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## CDKL5 Program of Excellence 2025 Pilot Grant Program

**Project Title:** “Exploiting microRNAs to disclose novel pathophysiological mechanisms, biomarkers and therapeutic approaches for CDKL5 deficiency disorder”

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CDKL5 deficiency disorder (CDD) is a rare and severe neurodevelopmental disease caused by mutations in the CDKL5 gene, leading to cognitive, motor, and sensory impairments. While there is currently no cure, recent research suggests that restoring CDKL5 function could improve symptoms. Our study focuses on extracellular vesicles (EVs), tiny particles released by cells that help neurons and glial cells communicate. We discovered that CDKL5 plays a crucial role in EV production and that specific microRNAs (miRNAs) carried by EVs are altered in CDD patients. These miRNAs impact brain function and transferring healthy EVs to diseased neurons can restore normal activity. By further investigating these findings, we aim to uncover novel CDKL5 functions, new biomarkers and explore EV based treatments as a potential therapy for CDD.