Title: A new genetic variants in *DNAI2* detected by target sequencing in a newborn with Primary Ciliary Dyskinesia

Authors: **M.S. Rocca[1]**, C. Vinanzi[1], A. Michelucci[2], M.A. Caligo[2], A. Valetto[3], M. De Santi[4], V. Bertini[3] ,G. Piatti[5], C. Foresta[1]

[1] Department of Medicine, University of Padova, Padova, Italy
[2] Molecular Genetics Lab, University Hospital of Pisa, Pisa, Italy.
[3] Cytogenetics Laboratory, Scientific Institute, IRCSS Eugenio Medea , Bosisio Parini , Italy.
[4] Department of Pediatrics, University of Siena, Viale Bracci, I-53100 Siena, Italy.
[5] Unit of Bronchopneumology, Department of Pathophysiology and Transplantation, Fondazione IRCCS Ca' Granda, Ospedale Maggiore Policlinico, University of Milan, Milan, Italy.

Introduction: Primary Ciliary Dyskinesia (PCD) is a rare recessive disease characterized by motile cilia dysfunction. Clinical manifestations of this disease include upper and lower respiratory tract infections, laterality defects and infertility. To date, mutations in approximately 40 different genes have been found to be causative of PCD. Here, we report the case of a new-born with PCD carrying a new homozygous deletion in *DNAI2* gene.

Materials and Methods: Transmission electron microscopy was carried out for diagnosis of PCD. To identify genetic cause of disorder, DNA sequencing by a custom multigene next generation sequencing panel and aCGH were performed.

Results: Transmission electron microscopy showed the absence of outer dynein arms in all analysed axonemes and abnormal inner dynein arm in more than 90% of axonemes. Target sequencing and microarray analysis detected a homozygous 6.9Kb deletion including exons 7-8-9 of *DNAI2* gene.

Conclusions: In this study, we describe a novel homozygous deletion of exons 7-9 of *DNAI2* found in a 4-month old girl with respiratory distress, ventriculomegaly, situs inversus, patent foramen ovale, absent outer dynein arms and abnormal inner dynein arms. Although most of the PCD cases are the result of mutations in gene encoding axonemal proteins or protein related to dynein arm assembly, variants in *DNAI2* gene are rarely found in PCD patients. The application of high-throughput technologies allowed us, hence, to identify a new intragenic deletion of *DNAI2* gene that could likely cause the loss of function of the protein resulting in a severe PCD phenotype.