Actin is in the cytoplasm present either as a monomer or in form of filaments, which is the major component of cytoskeleton. It is required for maintenance of cell shape, motility, vesicle movement, cytokinesis, and signalling. In last decades it has been well documented by a multiple studies that actin localizes also to the cell nucleus1, where it participates in transcription2 and chromatin remodeling3. However, the state of nuclear actin is not fully understood yet. It is anticipated that besides monomers actin exists also in oligomeric or polymeric form4. Recent study showed formation of nuclear actin filaments after overexpression of beta-actin fused to a NLS and flag tag5. Here we confirmed a presence of such actin filaments in the nucleus upon overexpression of EYFP-actin fused to NLS (EYFP-NLS-actin) in human U2OS cell line. These filaments seem to be emanating from below nuclear envelope, ranging variably through the nucleus. They can be visualized by phalloidin and they do not bind any of actin-binding proteins (spectrin, vinculin, paxillin, nuclear myosin 1) as tested by immunolocalization, which suggests their differential behaviour from the cytoplasmic ones. In addition, nuclear actin filaments do not seem to enter heterochromatin regions, active chromatin or interchromatin granules. Surprisingly, cells possessing nuclear actin filaments seem to exhibit higher transcriptional activity in comparison to the controls. The question still remains upon which stimulus the actin filament formation occurs and how does it change the cellular processes in general.


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