Looking into tunneling nanotubes between pancreatic cancer cells induced by the macrophage conditioned medium and electric fields

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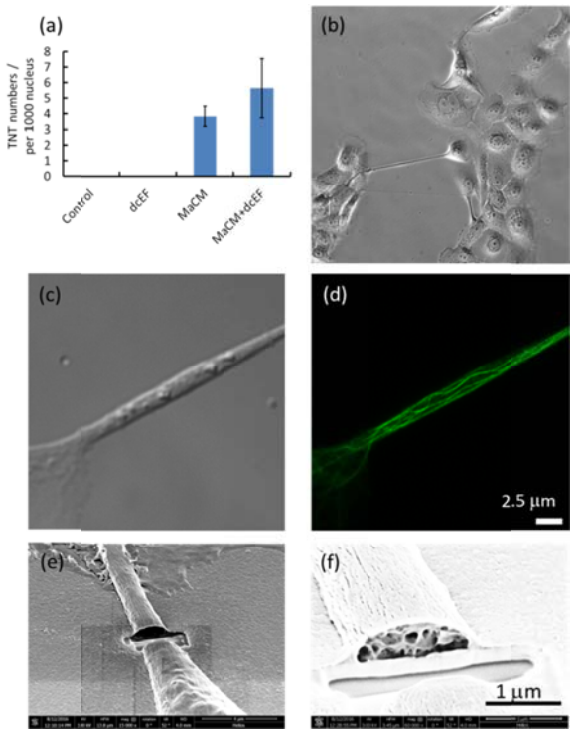
Cell–cell communications play essential roles in many important physiological and pathological processes. In addition to the cytokines secreted by communicating cells, cell–cell contacts are usually considered as major types of short-distance communications. Tunneling nanotubes (TNTs) were recognized as a special cellular structure for long-distance contact cell–cell communications [1]. Various substances can be transported through TNTs, including proteins, microRNAs, intracellular vesicles, mitochondria, etc. [2]. Therefore, the formation and functions of TNTs are important subjects for understanding tumor progression and invasion. In this work, we used direct-current electric fields (dcEFs) in a cell culture device to separate pancreatic cancer cells (BxPC-3) in a colony, and found that the macrophage conditioned medium (MaCM) promoted the formation of TNTs between the cancer cells, as showed in Figure (a). Figure (b) shows a phase-contrast image of a TNT between two cancer cells. We are interested in figuring out what types of cytoskeletons inside a TNT to support such long nano-structures. Figures (c) & (d) show a segment of TNT labeled with anti α-tubulin imaged with confocal microscopy. We employed focus ion beam to cut a TNT out and saw the structure of microtubues inside with scanning electron micrscopy [Figures (e) & (f)]. More data will be presented in the Conference.



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