Using Hyaluronic Acid to Enhance Wound Healing

Fig 1. (A) The growth of a human dermal explant cultured for 5 days in the presence of hyaluronic acid (HA). The increased migration is evident in the presence of HA, allowing for improved in vitro studies of wound healing.

Fig 2. (A) The growth of fetal wound healing matrix is exceptionally rich in hyaluronic acid (HA). Fetal wounds heal without scarring or contraction. The fetal wound healing rate, absence of scar tissue in the extracellular matrix, and high water content are characterized by fetal wounds. Ann Surg 1989;210:5.

Materials and Methods

Dermal biopsies were obtained from a 72-year-old woman and cultured in the presence of hyaluronidase, which aids in the breakdown of HA. The increased migration is observed in the presence of HA, which provides a favorable environment for cell proliferation. Dermal explants were cultured with different concentrations of HA, and the results were graphically represented in Figure 1.

Results

In our experiments, we noted a dramatic and consistent acceleration of cell migration in the presence of HA. Using highly purified, medical-grade HA, we observed an increased rate of migration and proliferation, which is consistent with previous studies by Longaker MT, Chiu ES, Harrison MR, et al. (1, 2).

Discussion

The fetal wound healing rate, absence of scar tissue in the extracellular matrix, and high water content are characterized by fetal wounds. The fetal healing rate is faster and more effective than that observed in adult skin. The increased migration and proliferation are accelerated by the addition of HA, which provides a favorable environment for cell proliferation. Using highly purified, medical-grade HA, we observed an increased rate of migration and proliferation, which is consistent with previous studies by Longaker MT, Chiu ES, Harrison MR, et al. (1, 2).

We would like to thank John H. Wells of the Wells Johnson Company for his support that made this work possible. We are currently developing methods, based on these findings, to reduce the incidence of wound healing disruption. Our work will center on the further research and development of biomedical applications of HA.