Frozen-Dried Human Cord Blood Leukoconcentrate as Correcting Agent of Immune Status when Treating Atopic Dermatitis (Experimental Study)


Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine

Nowadays one of the most pressing public health problems is the search for new biologically active substances and using them in the development of the medicinal products, able to restore the immune system (IS). One of the possible approaches to regulate the immune disorders in humans with atopic dermatitis (AD) could be the use of cord blood. Freeze-drying of the biological object may expand the possibility of its application.

The purpose of this work was the experimental substantiation of possible using of frozen-dried human cord blood leukoconcentrate (fHCBL) to restore the IS parameters at AD, as an example of autoimmune pathology.

The experiments were performed in 6-month-old Wistar rats. Atopic dermatitis was modeled as previously described [Zalkan P.M. and Ivlev E.A., 1965]. The inflammation focus was created at the site of rat’s back (9–10 cm²) by daily rubbing of 5% alcohol-acetone solution of dinitrochlorobenzene during 21 days. The fHCBL was intraperitoneally injected by 0.5 ml in a dose of 5×10⁶ cells to day 22 of AD development. Subpopulations of spleen cells were examined by flow cytometry (FACS Calibur, BD, USA) using monoclonal antibodies to CD3, CD4, CD8, CD25-molecules (BD, USA). The concentration of circulating immune complexes (CIC) was determined in the serum. The indices before and after treatment were analyzed to day 3, 7, 14 of the pathology development.

The fHCBL efficiency when treating an experimental atopic dermatitis has been proven. It has been shown that in the rats with induced AD the changes in IS occur already in 3 days after the disease induction. Application of the fHCBL stipulated the recovery of T-lymphocyte content (CD3⁺, CD4⁺, CD8⁺) and immuno-regulatory index to day 14. By that time, there was the reduction observed in the concentration of CIC, IgE and T-reg (CD4⁺ CD25⁺).

Thus, the fHCBL demonstrated an immune correcting activity when treating experimental AD, which could be promising for clinical practice.