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Mitocryptides: A novel family of neutrophil-activating peptides hidden in mitochondrial proteins and their accumulative signaling mechanisms

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Various functional proteins and physiologically active peptides are firstly synthesized as precursor proteins and matured by specific proteolytic cleavages of them. These proteins and peptides are then degraded by various proteases to inactivate. During these maturation and degradation processes, many fragmented peptides are simultaneously produced, but their physiological roles have not been well elucidated. Recently, we discovered novel bioactive peptides produced from mitochondrial proteins including cytochrome c oxidase subunit VIII, cytochrome b, and cytochrome c which efficiently activate neutrophils. We also found the presence of many neutrophil-activating peptides produced from various mitochondrial proteins. We named such bioactive peptides hidden in protein structures "cryptides" and those cryptides that are produced from mitochondrial proteins "mitocryptides". Here, we report comprehensive identification of various mitocryptides utilizing bioinformatic strategies. We also present the characterization of novel accumulative signaling mechanisms in which many cryptides sharing similar physicochemical properties but having different amino acid sequences cooperatively regulate cellular functions.

Biography

Hidehito Mukai received his Ph.D. degree in Applied Biochemistry from the University of Tsukuba in 1990. He advanced his career by working at UT Southwestern, University of Tsukuba, MITTI-NEDO Project at JT, Mitsubishi Kagaku Institute of Life Sciences, and Kyoto Pharmaceutical University. He is currently Principal Investigator of Laboratory of Peptide Science and Associate Professor of Nagahama Institute of Bio-Science and Technology. His main research interests are the discovery of "cryptides", novel endogenous regulatory peptides hidden in protein structures, and their "accumulative" signaling mechanisms.

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