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Searching for progression markers in patients with Alström and Bardet-Biedl syndromes

Alström Syndrome (ALMS) and Bardet-Biedl Syndrome (BBS) are progressive and complex genetic syndromes occurring in children, the essence of which is the presence of diabetes associated with many disorders of other organs such as obesity, progressive visual and hearing impairment leading to loss of vision and hearing, neurological, nephrological, hepatological, endocrine, pulmonological and cardiological disorders. These syndromes are inherited in an autosomal recessive manner. They are also linked by a lack of defined markers of disease progression and causal treatment.

The aim of the presented project is to analyze markers of disease progression in relation to detailed clinical analysis in the already genetically defined group of patients with ALMS and BBS. Another very important aspect of the proposed research will be to conduct research aimed at identifying markers of disease progression on human cell models of both syndromes.

The study group will consist of about 20 patients with genetically confirmed ALMS and BBS syndromes, which were brought together in previous research projects carried out in the Department. In the study group, the progression markers will be evaluated twice, at an interval of at least two years, on the basis of laboratory tests and neuroimaging studies and an assessment of the profile of metabolites and miRNAs in serum. About 20 obese children will be included to the reference group and about 30 healthy subjects as the controls.

Experimental studies will include the process of transforming skin fibroblasts and urine cells taken from patients into induced pluripotent stem cells (iPS). This human cell model will be used to evaluate the profile of metabolites, proteins and miRNAs as well as the transcriptional profile of individual cell lines compared to healthy individuals' cell lines.

There are intensive attempts around the world to find effective interventions for patients with ALMS and BBS syndromes. A definition of appropriate prognostic markers in the course of ALMS and BBS may be a useful way to assess the effectiveness of causative treatment of these patients. Early multi-specialist care for the patients with the possibility of delaying the development of complications, is also related to the prolongation of their survival period.