Currently, the long-term storage of canine erythrocytes is the least developed approach if compared to that of human ones, although the development of veterinary medicine predetermines introduction into practice of cryopreserved animal cells. Based on this, the researches aimed to study the sensitivity of canine erythrocytes to the effect of different cryoinjuries, implemented at various stages of cryopreservation, are necessary for the further development of conditions and media for their storage.

Research aim was to study the response of canine erythrocytes to changes in the osmotic media conditions in comparison with human cells.

Hypotonic stress (HS) of erythrocytes was initiated by transferring the aliquots of cell suspension to hypotonic media containing NaCl (40–120 mmol/L). To perform hypertonic shock (HSH), aliquots of the suspension were placed in a solution containing NaCl (1.0–4.0 mol/L). Temperature was 37 °C or 0 °C, and the incubation time was 5 min. The hemoglobin content in the supernatant was determined spectrophotometrically (λ = 543 nm).

Studying the sensitivity of canine and human erythrocytes to the effect of HS, the dependencies of erythrocytes hemolysis on the concentration of NaCl were obtained, which in general have the same character, but possess some specific features. Thus, in the medium containing 40 mmol/L NaCl, the level of hemolysis of canine erythrocytes was about 80%, for human ones this was 100%. At 37°C, there were practically no differences in the values of threshold concentration (70 mmol/L NaCl) and osmotic fragility index (~55 mmol/L NaCl) for canine and human erythrocytes. At 0°C, there was a rise in the threshold concentration values up to 80 mmol/L NaCl for cells of both species and an increase in the osmotic fragility index values up to 60 and 71 mmol/L NaCl for canine and human erythrocytes, respectively. When investigating the hypertonic hemolysis level of canine and human erythrocytes, it was established that within a wide range of nonphysiological concentrations of NaCl, cells were not damaged, but began to lyse (hemolysis above 10%) in the medium containing 2.75 mol/L NaCl. In a highly concentrated saline (4.0 mol/L NaCl), differences in the sensitivity of cells to the effect of HSH were observed at both temperatures. Canine erythrocytes were more stable under the conditions of HSH. Comparative analysis showed that at 37°C the hemolysis level of human erythrocytes exceeded the one of canine erythrocytes by 1.7 times, at 0°C this was by 2.1 times higher. Therefore, the temperature-osmotic characteristics of canine erythrocytes determined in this research and the results of analyzed publications indicate the inexpediency of direct application of cryopreservation conditions, developed for human erythrocytes to the canine cells.