

ABSTRACT:

Many studies have established the presence and essentiality of actin in the nucleus. Recently, actin has been associated with processes in the nucleus ranging from chromatin remodeling to transcription, splicing or nuclear transport. To ensure the dynamics of the nuclear processes, actin is coupled with one of the main motor protein such as myosin. This study demonstrates a structural role of actin and the nuclear myosin I (NMI) take in the transcription of ribonuclear genes by RNA polymerase I (Pol I). We suppressed the transcription Pol I in vitro by microinjections of antibodies anti actin and anti MNI. The series of in vitro experiments confirm transcript Pol I inhibition after applying antibodies anti actin and MNI on pure DNA as well as on pre-assembled chromatin template. The co-immunoprecipitation experiments reveal direct bound between actin, NMI and rRNA genes and transcription complex Pol I. As actin binds to the primer and elonged Pol I molecule, NMI interacts with subunit of Pol I and is capable of assembling into productive initiation complex by binding up to TIF-IA, transcriptional factor responsible for regulation rRNA synthesis. There are known number of hypothesis on the form of nuclear actin. Recent research suggests actin exists in equilibrium between its monomeric and polymeric form. The images produced by electron microscope and obtained on the course of my project show ultrastructural allocation of six proteins (α -actinin, filamin, spectrin, paxilin, p190RhoGAP and tropomyozin) within particular nuclear compartments. Through this project I can present for the first time presence of tropomyozin and p190RhoGAP in the nucleus, as well as spatial colocalization of actin with spectrin and paxillin with α -actin in the nucleus