Abstract
Grey level co-occurrence matrix analysis (GLCM) is a well-known mathematical method for quantification of cell and tissue textural properties, such as homogeneity, complexity and level of disorder. Recently, it was demonstrated that this method is capable of evaluating fine structural changes in nuclear structure that otherwise are undetectable during standard microscopy analysis. In this article, we present the results indicating that entropy, angular second moment, variance, and texture correlation of lymphocyte nuclear structure determined by GLCM method are different in thymus cortical and medullar regions of thymus. A total of 300 thymus lymphocyte nuclei from 10 one-month-old mice were analyzed: 150 nuclei from cortex and 150 nuclei from medullar regions of thymus. Nuclear GLCM analysis was carried out using National Institutes of Health ImageJ software. For each nucleus, entropy, angular second moment, variance and texture correlation were determined. Cortical lymphocytes had significantly higher chromatin angular second moment (p < 0.001) and texture correlation (p < 0.05) compared to medullar lymphocytes. Nuclear GLCM entropy and variance of cortical lymphocytes were on the other hand significantly lower than in medullar lymphocytes (p < 0.001). These results suggest that GLCM as a method might have a certain potential in detecting discrete changes in nuclear structure associated with lymphocyte migration and maturation in thymus.

Keywords
Texture analysis, GLCM matrix, CD4, CD8, gene.