In a reality where many marketed antiviral drugs lose effect because of virus mutation, accelerated by the increased spread and incidence of viruses, there is a significant unmet need for new drugs with improved resistance properties. Vironova meets this need by developing antiviral compounds that are less prone to induce virus mutation.

Vironova is developing antiviral drugs against Herpes and Influenza, targeting structural components of the viruses. By utilizing our own virus analysis technology platform, the effects of the new antiviral drugs can be visualized and analyzed.

Experts and experienced organic chemists optimize lead compounds in Vironova’s new fully functional organic chemistry laboratory which has been operational since mid 2011.
VIRONOVA’S ANTI-INFLUENZA COMPOUNDS

Although influenza vaccination remains the primary method for the prevention of influenza, efficacy may be limited by a poor match between the vaccine and circulating strains and the poor response to vaccination of elderly patients. Hence, there is an important role for antiviral therapy in the management of influenza.

Available anti-Influenza drugs

Currently, two classes of anti-influenza drugs are available on the market, M2 proton channel inhibitors and neuraminidase inhibitors, the latter are regarded as the predominant class of anti-influenza drugs for the treatment of existing influenza infection and prophylaxis of potential outbreaks. However, problems with resistance due to viral mutations are extensive and there is therefore an urgent need for novel antiviral therapies with more effective, broad spectrum activity that can decrease the problem with resistance.

Vironova’s anti-influenza candidates

In the development of antivirals against influenza, the thionation process with our novel thionating reagent was used to chemically modify nucleozin and derivatives thereof. The compounds were evaluated for their antiviral properties in a band of various virus strains of influenza A. Most importantly, the new compounds VNFC045 and VNFC051, showed antiviral activity against the 2009 H1N1 strain A/HH/2009, where previously nucleozin was shown to be inactive. Consequently, these compounds have been selected as candidates for in vivo antiviral activity studies in mice.

Market

The influenza drug market was worth $4.0 billion in 2014 and is expected to grow to $8.5 billion by the year 2019 and $11.8 billion by 2024 (Research and Markets: Global Antiviral Therapeutics 2015-2024 - Technologies, Markets and Companies).

Intellectual property

Vironova has patent applications that are either pending or approved in several countries for a new chemical synthetic method – thionation. By applying this thionation method on new antiviral substances against influenza, new drug candidates with increased antiviral activity has been synthesized and patents were submitted during 2012 and 2013. The work leading to this invention has received funding from the European Union Seventh Framework Programme.

The nucleoprotein (NP) is a target for antiviral treatment and nucleozin was the first molecule identified to bind with NP and cause an anti-influenza effect by interfering with viral replication (Kao RY et al. Nat Biotechnol. 2010 Jun;28(6):600-5, Gerritz SW et al. Proc Natl Acad Sci USA. 2011 Sep 13;108(37):15366-71). Vironova’s anti-influenza compounds are thionated derivatives of nucleozin.

THE EPIDEMICS CAUSED BY THE INFLUENZA VIRUS ARE ESTIMATED TO RESULT IN ABOUT 3 TO 5 MILLION CASES OF SEVERE ILLNESS, AND UP TO 500 THOUSAND DEATHS WORLDWIDE EACH YEAR.