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Perspective of TRAIL and PEGylated TRAIL

TNF-related apoptosis-inducing ligand (TRAIL) is a member of the TNF cytokine family capable of inducing apoptosis by its cognate receptors in cancer cells without apparent toxicity to normal cells. TRAIL has been considered as an anticancer drug due to its unique ability to selectively induce DR-mediated apoptosis in transformed cells. To date, recombinant human TRAIL and antibodies directed against TRAIL-R1 or TRAIL-R2 have been tested clinically. However, these have been disappointing, showing a very limited benefit as an antitumor agent basically due to their poor agonistic activity of these agents. And in recent years, the physiological importance of TRAIL has expanded beyond being a tumoricidal molecule to one critical for a number of clinical settings - ranging from fibrosis and autoimmunity to cardiovascular anomalies. In an attempt to overcome the poor agonistic activity and also low stability and solubility of rTRAIL *in vivo*, we developed a delivery system by using PEGylation. PEGylation of protein improves solubility, reduces the interaction with blood cells and serum proteins, provides a better biocompatibility, and extends circulation times. We recently confirmed the therapeutic efficacy of this prolonged systemic TRAIL *in vivo* on different animal models. In this talk, I will introduce how our research experience, at the crossroads of bioconjugation, drug delivery, and biology, enabled the engineering of stable TRAIL-based therapies, the discovery of clinically viable targets for cancer, inflammatory, fibrosis and autoimmune disease therapy towards clinical translation.

Biography

Kang Choon Lee is Haengdan Distinguished Professor at the SungKyunKwan University (SKKU), Korea, and was Director of the Center of Excellence for Future Pharmaceutical Education and Research in the College of Pharmacy at SKKU. He served as a Professor and Dean at the College of Pharmacy as well as the Director of the Institute of Pharmaceutical Science. Prior to joining SKKU in 1992, he was a Principal Scientist at Dong-A Pharmaceutical Co. for ten years before joining Chonnam National University as a Professor of Pharmacy. For over 30 years, his Drug Targeting Laboratory has focused on immuno-targeting including immunotoxins, preformulation and bioconjugation of peptide and protein drugs. He is internationally recognized as one of the leading experts in site-specific peptide/protein PEGylation and firstly demonstrated the therapeutic potential of novel site-specific PEGylated drugs such as GLP-1 and TRAIL. He served as President of the Korean-American Pharmaceutical Scientists Association and Vice-president of the Pharmaceutical Society of Korea and Korean Society of Pharmaceutical Science and Technology. He is a recipient of the Distinguished Pharmaceutical Scientist Award from the Pharmaceutical Society of Korea in 2002 and honored as a Fellow of the American Association of Pharmaceutical Scientists (AAPS) in 2003. He currently serves on the Editorial Advisory Board of many international scientific journals including *Pharmaceutical Research, Pharmaceutical Development and Technology, PharmSciTech, Journal of Drug Delivery and Heliyon*. For clinically translating and commercializing of site-specific PEGylated peptide/protein drugs developed by his laboratory, he co-founded B&L DeliPharm, Korea and Theraly Pharmaceuticals, USA.

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