OFFICIAL ABSTRACT and CERTIFICATION

Maltose-binding Protein (MBP) Fusion Tag Enhances Expression and Solubility of CCDC11 Constructs

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Through discoveries made in past research, CCDC11 is a protein known to be an integral part of cytokinesis, including cell division and viral replication. The highest concentrations of this protein are found around the centrosomes. CCDC11 functions by transporting proteins to and from the centrosomes and cilia. The purpose of MBP tagging CCDC11 constructs was to determine a way to purify the protein so that its structure can be concluded after performing crystallization. Protein purifying is a series of processes intended to isolate a protein from a complex mixture. This is vital for the characterization of the function, structure, and interactions of our proteins of interest, CCDC11-CC1-2 and CCDC11-CC1-3. The arctic bacteria strain yielded the greatest abundance of protein. These bacteria containing CC1-2 and CC1-3 constructs were grown overnight and induced at their peak optical densities. Samples taken from the supernatant were run through an amylose column containing column buffer followed by an elution buffer. Additional samples were collected at various times and run through a protein gel. CC1-2 revealed better expression than its larger counterpart, CC1-3. The solubility of CCDC11-CC1-2 remains questionable, however, if it continues to be stable, steps may be taken to attempt crystallization of this protein. This will enable the determination of its structure, which will then allow the synthetic formation of CCDC11 for uses in tumor-fighting drugs.

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