Complimenting a *Chlamydomonas reinhardtii* Mutation Using Cell Penetrating Peptides

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Chlamydomonas reinhardtii is a photosynthetic model organism most notable for its easily manipulatable genetics. *C. reinhardtii* uses flagella to swim and optimize its growth conditions in the light. We plan to use cell penetrating peptides (CPPs) to compliment *C. reinhardtii* that is affected with the IFT46 mutation. Cell penetrating peptides are short peptides that can move across a cell membrane. The novel CPP that we are using is called TaT-CaM. It consists of the trans-activator of transcription (TaT) and the calmodulin domain (CaM) that binds to a calmodulin binding site (CBS) engineered into our protein of interest, IFT46. IFT46 is an Intraflagellar Transport Protein (IFT) required for flagella assembly. The IFT46-1 mutant causes paralyzed flagella. Previous results have shown TaT-CaM is an effective way to deliver protein into *C. reinhardtii*. To complement the IFT46 mutation using CPP, we must express the CBS-tagged IFT46 protein (CBS-IFT46). I have transformed bacterial competent cells with the CBS-IFT46 plasmid, attempting to make the competent cells express the protein. I have performed restriction digests to ensure the CBS-IFT46 sequence was properly inserted into the vector. The digest results indicate the DNA was inserted into the vector correctly, but I have been unsuccessful in getting the bacterial cells to express the CBS-IFT46 protein. In the future, we will send samples of the clone plasmid to be sequenced and potentially a different expression vector will be used. Completion of this work will show that CPPs have novel use, allowing efficient protein introduction into the cell.

Keywords: Flagella, Algae, *Chlamydomonas*, Mutation, Cell Penetrating Peptide, CPP, *Chlamydomonas reinhardtii*, *C.reinhardtii*, IFT46, TaT-CaM.