Evidence for a palmoplantar-specific role for microtubules

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Introduction

- The palmoplantar epidermis is uniquely adapted to withstand physical stress
- Investigating cytoskeleton and microtubules in palm using palmoplantar keratoderma models and two proteins AQP5 and iRhom2 that appear to have key roles in regulating these key cellular processes

Results

Microtubule dynamics differ between interfollicular and palmoplantar skin

AQP5 mutations leads to microtubule dysregulation

iRhom2 regulates the cytoskeleton and the microtubule network

iRhom2 cytoplasmic N-terminus interacts with two giant cytoskeletal crosslinkers: BPAG1 and MACF1

Conclusion - Perspectives

- We report BPAG1 (Bullous Pemphigoid Antigen 1 or Dystonin) and MACF1 (Microtubule-Actin Crosslinking Factor 1 or ACF7) as iRhom2 interacting partners, via their spectrin repeat domain. These are both spectraplakins; giant cytoskeletal linker proteins that can interact with all three cytoskeletal components
- Immunostaining revealed a palmoplantar-specific localisation pattern for the microtubule plus-end binding protein, EB1, that correlated with the palmoplantar ridges and also the alternating expression patterns for keratins 9 and 16, indicating that microtubule dynamics differ between interfollicular and palmoplantar skin
- Whilst the physical resilience of the palmoplantar epidermis has been linked predominantly to an abundance of keratin intermediate filaments, we have now identified a potential role for microtubules in this function