THE 3D RECONSTRUCTION OF EYES CORNEA STRATIFIED EPITHELIUM

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Three-dimensional tissue organization is the most essential and difficult for analysis by using empirical approach. Though it remains practically unknown. A new theory of tissue module construction has been put forward. The approach is based on the idea that every tissue is cellular lattice which consists of cell groups (modules). A special attention has been called to a regularity of tissue organization. The approach permits to make a family of 3D models and verify that.

A series of epithelium sheet two-dimensional models have been made basing on the theory. Then a family of three-dimensional models has been built by combining slices of the two-dimensional models by a different way. In the issue a special computer program Histoarch has been produced to make easy the reconstruction. 3D organization of two-layer and pseudo stratified epithelium was reconstructed earlier. At present stratified epithelium model has been built (Fig.1). To verify the models a cornea epithelium of the rats has been examined by using confocal microscope Leica TCS SL and the optical tangential sections of the epithelium have been made.

The epithelium is multilayer, cells of adjacent layers are at a ratio 1/2, which correspond to the AB2 model. The model sections have been compared with the real optical sections.

The models facilitate and speed up the reconstruction of 3D tissue structure. The high result precision and small number of the necessary tangential sections provide reasons for the new approach described to be widely adopted.

Figure 1. 3D model of stratified epithelium, her section on several levels and suitable tissue sections: a) section of hexagonal cells; b) section of 12-faced and triangle cells; c) section of hexagonal and triangle cells; d) section of adjacent layers hexagonal cells.

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