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研究成果報告書

研究課題名
健康寿命の促進を目指したロコモ・フレイル発症の機構解明とその制御法の開発
Elucidation of locomotive frailty and development of its control strategy

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研究代表者
東京医科歯科大学・大学院医歯学総合研究科・分子情報伝達学・教授
中島　友紀
Department of Cell Signaling, Graduate School of Medical and Dental Sciences,
Tokyo Medical and Dental University, Professor,
Tomoki NAKASHIMA

Abstract

In an aging society, which is progressing on a global scale, fragility of bones and dysfunction of musculoskeletal locomotor system have become a serious social problem because it predicts prognosis and supports healthy aging. Bone and muscle, which are the major components of the locomotor, achieve integrated locomotive function. The elucidation of bone and muscle homeostasis will greatly contribute to the maintenance of musculoskeletal health, the establishment of innovative treatments for various locomotive frailty such as osteoporosis and sarcopenia. The research outcome is expected to be utilized as a medical platform for supporting healthy aging. However, there are still many unclear points about what kind of linked crosstalk exists between bone and muscle.

In this study, we revealed the molecular mechanisms underlying the interaction of the between bone and muscle and uncovered the regulatory network governed by the locomotor system. To identify regulatory factor, we performed spatiotemporal expression profiling associated with mechanical stimulation and hormonal regulation, in addition to static condition. Furthermore, we integrated gene expression profiling of cells and tissues obtained from model mice, including exercised or unloaded. We focused on certain regulatory factor and generated cell/tissue-specific genetically modified mice. Moreover, we searched for chemical compounds targeting the crosstalk between bone and muscle by screening of chemical library. Importantly, we discovered that candidate chemical compound as drug seeds mediates the increased locomotive activity.

The elucidation of regulatory network implemented by the locomotor system is attracting to develop next-generation medical strategies for locomotive frailty.