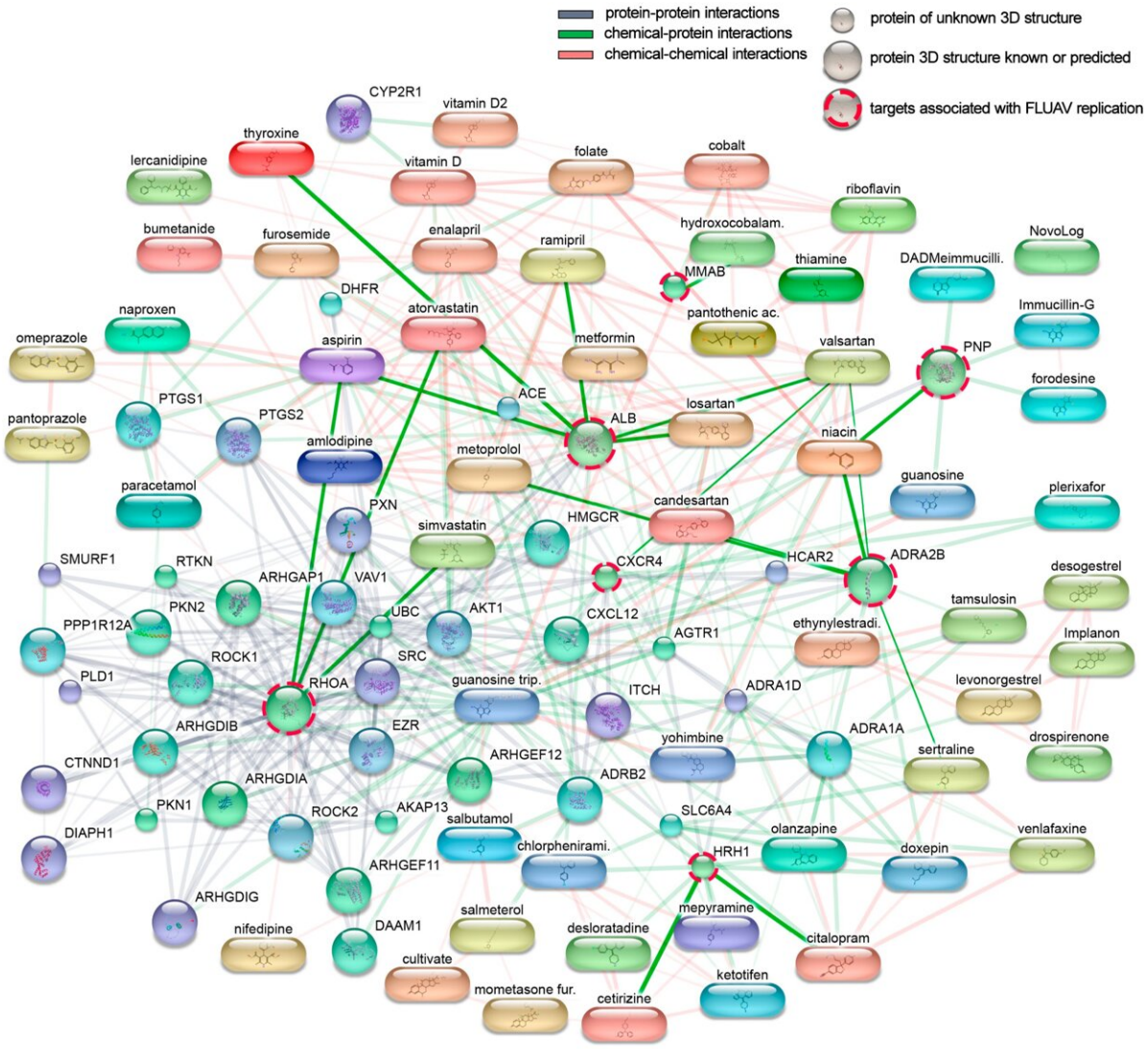

Direct and downstream cellular targets of 45 active components of commonly prescribed medicines. Targets associated with FLUAV replication are marked with red dashed circles, and interactions between them and commonly prescribed

drugs are highlighted. Credit: 10.3390/v13081537

Although the influenza virus varies a lot from year to year, the flu usually contributes to approximately 1000 deaths a year in Norway. The different measures used to stop the spread of coronavirus brought the flu infection rate way down, but this year scientists expect that we will be facing a tough season.

Recent experiments performed by researchers at NTNU and universities in Estonia and Finland have shown that commonly prescribed medications used for completely different conditions can make the flu virus more or less active.

The researchers have identified several of these drugs.

This information is important to know, since many of the patients who die from the flu are elderly people who often rely on these various medications.

Changes how viruses react with cells

"We first identified 45 different active drug compounds. We then tested them to see if they influenced the influenza A virus," says Denis Kainov, a professor in NTNU's Department of Clinical and Molecular Medicine (IKOM).

The team found that several active ingredients can alter how the virus interacts with our cells. These ingredients include:

- Atorvastatin, which reduces blood cholesterol levels and prevents atherosclerosis.

- Candesartan, which is used to treat high blood pressure and heart failure.
- Hydroxocobalamin, which is used to treat vitamin B12 deficiency.

These are commonly prescribed medications that are used for common illnesses.

"Some of the medicines amplify the effect of viruses in the cells, while others dampen them. The response depends on the target of the drugs in our cells. If the drug target is important for the spread of the virus, we can curb virus activity. But if the target of the medicine is part of the immune system that protects us from viruses, and we inhibit it with the medicine, the virus activity can increase," Kainov explains.

Consequences for patients not yet known

The results don't show what consequences these interactions might have for patients in practice.

"We don't know how the various medications affect the course of the disease or the death rate for influenza patients. Our hypothesis is based on experiments with computer models and in the laboratory," says Kainov.

More research is needed to see exactly how different medications influence disease outcome in patients.

"Well-structured, clinical tests can give us answers," Kainov says.

The results from this pilot study provide a good starting point for further research, since the research group has identified the active compounds that could also affect the course of the illness.

More information: Aleksandr Ianevski et al, Active Components of Commonly Prescribed Medicines Affect Influenza A Virus–Host Cell Interaction: A Pilot Study, *Viruses* (2021). DOI: 10.3390/v13081537