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Screening of the natural products as novel chemical inhibitors of the PRRSV helicase, nsp10

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Porcine reproductive and respiratory syndrome (PRRS) is one of the most devastating diseases causing severe economic losses in swine industry worldwide. Its causative agent, PRRS virus (PRRSV) is a positive-strand RNA virus and expresses at least 14 non-structural proteins (nsp) and 8 structural proteins for viral replication. Since current antiviral treatments fail to prevent and control PRRSV, it has been suggested to use natural products as anti-PRRSV treatments because they have been successfully employed in many cases as antiviral agents. Thus, we investigated natural products to find anti-PRRSV drugs. To do this, PRRSV helicase nsp10 was chosen for antiviral target because it is indispensible for virus replication and *in vitro* high-throughput screening system for helicase activity can be easily established. Firstly, we purified nsp10 recombinant protein from *E. coli* using maltose binding protein (MBP) tag affinity purification. Next, we determined that the recombinant nap10 possesses one of helicase activities, ATPase activity by ATP bioluminescence assay system. Using this assay, 44 natural product extracts (NPE) were evaluated as ATPase inhibitors and four NPEs including NPE-44 showed more than 50% ATPase inhibition. To further characterize which compounds of NPE-44 have the inhibition activity, 12 compounds were isolated from NPE-44 and tested for ATPase inhibition. Interestingly, 3 compounds were discovered to have the inhibition activity of NPE-44. Now we are investigating the cytotoxicity and antiviral activity of the NPEs having ATPase inhibition activity using cell culture based assays. Taken together, this study will certainly provide valuable information to develop new promising anti-PRRSV drugs.

Biography

Ju Huck Lee has received his PhD degree in 2009 from University of Connecticut Health Center. He had two Post-doctoral experiences at Harvard Medical School and UTHealth at Houston. He has joined Korea Research Institute of Bioscience and Biotechnology as a Junior Researcher in 2015 and has been studying Molecular Biology of Infectious Diseases. He has published 25 papers in prestigious journals.

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