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Inhibition of reverse transcription of Influenza A virus genome RNA by peptide nucleic acids

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Influenza A virus is a negative-strand RNA virus that possesses 8 genome segments in the virion. When the virus is exposed to low pH within the cellular endosome, it releases the viral RNP complex into the cellular cytoplasm. Determining whether nucleic acid analogues can recognize the viral RNA within the ribonucleoprotein (RNP) complex is important for development of influenza A diagnostic and treatment methods.

We prepared phosphorothioate (PS) and peptide nucleic acid (PNA) that target a 15-base highly conserved sequence in the polymerase subunit 2 (PB2) genome and evaluated their abilities to recognize the RNP complex by monitoring the inhibition of reverse transcription using real-time RT-PCR. Both PS and PNA recognized the viral RNA within the RNP complex and inhibited the reverse transcription in a sequence-dependent manner. PNA had greater antiviral activity than PS. We also synthesized a series of PNAs that recognize different types of the hemagglutinine genome sequences and succeeded to diagnose the virus strains. Further details will be discussed in this paper.

Biography

Dr. Kunihiro Kaihatsu has completed his Ph. D at Kobe University, Japan, in 2001. He trained in organic chemistry, enzymatic chemistry, and nucleic acid chemistry in Japanese, American, and British institutions and is now Assistant Professor in the departments of organic fine chemicals at Osaka University in Osaka, Japan. He published numbers of papers in the field of antisense technology between 2002 and 2005. His current research interests are in the development of antiviral agents, with emphasis on influenza viruses. He has won a jury's special award in the 9th and 10th Biobusiness Competition Japan in 2009 and 2010.