

Editorial

Cell-to-Cell Communication in Muscle Development

As more information is revealed about regulatory pathways involved in muscle growth control it is becoming increasingly apparent that individual muscle cells (myoblasts, myocytes, myofibers) possess some ability to adjust their own physiology based on cues (signals), derived from themselves or other (adjacent) cells. Putative signals shown to be involved in cell-to-cell communication include chemotactic agents, neuronal impulses, and physical ties to other cells. Cell-to-cell signals have been shown to be both positive and negative. That is, some intercellular communication signals may act as developmental stop signs, while others provide the green light for development to occur. At present it is not known if muscle cells differ in ability to produce or respond to cell-to-cell communication factors throughout development, and the magnitude by which other cells included in muscle tissue regulate events associated with muscle cell development is not defined.

Regulation of muscle growth and development has been categorized into two general terms, intrinsic and extrinsic regulation. Which category does cell-to-cell communication reside? If we consider muscle cells to possess some intelligence, perhaps cell-to-cell communication should really fall into a new category, perhaps termed "interactive regulation," as both intrinsic and extrinsic mechanisms are at play in this give-and-take intercellular communication system.

What proportion of muscle growth control may be levied onto cell-to-cell communication, as compared to systemic communication? Are locally produced regulatory signals more powerful than systemic signals in regulating muscle development, or are local signals meant only to fine-tune certain processes of muscle growth? Which cell-to-cell communication factor [blood-born, other muscle cells, connective tissue cells, nerve interactions] is the most powerful? This issue of *Basic and Applied Myology* will address these and other aspects of cell-to-cell communication in muscle development.

While the complete spectrum of cell-to-cell communication systems could not possibly be included herein, we have focused on developmental periods prior to muscle fiber formation, during muscle fiber determination and development, and during postnatal myofiber maintenance. Positive and negative signals, recognition signals, and chemotactic signaling systems have been covered by contributions to this issue. Further, we offer information on the importance of muscle/nerve interactions and on physical systems through which muscle cells communicate with their surroundings. As with many of these efforts, we hope that more questions are derived from this issue than answers.

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