



Actin and its role in intracellular movement bacterial pathogen

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Abstract:

In eukaryotic cells, the actin cytoskeleton regulates a variety of functions. Due to its importance in these diverse cellular processes, the actin cytoskeleton is also a critical target of intracellular bacterial pathogens. Many pathogens hijack actin at different steps of their life cycle. Understanding the mechanism of movement helps the prevention of bacterial infections. The aim of this study was to investigate the mechanisms of actin base motility of bacterial pathogens. The study focused on four microbial pathogens genera; including *Listeria monocytogenes*, *Shigella flexneri* Burkholderia spp. in the *Pseudomallei* group, and spotted fever group (SFG) *Rickettsia* spp. These pathogens share common mechanisms of infection. To compare this phenomenon, the searching process was performed through PubMed and Google Scholar databases. Accordingly, our review showed a critical role for the host Arp2/3 complex and its nucleation promoting factors (NPFs) in actin assembly. As we know the diverse biochemical mechanisms of actin polymerization are used by pathogens, resulting in divergent actin filament organization and consequently motility. These are dynamic and complicated processes coordinated by a network of host and bacterial factors. New studies provide new information on an intracellular movement; for example, in addition to RickA, SFG *Rickettsiae* also express Sca2, a mimic of host formin proteins, which directly nucleates actin and promotes filament elongation by progressively relatedness to the barbed end of an actin filament and preventing the host capping protein activity. Our results showed that the bacteria capable of actin-based motility subvert a variety of host factors to promote movement. However, we still do not know how all of these factors are recruited or their precise mechanism of action. Moreover, we do not know whether each pathogen hijacks a unique profile of cytoskeletal and regulatory proteins that may reflect distinct modes of actin-based movement. For



understand this subject more research is needed.

Biography:

Dr Ali Shakeri is a Doctor of Philosophy(Ph D), Medical Physics, Iran University of Medical Sciences.

Recent Publications:

1. Dr Ali Shakeri; Fe₃O₄@Au/reduced graphene oxide nanostructures: Combinatorial effects of radiotherapy and photothermal therapy on oral squamous carcinoma KB cell line; 2020
2. Dr Ali Shakeri; A multimodal MR-compatible olfactometer with real-time controlling capability; 2020
3. Dr Ali Shakeri; Analysis of trace elements in human hair through X-ray fluorescence spectroscopy for screening of prostate cancer; 2020
4. Dr Ali Shakeri; Magneto-plasmonic nanoparticle mediated thermo-radiotherapy procedure significantly affects the nonlinear optical properties of treated cancer cells; 2020
5. Dr Ali Shakeri; Magnetic targeted delivery of the SPI-ONs-labeled mesenchymal stem cells derived from human Wharton's jelly in Alzheimer's rat models; 2020

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