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The effect of sodium hyaluronate on migration and proliferation of human corneal cells.

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Purpose: To investigate the effects of exogenous sodium hyaluronate (SH) in migration and proliferation of human corneal epithelial cells in culture; to evaluate whether SH up regulates the expression of its receptor, CD44; and to determine if HS induces epithelial apoptosis.

Methods: Human corneal epithelial cell cultures were established form 17 donor rims. Cultures form each rim was maintained in 3 culture conditions. Culture medium enriched with SH 0.6mg/ml; 2. Culture medium enriched with 2.5 mg/ml Hydroxypropylmethylcellulose (HM); and 3. Culture medium without additives (Control). The total area covered by the migrating epithelium cell sheet in each case was measured by one masked observer on days 4, 8 12 and 16. This experiment was repeated and, on day 16, epithelial cells from groups SH, HM and control were suspended, and proliferation was determined by propidium iodide (PI) flow cytometric analysis (n=5) and by immunohistochemical Ki-67 detection (n=6). Immunohistochemical analysis for CD44 (n=5) and apoptosis determination using Hoechst technique (n=6) was also performed. Comparisons between Sh. Hm and Control groups were performed using repeated measured ANOVA for migration and Friedman's test for PI and Ki-67 proliferation, CD44 and apoptosis analysis.

Results: Cells cultured in the presence of SH showed signicantly increased migration on day 12 when compared to HM (p=0.007) and Control (p=0.025). On day 16, the 3 groups were statistically different between them (SH x Control: p=0.001; HM x control: p=0.010; and SH x HM; p=0.003). Epithelial proliferation with PI and ki 67 were not statistically different for SH, HM and Control (p=0.819 and p=0.957, respectively). No differences in CD44 expression or in apoptosis induction were observed between the 3 study groups (p=0.819 in both).

Conclusion: Exogenous SH promotes migration of human corneal epithelial cells in vitro. On the other hand, SH did not seem to increase epithelial cell proliferation and does not induce apoptosis. CD44 was expressed in most epithelial cells from the 3 study groups.