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Probing the Structure of mChe-12’s TOG Domains to Understand their Role in Regulating Microtubule Dynamics in vitro

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Non-motile primary cilia are found in most mammalian cells in which they are important for sensory reception. These cilia perform sensory transduction by translating physical and chemical stimuli from outside the cell into biochemical responses within the cell. The protein mChe-12 is a conserved protein thought to regulate cilia structure through the function of its four TOG domains, which regulate microtubule polymerization. The purpose of my in vitro study of mChe-12 is to further understand mChe-12’s role in dictating the dynamics of microtubules within cilia. I have purified multiple different constructs containing mChe-12 TOG domains. I have used these purified proteins for both structural determination using X-ray crystallography and tubulin polymerization assays using light scattering techniques. Based on these experiments, I have gained insight into the role of mChe-12’s TOG domains in the protein’s cellular function and begun to understand the relation between mChe-12’s atomic structure and observed behavior in vitro.