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In Vivo Assessment of Corneal Limbal Microenvironment by Scanning Slit Confocal Microscopy

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Purpose: To characterize the morphological uniqueness of limbal niche by in vivo real time scanning slit confocal microscopy. **Methods:** Five healthy normal individuals without any ocular and systemic abnormalities or previous surgery were included in this study (2 women and 3 men). The limbal region was divided into 4 quadrants: superior, inferior, temporal and nasal. Five frames of each quadrant from each patient was randomly selected and recorded. Gross morphology, nerve branching, epithelial cell layers number and epithelial cell size were evaluated by confocal microscopy. **Results:** The limbal anatomy characteristically had an undulating configuration with an ill-distinct basement membrane, features known to be unique in the limbal region. This undulating configuration of the limbus -palisades of Vogt- was seen more frequently in the inferior and superior quadrants but scarce or not present at all in the horizontal quadrants. Nerves were observed in all limbal quadrants but were more abundant in the nasal and temporal. Cell layers number was higher in the superior and inferior quadrants. Limbal cells sizes increase from basal to superficial layers. The corresponding values of basal cells and superficial cells were 9.8 ± 0.7 and 19.3 ± 1.2 μm respectively ($p < 0.0001$). **Conclusions:** The limbal region reveals a unique microenvironment with enriched innervation, and an undulating surface with small cells located at the basal layer. This unique structure with all the aforementioned characteristics is believed to play a key role in maintaining epithelial stemness