Preclinical study suggests no harm to limbal stem cells from CXL

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Chicago—Preliminary results of a preclinical study investigating the effect of peripheral collagen crosslinking (CXL) on the limbal stem cells provide some reassurance about the safety of the technique.

The research, conducted by Olivier Richoz, MD, and Farhad Hafezi, MD, PhD, Department of Ophthalmology, Geneva University Hospitals, Geneva, Switzerland, was presented at Refractive Surgery 2012.

In the study, male adult New Zealand white rabbits were divided into a number of different groups to undergo CXL with riboflavin in the right eye using different areas of irradiation (central 7 mm or corneal/limbal 7 mm) and with different irradiation regimens varying in exposure time and UVA light intensity. The fellow eyes served as controls, receiving riboflavin only but no irradiation.

The results showed peripheral CXL did not significantly modify time to re-epithelialization, which was investigated as an indicator of stem cell activity, even in eyes treated with the most aggressive irradiation dose (10 mW/cm² at 30 minutes). In addition, there were no macroscopic or microscopic signs of vessel thrombosis. Additional evaluations, including immunohistochemical staining and Western blotting for stem cell markers and RT-PCR analysis of cytokine profiles, are ongoing.

“For some corneal disorders, such as pellucid marginal degeneration, UVA irradiation close to the limbus is required when performing CXL,” Dr. Richoz said. “Currently, many surgeons cover the limbus and peirpheral cornea to protect the limbus. However, this might compromise the therapeutic effect.

“Our study results show that direct irradiation of the corneal limbus using the standard CXL parameters of 3 mW/cm² for 30 min and even 10 mW/cm&sup2 for 30 minutes does not affect the efficacy of re-epithelialization,” Dr. Richoz said. “We believe that the limbal stem cells probably remain capable of regenerating the epithelium.”

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