Liver-specific gene delivery using engineered virus-like particles of Hepatitis E Virus

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Virus-like particles (VLPs) possess the potential for organ-specific transport of therapeutic agents owing to their empty space surrounded by viral capsid proteins and a tropism similar to those of with the original viruses. However, there have been few reports on suitable VLPs for target-specific delivery. Hepatitis E virus (HEV) is one of the hepatotropic viruses showing remarkable liver tropism. N-terminal truncated ORF2 (Nt-ORF2) of HEV can form VLPs via self-assembly. In this study, we investigated whether HEV-LPs could specifically deliver foreign genes through tropism to the liver. HEV-LPs were obtained by Nt-ORF2 expression in Huh7 cells transduced with recombinant baculovirus and were then purified by continuous density gradient centrifugation. The purified HEV-LPs efficiently penetrated liver-derived cell lines such as Huh7 cells and SK-Hep-1 cells. Next, to verify the utilization of HEV-LPs as gene delivery tools, GFP-encoding plasmids were encapsulated into HEV-LPs in a disassembly/reassembly procedure. After encapsulation, EGFP was expressed in only liver-derived cells. HEV-LPs produced in mammalian cells by transduction with recombinant baculovirus can encapsulate foreign genes into the central cavity of HEV-LPs. Moreover, encapsulated foreign genes can specifically transport and express to liver-derived cells by property of HEV-LPs. This study may provide valuable information for the development of novel gene therapy tools for liver disease.

Speaker Biography

Seung Kew Yoon is now a professor of the division of Hepatology and Gastroenterology, Department of Internal Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea. He earned his MD at the Catholic University of Korea in 1985. He trained in Hepatology & Gastroenterology at Seoul St.Mary's Hospital, The Catholic University of Korea from 1992 to 1994. He then subsequently trained as research fellow in Molecular Hepatology Laboratory, MGH, Harvard Medical School, Boston, USA from 1996 to 1998. He has been principal investigator in several International Multicenter Researches on antiviral therapy against hepatitis virus B & C, and target therapy for HCC. He holds scientific membership in numerous professional associations in Korea and is a member of the American Association for the Study of Liver Diseases (AASLD), EASL and APASL. He served as a secretary general of Korean Association for the Study of the Liver (KASL) from 2013 to 2015. Also, he served as a secretary general of APASL STC 2016 in Busan. Now he is a vice president of Korean Association of Internal Medicine. He works as a Director of Liver Cancer Center in Seoul St,Mary's Hospital and Catholic University Liver Research Center. He has published more than 300 authored and co-authored original articles on the viral hepatitis B and C, NASH, and HCC. He had also written chapter on molecular diagnostics of HCC in the textbook "Principles of Molecular diagnostics and personalized cancer medicine".

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