Characterization of nuclear myosin nucleocytoplasmatic transport

Nuclear myosin 1 (NM1) and myosin 1c are two myosin isoforms, which differ only by addition of 16 amino acids at the N-terminus of NM1. Both myosins are products of one alternatively spliced gene. NM1 was found in the nucleus and its 16 amino acids N-terminal extension was supposed to be responsible for nuclear localization. Myosin 1c was described to be present only in the cytoplasm. Because NM1 seems to be one of the basal transcription factors, we first tried to describe its phylogenetic occurence. We found NM1 in tissues of all tested vertebrates and that 16 aa N-terminal sequences are perfectly conserved in mammals. Next, we performed experiments to reveal the role of 16 aa N-terminal sequence in nuclear transport of NM1. We conclude that both myosins (NM1 and myosin 1c) enter the nucleus in the same manner and that 16 amino acid sequence is not necessary for nuclear transport. Even that, if a short tag (V5, FLAG) is added at the C-terminus of the myosin molecule, it decreases nuclear transport or nuclear retention of tagged molecule. Nuclear myosin 1 is not bound to mitotic chromosomes, it is transported into the nucleus after the formation of nuclear envelope. No classical nuclear localization signal was detected in NM1 sequence. It seems that there is no short sequence in the molecule, which would work as nuclear localization signal. Probably, the transport into the nucleus can be undirect (maybe via the binding calmodulin) and other parts of the molecule (e.g. myosin tail at the C-terminus) can be responsible for the regulation of nuclear retention separately.