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Non-soluble drug delivery using reconstituted high-density lipoprotein to enhance anti-senescence and tissue-regenerative activity

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Rapamycin and curminarenon-soluble drug although they have potent pharmaceutical activity. Rapamycin (rapa) is a R fungicide, it is now believed to possess the capacity to extend mammalian lifespan. Because rapamycin is insoluble in water, its study in the aqueous phase has been limited. We therefore solubilized rapamycin in isotonic buffer using reconstituted high-density lipoprotein containing V156K-apolipoprotein A-I (V156K-rHDL). Rapamycin (final concentration, 0.1 mg/mL) was solubilized in rHDL containing either wild-type (WT) or V156K apoA-I (1 mg/mL of protein) prepared using the sodium cholate dialysis method. V156K-rHDL containing rapamycin (V156K-rapa-rHDL) had a slightly larger particle size than rapamycin-loaded WT-rHDL (WT-rapa-rHDL). V156K-rapa-rHDL exhibited enhanced antioxidant ability, CETP inhibitory activity, and anti-atherosclerotic activity. Treatment with V156K-rapa-rHDL resulted in attenuation of senescence in human cells with increased cell survival and enhancement of tissue regenerative activities in zebrafish model compared to WT-rapa-rHDL or rHDL alone. Using the rHDL, adenoviral gene delivery and virus stability are also significantly enhanced in mice and zebrafish model.

Biography

Kyung-Hyun Cho obtained his PhD from the Kyungpook National University of South Korea in 1998 and gained his Postdoctoral training at the University of Illinois at Urbana-Champaign until 2000. He joined Cleveland Clinic Foundation as a Research Doctor until 2001. Back home, he worked at Korea Research Institute of Bioscience and Biotechnology as senior scientist for 4 years. Then he moved to the Yeungnam University (YU), in 2005, where he is currently the Full Professor (tenured) and Head of the Research Institute of Protein Sensor (RIPS) and BK21plus Serum Biomedical Research and Education Team in the YU. He published more than 70 papers in well known journals and filed more than 20 patents.

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