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## CDKL5 Program of Excellence 2024 Pilot Grant Program

**Project Title:** “Looking for differences: in vitro isolation of hCDKL5-specific antibody fragments and set-up of a method to quantify hCDKL5 and possibly distinguish between its isoforms.”

**PI:** Ario de Marco, PhD

**Institution:** University of Nova Gorica

Antibodies (Abs) are key elements of the vertebrate immune system, as they are endowed with an unequalled capacity to recognize their specific epitope amongst billions of others with extremely high affinity. This binding is the first step towards the body successful reaction against viral or bacterial infections. In the hands of biomedical researchers, Abs are also very powerful biotechnological tools. Indeed, the use of Abs to recognize a specific protein can efficiently help in finding answers to critical biological questions, such as “Is the protein X present in pathological tissue?” or “Where protein X is localized in the cell?” or “Which are protein X partners?”. Without the availability of good Abs to recognize the protein of interest, biomedical researchers are virtually blind. This is almost the present condition of all researchers studying the Cyclin-dependent kinase-like 5 (CDKL5) and the pathology deriving from mutations of its gene. This proposal is aimed at developing selective and reliable recombinant Abs by applying the in vitro “phage display” technique to large Ab collections. By virtue of such technique, the research team will select single-domain Abs (knowns as nanobodies) able to recognize specific portions of CDKL5 protein. The resulting Abs will then be tested to assess their ability to discriminate amongst the two more abundant brain-specific CDKL5 isoforms and will be converted into immunoreagents suitable for alternative diagnostic set-ups. The CDKL5 scientific community is waiting for them to foster our knowledge on CDKL5, for instance to clarify the spatial/temporal distribution of CDKL5 isoforms in healthy and sick tissues.