Acute leukemia is the most common type of cancer in childhood, with approximately 80% of childhood leukemias being acute lymphoblastic leukemia (ALL). Some subtypes are specific to pediatric patients and display different biological behavior compared to adult ALL. In the Czech Republic, approximately 65 children are diagnosed with ALL each year, with a characteristic age distribution. The peak incidence occurs in the preschool age group.

In reality, ALL is not a single homogeneous disease, but rather a collection of relatively well-defined subgroups characterized by specific immunophenotypic and genotypic features. These subgroups differ in typical age of onset, response to treatment, and, naturally, in prognosis [1].

Clinical and genetic prognostic groups
Although various genetic defects (e.g., deletions or point mutations) are also relatively common in ALL, the presence of major chromosomal aberrations is considered typical. These include changes in ploidy (more often hyperdiploidy than hypodiploidy), and especially the frequent occurrence of certain non-random translocations. These changes are clonal in nature, which distinguishes leukemia from epithelial tumors (carcinomas), where we often observe significant karyotypic diversity caused by chromosomal instability in tumor cells [2].

Another typical feature of chromosomal translocations in ALL is that they are usually reciprocal or balanced alterations and that specific aberrations are associated with particular biological subtypes of ALL. The most frequently detected translocations in pediatric ALL are summarized in Table 1.