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PROCEEDINGS

Mechano-Regulated Intercellular Waves Among Cancer Cells

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ABSTRACT

Cancer accounts for 12.6% of all human deaths worldwide and 90% of cancer-related deaths are due to metastasis: the dissemination of invasive tumor cells from the primary tumors to other vital organs [1-3]. However, how these invasive tumor cells coordinate with each other to achieve the dissemination remains unclear. Recently we discovered that human tumor cells can initiate and transmit previously unknown long-distance (~100s μm) intercellular biochemical waves in a microenvironment-mechanics-regulated manner. [4-5] In this presentation, we will present our new results on (1) the 2D/3D spatial-temporal characterization of the long-distance and the intra-/inter-cellular Ca^{2+} signals; (2) the functional influences of mechanical microenvironment on the spatial-temporal properties of Ca^{2+} dynamics (i.e., signaling symphony); and (3) the molecular mechanisms and biological consequences of the Ca^{2+} dynamics during tumor progression and metastasis *in vivo*. To our knowledge, this study is the 1st report that shows the detailed characterization and mechanistic dissection of long-distance Ca^{2+} waves in human cancer cells [4-5]. Our results advance the understanding of the mechano-regulated functions/mechanisms of Ca^{2+} signals in human cancer and potentially contribute to the development of new therapies for tumor suppression.

KEYWORDS

Biomechanics; cancer; mechanical microenvironment; Ca^{2+} waves; functional imaging

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