Skeletal Muscle Satellite Cells

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Contents

1 Introduction ..................................................................................................................... 214

2 Developmental Origins of Satellite Cells ....................................................................... 215
  2.1 Somitic Origin ..................................................................................................... 215
  2.2 Relationship to Embryonic Myoblasts ............................................................... 215

3 Morphology of Satellite Cells ........................................................................................ 217
  3.1 Cell Shape ........................................................................................................ 217
  3.2 Nuclear Features ................................................................................................ 218

4 Markers of Satellite Cells ............................................................................................... 219
  4.1 Antibodies ........................................................................................................... 219
  4.2 Vital Stains .......................................................................................................... 220
  4.3 Transcription Factors ......................................................................................... 221
  4.4 Retroviral Markers .............................................................................................. 221
  4.5 Nuclear Labels .................................................................................................... 221

5 Distribution of Satellite Cells ......................................................................................... 222
  5.1 Species Distributions .......................................................................................... 222
  5.2 Changes in Distribution with Age ...................................................................... 222
  5.3 Distribution Among Muscles .............................................................................. 223
  5.4 Distribution Among Fiber Types ........................................................................ 224
  5.5 Distribution on Individual Fibers ....................................................................... 225
  5.6 Experimental Alterations of Satellite Cell Distributions .................................... 225

6 Heterogeneity of Satellite Cell Populations ................................................................... 227
  6.1 Heterogeneity Among Muscles .......................................................................... 227
    6.1.1 In Vitro Assays ................................................................................................... 227
    6.1.2 In Vivo Assays .................................................................................................... 229
  6.2 Heterogeneity Within Muscles ........................................................................... 230
    6.2.1 In Vitro Assays ................................................................................................... 230
    6.2.2 In Vivo Assays .................................................................................................... 232

7 Satellite Cell Functions .................................................................................................. 233
  7.1 Myonuclear Production ...................................................................................... 233
    7.1.1 Regulation of Nuclear Production ...................................................................... 233
  7.2 Synthetic Functions ............................................................................................ 236
  7.3 Roles During Muscle Adaptive Responses ........................................................ 237
  7.4 Roles During Muscle Regeneration .................................................................... 240
    7.4.1 Activation After Muscle Injury .......................................................................... 240
    7.4.1.1 Mechanisms of Activation .................................................................................. 241

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The discovery and description of a separate cell type in adult skeletal muscle was dependent upon the evolution of the electron microscope. Single cells intimately associated with muscle fibers were first reported in 1961. Katz (1961) included in his description of the capsular region of the frog muscle spindle, a report of cells that were in "hypoectolemmal" contact with intrafusal fibers. Later the same year, Mauro described a cell, intimately associated with frog extrafusal myofibers, that he called a satellite cell. Mauro (1961) speculated this cell might be related to those thought to bud or separate from myofibers after injury, by forming a membrane around a myonucleus and a small amount of cytoplasm. Although several papers subsequently presented morphological evidence purporting to demonstrate myonuclear segregation from a fiber (Reznik 1969; Hess and Rosner 1970; Mastaglia et al. 1975), there has been no further support for this unusual mechanism of myoblast formation in mature muscle. Mauro (1961) further speculated that satellite cells might be related to the embryonic process of muscle formation and represent dormant myoblasts that failed to fuse during muscle histogenesis. These initial reports of a cell population intimately associated with skeletal myofibers created a foundation for a large number of studies related to satellite cell structure and function in growing and injured skeletal muscles carried out in labs throughout the world.

The definition of a satellite cell has not changed since its initial description. The cells are a feature of postnatal and adult muscle, and continue to be defined according to morphological criteria. No other cell-type is located in this position. Previous reviews, dealing specifically with satellite cells, have been written by Campion (1984) and by Mazanet and Franzini-Armstrong (1986). In the present review, a summary of current information on the origin, structure and function of satellite cells is presented, with an emphasis on the material since these last reviews.