

## VISCOELASTIC PROPERTIES OF CROSSLINKED ACTIN FILAMENT NETWORKS

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### ABSTRACT

Actin filaments (F-actin) that locate just beneath the cell plasma membrane could be crosslinked into a thin film network by actin binding proteins (ABPs). Among these different actin binding proteins, filamins prefer to crosslink actin filaments into a complex orthogonal network structure. As a crucial substructure of cell cytoskeleton, the crosslinked actin filament network (CAFN) plays a major role in different cell functions, such as cell migration, cell division and signal transduction. In physiological conditions, the extra cellular matrix (ECM), cells and cytoskeleton could deform largely in response to external force [1] or internal contraction, and thus show obvious viscoelastic properties [2-6]. However, the viscoelastic behaviour of crosslinked actin filament network is not well understood because of the extreme complexity of its structure. In order to study the viscoelastic properties of crosslinked actin filament networks, a three dimensional representative volume element (RVE) model is developed by finite element method (FEM) according to the physiological conditions. Periodic boundary conditions and free boundary conditions are adopted in this model. The creep and relaxation behaviour of crosslinked actin filament network are studied by conducting numerical simulations and results show good agreement with experimental measurements [7]. Moreover, the influences of load frequency and amplitude on the dynamic shear modulus of crosslinked actin filament network are also obtained and compared with results reported in literature [6, 7].

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