Angiosperms (flowering plants) represent 90% of all living plant species and without any doubt it is the most diverse group of modern plants. The sexual reproduction of angiosperms takes place in the flower and results in the formation of fruits containing seeds, which enable the plant to survive to a new generation. At a time of unprecedented human population growth, climate change, and losses in biodiversity, the plant reproduction is a particularly strategic research topic. Although our understanding of the plant sexual reproductive system has evolved enormously, and at a great pace, we still conduct research to understant this process well. The sexual reproduction of angiosperms starts with the landing of a pollen grain onto the surface of a receptive stigma. Here, a compatible pollen grain hydrates and germinates the pollen tube, which rapidly grows through the pistil tissues. Carrying male gametes (two sperm cells), the pollen tube grows along the style, following several cues that guide it until it reaches an ovule. The two sperm cells released by the pollen tube when it bursts fuse with the egg cell and the central cell (double fertilization), giving rise to the embryo and the endosperm, respectively. The proper growth of the pollen tube is one of the key events in the sexual reproduction of angiosperms. Unlike animal sperms, plant sperm cells lost the ability to move. Therefore, developmental product of the pollen grain - elongating pollen tube - enables the male gametes to reach the embryo sac, and thus, makes generative reproduction of plants independent from the water environment.

The pollen tube of flowering plants is the fastest growing plant cell. The polarized growth of the tube occurs via apical expansion (so called tip-growth) depends on an elaborate mechanism that integrates different molecular and cytological processes including the formation of tip-focused Ca^{2+} gradient, spatial organization of endomembrane systems, or dynamic organization of the cytoskeleton. The possibility to culture pollen tubes on a solid or liquid growth media makes that tubes, like root hairs, provide a convenient model for studying the cellular mechanisms related to the polarized tip growth of specialized plant cells. The proposed project focuses on the fundamental cellular processes and mechanisms controlling the elongation of the tube. We hypothesize that one of the key molecules involved in pollen tube formation is calnexin (CNX). In eukaryotic cells CNX acts as an endoplasmic reticulum (ER)-associated molecular chaperone proposed to promote folding and assembly of newly synthesized proteins that traverse the secretory pathway. Since the extremely high growth rate the pollen tube requires synthesis, folding and then secretion of proteins, the participation of CNX in these processes in elongating pollen tube is possible. Using post-transcriptional silencing of *CNX1* gene expression in *Petunia* (*PhCNX1*) cultured pollen tubes and cyto/immunocytochemical/analytical techniques, molecular biology techniques and ultrastructural analysis we aim to verify the potential role of CNX1 in the process of pollen tube growth.