Dr. Sekyoo Jeong

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Title: Cosmetic application of peptide-based autophagy activators: From bench to shelf

Summary: Through a series of biological activity assessment, Aquatide™ (hexacarboxymethyl dipeptide-12), originally designed as a skin moisturizing ingredient, showed stimulating effects on autophagy signaling in skin cells, including epidermal keratinocytes and dermal fibroblasts. Further investigations revealed that direct binding of Aquatide™ molecule on sirtuin 1 (Sirt 1) protein and consequent activation of autophagy signaling via deacetylation of forkhead box class O (FOXO) 1. Recently, we could also identify the potential binding mode for Aquatide™ on Sirt 1 using protein docking simulation engine. Various kinds of cosmetic benefits, including enhancing the cellular antioxidant system, increasing the skin elasticity, improving the skin barrier function, were observed for this newly developed autophagy activating cosmetic ingredient. From the structural feature of Aquatide™ as providing several points of chemical derivatization, we could construct the autophagy modulating peptide library and explore their biological activities in skin. Interestingly, one of the derivatives, pentasodium tetracarboxymethyl palmitoyl dipeptide-12 (PTPD-12) showed very strong autophagy stimulating effects, but its potential model of action was different from that of Aquatide™. Along with the biological efficacy assessments, transcriptomic analysis for PTPD-12-treated epidermal keratinocytes were performed to explore the effects of autophagy activation in skin cells. In this talk, I would like to briefly address the development of peptide-based autophagy activators and their application as cosmetic ingredients.

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Education and Training :

1997 B.A. Department of Chemical Technology, Seoul National University, Korea

1999 M.S. Biochemical Engineering, School of Chemical Engineering, Seoul National University, Korea

2007 Ph.D. Department of Medical Science, Yonsei University College of Medicine, Korea

Employments :

1999 - 2006 Researcher / Senior Researcher, Aekyung Corporation Central Research Laboratories

2002 - 2003 Visiting Researcher, Central Research Laboratories, Yongdong Severance Hospital, Yonsei University College of Medicine

2006 - 2011 Senior Researcher, Research Division, Neopharm Co., Ltd.

2011 Visiting Researcher, Department of Dermatology, University of California San Francisco, CA, USA

2012 - 2016 Research Director, CRID Center, NeoPharm Co., Ltd.

2013 - 2016 Adjunct Professor, Department of Pharmaceutics, Chungbuk National University College of Pharmacy

2016 - 2018 Assistant Professor, Department of Cosmetic Science, Seowon University

2018 - Director/CTO, Incospharm Corp.

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Selected Paper List :

1. Ko, Minji, Hyeng Jin Kim, Jaeeun Park, Hansol Lee, Keyong Nam Lee, Kayoung Kim, Jaehyuk Lee, *et al.* "Isolation of bovine milk exosome using electrophoretic oscillation assisted tangential flow filtration with antifouling of micro-ultrafiltration membrane filters." ACS Applied Materials & Interfaces (2023) acsami.3c00446.
2. Kim, Yoonji, Seung-Hwa Lee, Yunji Song, Sekyoo Jeong, and Ha-Jung Kim. "Induction of autophagy improves skin and hair conditions in dogs with underlying diseases." Front Vet Sci (2023) 10: 1078259.
3. Shin, Kyong-Oh, Debra A. Crumrine, Sungeun Kim, Yerin Lee, Bogyeong Kim, Katrina Abuabara, Chaehyeong Park, *et al*. "Phenotypic overlap between atopic dermatitis and autism." BMC Neuroscience (2021) 22: 43.
4. Jeong, Yujin, Hyun Ju Kim, Suran Kim, Seo-Young Park, HyeRan Kim, Sekyoo Jeong, Sang Jun Lee, and Moo-Seung Lee. "Enhanced large-scale production of *Hahella Chejuensis* -derived prodigiosin and evaluation of its bioactivity." J Microbiol Biotechnol (2021) 31: 1624–31.
5. Shin, Kyong-Oh, Lim, Chae-Jin, Park, Hye Yoon, Kim, Sungeun, Kim, Bogyeong, Lee, Yerin, Chung, Hwajee, Jeong, Se-Kyoo, Park, Keedon, and Kyungho, Park. "Activation of SIRT1 enhances epidermal permeability barrier formation through ceramide synthases 2 and 3-dependent mechanisms." J Invest Dermatol (2020) 140: 1435–38.
6. Lee, Yoonjin, Kayoung Shin, Kyong-Oh Shin, Seokjeong Yoon, Juyeon Jung, Eojin Hwang, Hwa-Jee Chung, *et al*. "Topical application of autophagy-activating peptide improved skin barrier function and reduced acne symptoms in acne-prone skin." J Cosmet Dermatol (2020) 13636