SOME QUANTITATIVE ASPECTS OF HAIR FOLLICLE LAYERS DIFFERENTIATION

P-02.09.1-004

E. Vsevolodov[I,II], V. Golichenkov[III], A. Mussayeva[I,II], I. Latypov[II]

[I]LLC "KazCytoGen", Almaty, Kazakhstan, [II]«Institute of General Genetics and Cytology» SC MES, Almaty, Kazakhstan, [III]Lomonosov`s Moscow State University, Moscow, Russia

In the course of stable hair growth the differentiation of hair bulb cambium cells to several layers with dissimilar cytochemistry and morphology takes place. This means the activation of different genes in the cells of different layers. Depending upon the hair diameter some layers may be absent (medulla in the thin hairs). The hair diameters of the Carpet sheep breeds vary widely even within the same square mm of the skin. We compared the different layers thicknesses proportions for the follicles with varying hair diameters. The follicle layers were measured on 155 microphotos of transverse histological sections of the follicles made under the standard magnification. All follicles belonged to the same skin biopsy. The measurements were made at the levels just below the fissure separating the hair and inner root sheath appeared. The empirical regressions of the layers thicknesses and of ratios of different layers against hair diameters were counted. The computer model was made on the basis of these regressions which allowed to obtain the absolute parameters of the layers as well as ratios of these parameters for every chosen hair diameter. Using this model we found an essential trend in changing the proportions in relative layers dimensions as we choose the follicles with more and more thick hair. When we change the follicles with 30 mcm hair diameter for those with the hair diameter 100 mcm the ratio of hair medulla diameter to hair diameter increases from 0.07 to 0.76. The ratio of hair diameter to the diameter of inner root sheath increased from 0.70 to 0.84. It means that the thicker is the hair the higher proportion of cells produced by cambium are spent to build innermost layers (medulla layer within the hair or hair within the complex - inner root sheath + hair). These data may throw some light on positional information mechanism of layers differentiation.