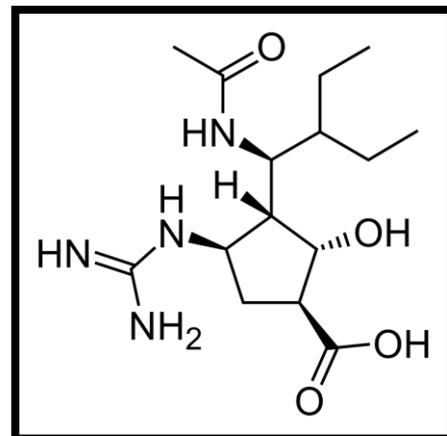


Peramivir

Medical name: Peramivir (Peramivirum, Peramivir-trihydrate [in pharmaceuticals], Rapivab [trade name], BCX-1812, RWJ-270201)

IUPAC-name: (1*S*, 2*S*, 3*R*, 4*R*)-3-[(*S*)-1-acetamido-2-ethyl-butyl]-4-(diaminomethylideneamino)-2-hydroxy-cyclopentane-1-carboxylic acid

Formula: $C_{15}H_{28}N_4O_4$ (molar mass=328,4 $\frac{g}{mol}$)



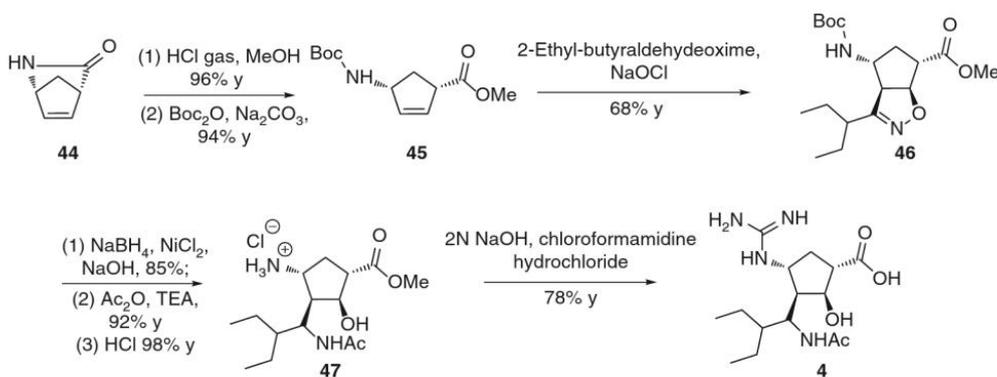
Structure of Peramivir. [1]

History

Peramivir is an antiviral drug for the treatment of influenza and was developed by BioCryst Pharmaceuticals. A study of using Peramivir in case of seasonal influenza in 2008 showed no effect compared to placebo, but in October 2009 Peramivir has shown life-saving effects in intravenous treatment of swine flu. Due to this, an Emergency Use Authorization has been established by the U.S. Food and Drug Administration (FDA), which says that Peramivir is allowed to be used in intravenous form for hospitalized patients if other methods of treatment are ineffective or unavailable. After this achievement the U.S. government supported the study of BioCryst Pharmaceuticals financially. In 2011 Phase 3 of this study revealed that one intravenous treatment with Peramivir is just as effective as a five-day oral treatment with Oseltamivir for people with seasonal influenza.

In June 2011 Peramivir has become very meaningful when a new variant of swine flu, with a genetic mutation, has emerged in Asia. The virus got resistant to Oseltamivir and Zanamivir because of this adaption, but not to Peramivir. According to this, BioCryst Pharmaceuticals proposed a motion for a new drug application for the intravenous treatment to the FDA. [1]

Synthesis



Synthesis of Peramivir. [2]

Medical Use

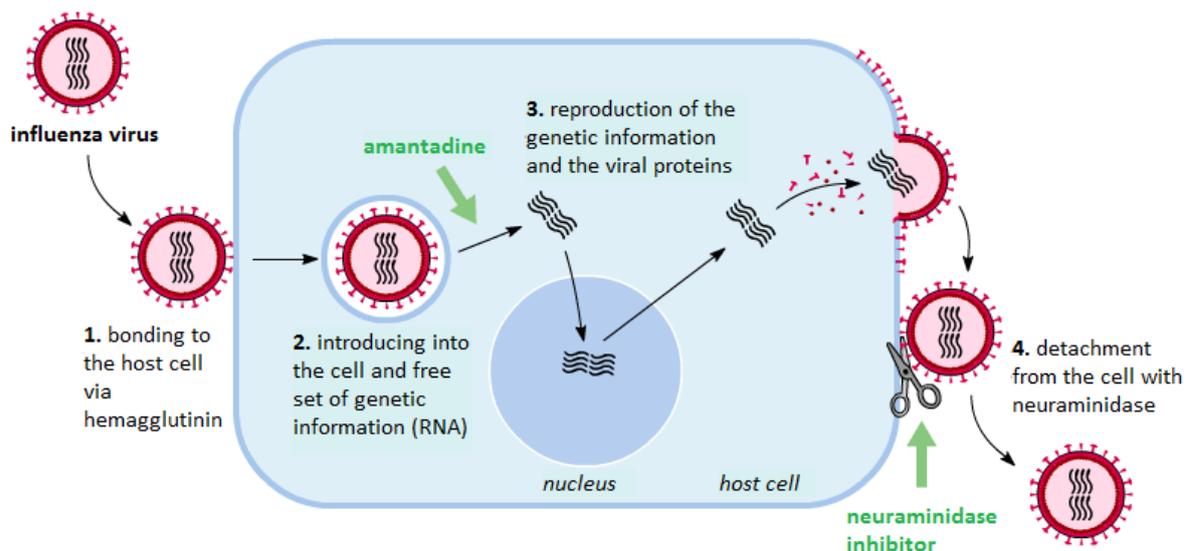
The specific inhibitor of the enzyme neuraminidase is used for the treatment of influenza type A (for humans, birds, pigs, horses, etc.) and influenza type B (only humans). The drug is administered intravenously, which distinguishes it from Zanamivir, which is administered with a spray, and Oseltamivir, which is administered orally. Following a single administration of Peramivir the flu infection can be shortened up to one day, while the fever period can be shortened to about 12 hours. The drugs most common adverse effect is diarrhea. Rarely, there are fatal skin reactions and other hypersensitivity reactions such as the Stevens-Johnson syndrome. Furthermore, the drug raises the risk for hallucinations, delirium and abnormal behavior. ^[3, 4]

Biological Response

A virus is like a parasite which affects the body by using the host cells to propagate. There are different points of application for the antiviral drug: before and after the virus affects the cell and while the virus is synthesized. Neuraminidase inhibitors cannot operate in the cell, because the enzyme neuraminidase is only found on the outer membrane.

If a virus affects a host cell, it first sequesters to the cell. Then the virus is absorbed into the cell through the process of endocytosis. The genetic information of the virus are delivered to the cytoplasm as ribonucleic acid (RNA) and absorbed by the cell nucleus, where the RNA propagates. Due to this, new viruses emerged which are still hanging on the outer membrane, but by the enzyme neuraminidase the viruses are separate from the host cell. Peramivir operates at this point by inhibiting the neuraminidase, which prevents the separation and the exponential increase of the viruses. ^[5, 6, 7]

medical point of application in the replication circle of the influenza virus



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Effect of Theo Inhibitor. ^[6]

Literature

- [1] <https://en.wikipedia.org/wiki/Peramivir>
- [2] Clemens Lamberth, Jürgen Dings: *Bioactive Carboxylic Compound Classes: Pharmaceuticals and Agrochemicals*. Wiley-VCH, 2016.
- [3] <http://arznei-news.de/peramivir/>
- [4] <http://www.rapivab.com/about-rapivab>
- [5] <http://www.pharmawiki.ch/wiki/index.php?wiki=Tamiflu-Animation>
- [6] <http://www.pharmawiki.ch/wiki/index.php?wiki=Neuraminidasehemmer> (translated into English)
- [7] <http://www.pharmawiki.ch/wiki/index.php?wiki=Peramivir>