Primary ciliary dyskinesia (PCD) is a rare, genetic disease that is recessively inherited. It belongs to the group of ciliopathies - diseases caused by defects of function and/or structure of cilia resulting from mutations in the genes encoding of ciliary proteins. Motile cilia are evolutionary conserved organelles, present on the surface of most eukaryotic cells. They are responsible for the movement of single cells or their groups in lower organisms, while in higher organisms (vertebrates) they are responsible for flow of fluids covering epithelium in various parts of the body and for the sperm motility.

Clinical symptoms in PCD caused by defective cilia function include respiratory tract distress, hearing impairment, infertility in men or lower fertility in women; additionally, *situs inversus* is observed in 50% of PCD patients (Karteneger syndrome). Due to the similarity of the symptoms to those observed in other pulmonary diseases, PCD is often diagnosed late.

Genetic basis of PCD is highly heterogeneous. Currently, ~40 genes are known to be involved in PCD pathogenesis, but mutations in these genes explain only 65-70% of the cases. It is therefore important to search for new genes involved in this disease.

The goal of the proposed project is to perform a cost-effective functional screening of candidate PCD genes preselected during the whole exome sequencing study of Polish PCD patients. Ten best candidate genes, selected based on bioinformatics analysis, will be examined by silencing their orthologues in planaria, the ciliated flatworm that moves by the action of thousands of cilia covering the ventral side of its body. By silencing the candidate genes in this organism it will be possible to examine the role of these gens in cilia motility; if the gene is involved in ciliary function, impairment of the worms locomotion is expected. Further validation of two best candidate genes will be performed using other animal model - zebrafish.

The implementation of the proposed project should indicate, which of the candidate genes are involved in the motile cilia function. That will allow a better understanding of the molecular basis of PCD and finally lead to the improvement of genetic diagnostics in this disease.