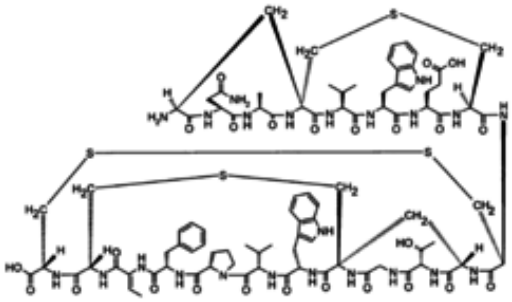
Technology Offer

Novel labyrinthopeptins as anti-viral agents

Reference Number 02-00337

Challenge

Viral infections are still a major threat for human health. Although most virus infections are asymptomatic or have only harmless consequences, the overall infection rate is high and in individual cases serious or life-threatening sequelae may occur. The human respiratory syncytial virus (hRSV), for instance, is a major cause of morbidity and mortality of children under 5 years and represents a major problem in elderly and immunocompromised patients as well. According to the CDC, around 14,000 mostly elderly patients died in the US due to hRSV infection in 2014. Today, no effective treatment for hRSV infections of the lower respiratory tract is available. Further examples are the human cytomegalovirus (hCMV), which infects between 60% and 70% of adults in industrialized countries and almost 100% in emerging countries, or the Kaposi sarcoma-associated herpesvirus (KSHV) with an infection rate of 1-3% of the population of North America and Europe, and up to 50% of the population in some areas of equatorial Africa. Therefore, in the light of an increasing number of multiple viral infections and the occurrence of novel resistant strains, there is a pressing need for the development of anti-viral agents that are active against a broad-spectrum of human pathogenic viruses.



Chemical stereostructure of labyrinthopeptin A1

Technology

The invention comprises novel labyrinthopeptins and combinations thereof as antiviral agents. Labyrinthopeptins are lantibiotics - ribosomally synthesized peptides, produced by Staphylococci, Lactobacillus and Actinomycetes - characterized by the amino acids lanthionine or methyllanthionine. The labyrinthopeptins are a novel class of lantibiotics containing the unusual amino acid labionin. The known Labyrinthopeptins A1 and A2 (LabyA1, LabyA2) for example display a distinct antiviral activity in the low micromolar range especially against hRSV, but also against KSHV, hCMV, dengue virus (DENV), chikungunya virus (CHIKV), tick-borne encephalitis virus (TBEV; FSME virus), vesicular stomatitis Indiana virus (VSV), zika virus (ZIKV) and hepatitis C virus (HCV). Novel findings now demonstrated a significant synergistic effect of the combined application of LabyA1 and A2 in the ratio 1:1. While their very strong activity against hRSV makes labyrinthopeptins particularly suitable for this indication, based on their proven effects against a large number of different enveloped viruses from diverse viral families, they furthermore have the potential for a broad-spectrum antiviral drug.

Commercial Opportunity

The technology is suitable for the development of broad-spectrum antiviral drugs and is offered for co-development or in-licensing.

Development Status

Data from cell culture model experiments are available. In vivo data in suitable infection mouse models are available.

Patent Situation

European priority application filed in November 2015, international PCT-application pending (WO2017/085257); national applications pending in Europe, US, Canada and Japan.

Further Reading

Meindl et al. 2010. Labyrinthopeptins: A New Class of Cabacyclic Lantibiotics; Angew. Chem. Int. Ed, 2010, 49, 1151-1154.
Férir et al. 2013. The Lanitbiotic Peptide Labyrinthopeptin A1 Demonstrates Broad Anti-HIV and Anti-HSV Activity with Poteintial for Microbicidal Applications; PLOS ONE, 2013, 8, 1-16.
Rupcic et al. 2018. Large Scale Production and Downstream Processing of Labyrinthopeptins from the Actinobacterium Actinomadura namibiensis; Bioengineering (Basel, Switzerland) vol. 5,2 42. 5 Jun. 2018, doi:10.3390/bioengineering5020042

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