CONTACT DERMATITIS:
PATHOPHYSIOLOGY, DIAGNOSIS & MANAGEMENT
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Contact dermatitis: from pathomechanisms to immunotoxicology

- Sensitization phase:
  - haptens captured by resident dendritic cells (Langerhans cells) that migrate to regional lymph nodes to activate & expand specific T-cell precursors; keratinocytes activated to express TNF-α, IL-6, GM-CSF with downstream activation of Langerhans cells & dermal endothelial cells with induction of ICAM-1 and CXCL8, further expression on keratinocytes of CCL2 & CCL27
  - Activation of keratinocytes is driven by contact allergens & not by cytokines from infiltrating cells

- Elicitation phase:
  - re-exposure results in rapid recruitment of specific memory T-cells predominated by Th1 cells with substantial proportion of Th17 cells
  - Milieu of IFN-γ, IL-17, IL-22, & TNF-α causes up-regulation of ICAM-1, MHC II, and MHC I and Fas, which makes keratinocytes targets for T-cell mediated cytotoxicity

Role of keratinocytes & Inflammatory cells in ACD

- Activation of the innate immune system
  - skin inflammation
- Activation of the adaptive immune system
  - allergic contact dermatitis

Threshold for contact sensitization

- Strong autoadjuvanticity (strong contact allergens)
- Weak autoadjuvanticity (weak contact allergens)
- Amplified autoadjuvanticity (weak contact allergens + X)
- Co-adjuvanticity (weak contact allergens + X)
- Substitute adjuvanticity (X)

Role of keratinocytes & Inflammatory cells in ACD

- Amplification phase:
  - Expression of CXCL9-11 begins @ 12 hours, peaks @ 72hrs
  - Followed by CCL27, CCL5, CCL22, & CCL1
  - Keratinocytes more sensitive to Th1 lymphokines
Test every patient with “standard tray”

Several standard series exist
- T.R.U.E. test (36 allergens)
- European series (23 allergens)
- International standard series (20)
- North American (NACDG) series (50)
- Pediatric series (40)
- Many other institutional or regional series

Larger the series used, the more positives found and the more relevant tests found

Most common allergen groups
- Preservatives (Quaternium 15)
- Medicaments
- Metals
- Fragrances
- Rubber

Allergen of the Year
- 2000 – Dispense dyes
- 2001 – Gold
- 2002 – Thimerosol (non-relevant)
- 2003 – Bacitracin/topical antibiotics
- 2004 – Cocamidopropyl betaine
- 2005 – Corticosteroids
- 2006 – Paraphenylene diamine (henna tattoos)

Allergen of the Year
- 2007 – Fragrances
- 2008 – Nickel
- 2009 – Mixed dialkyl thioureas
- 2010 – Neomycin
- 2011 – Dimethyl fumerate (European epidemic 2007)
- 2012 - Acrylates

Interpretation
- 0 negative
- 1+ doubtful – macular erythema
- 2+ weak – erythema, edema, ? Papules
- 3+ strong – edematous or vesicular
- 4+ extreme – spreading, bullous
- Irritant – decrescendo
- Allergic – crescendo
- “Angry back” – multiple (+)

Clinical Relevance
- Once positive reaction is documented, relevance must be determined
- Relevance based on:
  - History of exposures
  - Sources in patient’s environment
- Extended visit with patient may be necessary in allergen identification and avoidance
Management of ACD

- AVOIDANCE
- AVOIDANCE
- AVOIDANCE