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| **Mapping and identifying migration pattern differences in response to wounding in asthmatic and non-asthmatic airway epithelial cells** |
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| **Introduction/Aim:**Cell migration represents a significant component of the airway epithelial wound repair process. However, the pattern of migration and cell directionality has not been investigated in these cells before. Since defective cell migration is thought to contribute to the dysregulated wound repair of asthmatic epithelium, the aim of this study was to analyse cell migration patterns and trajectories in asthmatic and non-asthmatic airway epithelial cells (pAECs) post-injury.**Methods:**pAECs were obtained from (n=4, 3 males, 3.1-12.7 years) asthmatic and non-asthmatic (n=7, 4 males, 2.1-7.1 years) children undergoing elective surgery for non-respiratory conditions. Cells were initially cultured and subsequently seeded into 96-well ImageLock plates. Once confluent, monolayers were mechanically wounded and repair tracked using brightfield images of the wound taken every 30 minutes (Incucyte; Essen Bioscience). Migration patterns and trajectories of leading-edge cells were determined using ImageJ2 and the Chemotaxis and Migration Tool (Ibidi) plugin.**Results:**Leading-edge pAECs from non-asthmatic children were found to have a mean migration distance of 188±79μm and velocity of 0.37±0.17μm/min. Primary leading-edge cells were found to have an angular distribution of 98˚ with a directionality value of 0.91±0.10 during wound repair. Interestingly, leading-edge pAECs from asthmatic children were found to have similar mean migration distance and velocity to their non-asthmatic counterparts (181±127μm and 0.41±0.28μm/min respectively). Primary leading-edge cells of asthmatic pAECs were found to have greater angular distribution of 267˚ and lower directionality value of 0.53±0.19 during wound repair. Further analysis revealed that, asthmatic pAECs could be further subclassed as ‘responders’ and ‘non-responders’ according to their migration trajectories post wounding.**Conclusion:**Significant differences in cell directionality were observed between asthmatic and non-asthmatic pAECs. This is the first study to map and establish migration patterns of asthmatic pAECs post-wounding and correlates poor migrational response to dysregulated wound repair.**Grant Support:**NHMRC(#1048910), APA(UWA), Centre for Cell Therapy & Regenerative Medicine PhD Top-Up Scholarship**Declaration of interest:** No conflicts of interest to declare. |