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It takes two to cargo: mechanisms of dynein regulation revealed by cryo-electron tomography

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ABSTRACT

Danielle Grotjahn received her Ph.D in the laboratory of Dr. Gabriel Lander at The Scripps Research Institute where trained extensively on cryo-electron tomography imaging approaches to structurally examine mechanisms of cytoplasmic dynein regulation. Through her development of a novel tomography data processing strategy, Dr. Grotjahn solved the first three-dimensional structure of the dynein-dynactin motor protein transport complex bound to microtubule tracks used for intracellular transport. Surprisingly, this structure revealed the presence of two complete, dimeric dynein complexes bound to dynactin, and fundamentally changed the current models in the field for how dynein transports molecular cargo in cells. Currently, Dr. Grotjahn is training on the latest state-of-the-art tomography imaging techniques that promote the fusion between cellular and structural biology in the laboratory of Dr. Grant Jensen at California Institute of Technology. In January 2019, Dr. Grotjahn will begin her own independent research laboratory as a Scripps Fellow at The Scripps Research Institute. Through the development of innovative imaging techniques, Danielle's long-term goal is to develop a research program aimed at uncovering the hidden depths of the cell interior, and to investigate how the precise organization of organelles and associated macromolecules regulate the progression of dynamic cellular processes.