培養筋組織収縮力評価系の開発と抗筋萎縮ペプチド探索への応用

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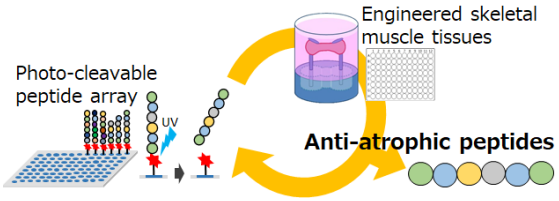
Development of an evaluation system for contractility of cultured muscle tissues and its application to the screening for anti-atrophic peptides ([1]*Graduate School of Engineering, Nagoya University*) ○Kazunori Shimizu,[1] Kazuki Yamamoto,[1] Saki Ohsumi,[1] Takunori Nagashima,[1] Hirokazu Akiyama,[1] Hiroyuki Honda [1]

As skeletal muscle atrophy worsens the quality of life, the development of anti-atrophic substances is desirable. Here, we demonstrated a screening process for anti-atrophic peptides using photo-cleavable peptide array technology[1)] and 96-well scale human contractile atrophic muscle models. Dexamethasone-induced human atrophic tissue was constructed on the microdevices for contractile force measurement. Eight peptides were selected from the literature and used for the screening of peptides for preventing the decrease of the contractile forces of tissues. The peptide QIGFIW[2)], which showed preventive activity, was selected as the seed sequence. As a result of amino acid substitution, we obtained QIGFIQ as a peptide with higher anti-atrophic activity. These results indicate that the combinatorial use of the photo-cleavable peptide array technology and 96-well screening system could comprise a powerful approach to obtaining anti-atrophic peptides.

Keywords: Phenotypic screening; Organ-on-a-chip; Tissue engineering; Peptides

骨格筋の萎縮は生活の質を低下させるため、抗萎縮物質の開発が望まれている。本研究では、光分解ペプチドアレイ技術 [1)]と 96 ウェルサイズのヒト萎縮筋モデルを用いて、抗筋萎縮ペプチドのスクリーニングプロセスを実証した。デキサメタゾン誘導によるヒト萎縮筋組織を収縮力測定マイクロデバイス上に構築した。文献から 8 つのペプチドを選び、培養筋組織の収縮力低下を防ぐ活性のあるペプチドのスクリーニングを行った。その結果、収縮力低下を抑制するペプチド QIGFIW[2)]をシード配列として選択した。アミノ酸を置換した結果、より高い活性を持つペプチドとして QIGFIQ を得た。以上、光分解性ペプチドアレイ技術と 96 ウェルスクリーニングシステムを組み合わせは、抗筋萎縮性ペプチドを得るための強力なアプローチとなると期待される。



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