세미나 초록

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발표 주제	Decoding Exercise at Molecular Levels and Health
발표 내용	Exercise has beneficial effects on several organs. A biochemical understanding of exercise has been considered a novel pharmaceutical strategy to find molecules to deliver exercise effects. These effects are often mediated by myokines, muscle-secreted factors for tissue crosstalk. Irisin is a myokine induced by exercise in skeletal muscle. Irisin is a polypeptide of 12kDa that is cleaved from a type I membrane protein called FNDC5. FNDC5 is expressed mainly in skeletal muscle, heart, and brain. FNDC5 mRNA increases in adult human muscles with several forms of endurance exercise. Advanced Tandem Mass Spectrometry has demonstrated that human irisin circulates at “hormone-like” levels and increases as a consequence of endurance exercise. Since its discovery in 2012, irisin has been shown to affect bone, fat, and brain. In many cases, irisin’s effects are reminiscent of those derived from physical exercise, including improved cognition in mice. Here, we identified the major receptor for irisin as the αV integrin family and its cofactor as cluster of differentiation 81 (CD81) with quantitative proteomics using mass spectrometry. Irisin treatment increased phosphorylation of focal adhesion kinase (FAK), and genetic deletion of CD81 or treatment of integrin αV inhibitors blunted the signaling. Genetic deletion of integrin β1 or integrin β5, dimer partners of integrin αV, prevented irisin-induced FAK phosphorylation. Irisin treatment delivered endurance exercise effects including bone remodeling and fat thermogenesis via the integrin αV family. Genetic deletion of CD81 blocked irisin-induced thermogenic fat cell proliferation *in vitro* and worsened metabolic phenotypes upon high-fat diet challenge. Overall, this study suggests that irisin can be utilized for therapeutic approaches to find cures for several diseases which can be relieved by endurance exercise.