Publication

Accumulation of muscle ankyrin repeat protein transcript reveals local activation of primary myotube endcompartments during muscle morphogenesis

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 156113
Author(s) Baumeister, A; Arber, S; Caroni, P
Author(s) at UniBasel Arber, Silvia ;
Year 1997
Title Accumulation of muscle ankyrin repeat protein transcript reveals local activation of primary myotube endcompartments during muscle morphogenesis
Journal The Journal of cell biology
Volume 139
Number 5
Pages / **Article-Number** 1231-42
Keywords Amino Acid Sequence; Animals; *Ankyrin Repeat; Base Sequence; Cell Compartmentation; Gene Expression Regulation; Developmental; Heart/*embryology; Mesoderm/metabolism; Models; Biological; Molecular Sequence Data; Morphogenesis; Muscle Denervation; Muscle Proteins/*biosynthesis/genetics; Muscle; Skeletal/*embryology/metabolism; Myocardium/metabolism; Nuclear Proteins/*biosynthesis/genetics; RNA Processing; Post-Transcriptional; RNA; Messenger/biosynthesis; Rats; Recombinant Proteins/biosynthesis; Repressor Proteins/*biosynthesis/genetics; Tendons/embryology; Thrombospondins/biosynthesis; Tissue Distribution
The characteristic shapes and positions of each individual body muscle are established during the process of muscle morphogenesis in response to patterning information from the surrounding mesenchyme. Throughout muscle morphogenesis, primary myotubes are arranged in small parallel bundles, each myotube spanning the forming muscles from end to end. This unique arrangement potentially assigns a crucial role to primary myotube end regions for muscle morphogenesis. We have cloned muscle ankyrin repeat protein (MARP) as a gene induced in adult rat skeletal muscle by denervation. MARP is the rodent homologue of human C-193 (Chu, W., D.K. Burns, R.A. Swerick, and D.H. Presky. 1995. J. Biol. Chem. 270:10236-10245) and is identical to rat cardiac ankyrin repeat protein. (Zou, Y., S. Evans, J. Chen, H.-C. Kuo, R.P. Harvey, and K.R. Chien. 1997. Development. 124:793-804). In denervated muscle fibers, MARP transcript accumulated in a unique perisynaptic pattern. MARP was also expressed in large blood vessels and in cardiac muscle, where it was further induced by cardiac hypertrophy. During embryonic development, MARP was expressed in forming skeletal muscle. In situ hybridization analysis in mouse embryos revealed that MARP transcript exclusively accumulates at the end regions of primary myotubes during muscle morphogenesis. This closely coincided with the expression of thrombospondin-4 in adjacent prospective tendon mesenchyme, suggesting that these two compartments may constitute a functional unit involved in muscle morphogenesis. Transfection experiments established that MARP protein accumulates in the nucleus and that the levels of both MARP mRNA and protein are controlled by rapid degradation mechanisms characteristic of regulatory early response genes. The results establish the existence of novel regulatory muscle fiber subcompartments associated with muscle morphogenesis and denervation and suggest that MARP may be a crucial nuclear cofactor in local signaling pathways from prospective tendon mesenchyme to forming muscle and from activated muscle interstitial cells to denervated muscle fibers.
Publisher Rockefeller University Press

ISSN/ISBN 0021-9525
edoc-URL http://edoc.unibas.ch/dok/A5259100
Full Text on edoc Available;
Digital Object Identifier DOI 10.1083/jcb.139.5.1231
PubMed ID http://www.ncbi.nlm.nih.gov/pubmed/9382869
ISI-Number WOS:A1997YK65800014
Document type (ISI) Journal Article