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Electrical signaling in epithelial migration

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Epithelia, such as skin are seldom considered to have any electrical activities. However, live polarized epithelia–epidermis for example does maintain electrical potential difference, normally apical negative and basal side positive. This electrical feature has been known over many decays and is named trans-epithelial potential difference (TEP). Whether the TEP has any significant functions in epithelial biology remain to be less well studied and understood. Research in the past decades provide compelling experimental evidences suggesting significant roles for the TEP in epithelial polarization, migration and wound healing. We have demonstrated the electrical feature of epithelial tissues and some of the molecular mechanisms as well as the overriding guidance effects of electrical signaling in cell polarization, guidance effects of electric fields in cell migration, and tissue growth in wound healing and finally some exciting and new understanding of how epithelial cells sense and respond to electrical stimulation. My presentation will draw attention of audience to this potentially important aspect of electrical signaling at tissue level in skin biology and implications in melanoma and skin diseases.

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