

DIABETES AND ENDOCRINOLOGY

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Genesis and potentials of (PEG)-BHD1028 – A potent agonist to adiponectin receptors, AdipoR1 and AdipoR2

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Adiponectin, an adipokine predominantly produced by white adipocytes, has been known to play various critical roles and offer physio-regulatory benefits, including improvement in insulin sensitivity, enhancement of energy metabolism and anti-inflammation. It has also been known that many diseases are negatively associated with plasma adiponectin concentration. (PEG)-BHD1028 was designed as an agonist of adiponectin receptors, AdipoR1 and AdipoR2, based on the amino acid sequence of the active binding sites using a binding docking simulation. (PEG)-BHD1028 is a novel 15-aa peptide and its design reflects dual binding sites on each receptor as verified by SPR analysis. Besides the physicochemical characterization of the molecule, a series of biological evaluations were performed to verify its functions *in vitro* and *in vivo* systems. The results indicated that the molecule exhibited adiponectin-like biological behaviors via the activation or inactivation of pathophysiological signals such as APPL1, PPAR α , AMPK, ACC, Akt and Erk pathways. Furthermore, the peptide effectively lowered glucose through the amelioration of insulin resistance and led to weight loss without compromising appetite in the disease model animal study. These findings suggest that (PEG)-BHD1028 may offer therapeutic opportunities for

the diseases associated with suboptimal adiponectin levels, such as type 2 diabetes mellitus, NASH, obesity and dry eye disease.

Recent Publications

1. Kim S, Lee Y, Kim JW, Son Y-J, Ma MJ, Um J-H, et al. (2018) Discovery of a novel potent peptide agonist to adiponectin receptor 1. PLoS ONE 13(6): e0199256.
2. Lee IK, Kim G, Kim D-H, Kim BB. PEG-BHD1028 Peptide Regulates Insulin Resistance and Fatty Acid β -Oxidation and Mitochondrial Biogenesis by Binding to Two Heterogeneous Binding Sites of Adiponectin Receptors, AdipoR1 and AdipoR2. International Journal of Molecular Sciences. 2021; 22(2):884.

Biography

Brian Kim has over 30 years of experience in the pharmaceutical industry in the US and South Korea as an executive member in the field of R&D, global regulatory/compliance affairs and global supply chain. He also served as an advisor to several departments of the Korean government. He currently serves as the CEO at EncuraGen, Inc. in South Korea. He studied biochemical toxicology during his MS and Ph.D. programs at the University of Northern Colorado in the US. He completed his Ph.D. in bioprocessing engineering at Inha University in South Korea.

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