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Title: INVESTIGATING MUD: ISOFORM EXPRESSION AND FUNCTION

Abstract: Meiosis is ubiquitous among multicellular organisms and key to sexual reproduction. Previous studies implicate Mud in several oocyte processes - these include synapsis, nuclear migration, and spindle cohesion at meiosis II - but how Mud participates is incompletely understood. Mud is well-established as the fly homolog of two proteins, vertebrate NuMA and nematode Lin-5, that are studied as regulators of microtubule organization. However, at the sequence level conservation between these proteins is low. Only a relatively short stretch, called the NLM sequence, is very similar between Mud homologs, and it can be detected across a long evolutionary span. This sequence is thought to include both a microtubule-binding domain and the binding site for an important partner protein called Pins/LGN/GPR1-2 (flies, vertebrates, worms) that helps Mud to drive mitotic spindle orientation. Remarkably, flies encode isoforms that do not include the NLM. This raises a question: is the only well-conserved region dispensable for some functions? Our work suggests that the isoforms lacking the NLM participate in meiosis. We show that these isoforms are expressed in the testis and ovary but not in the somatic tissues we examined. Additionally, whereas Mud has established roles in the oocyte, we show here that it is also at the nuclear envelope of developing sperm. We are now investigating the question of how isoforms lacking the NLM work.