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## Direct Immunofluorescence Patterns

Coleman Ritchie, MD

### Epidermal Intercellular Pattern

Disease	Target	Histopathology	DIF	Bx Site	Hints
<b>Pemphigus Group</b>					
Pemphigus Vulgaris	DSG 3 +/- 1	Suprabasal Acantholysis with "Tombstoning" of the basal layer	Crisp Deposition at ICS with IgG > C3 deposition	NPS	- DIF may be concentrated over <b>lower epidermal level</b> - IIF Monkey Esophagus
Pemphigus Foliaceus	DSG 1	Subcorneal or intragranular acantholysis with "cling ons"	Crisp Deposition at ICS with IgG > C3	NPS	- DIF may be concentrated over <b>upper epidermal level</b> - IIF Guinea Pig Lip or Esophagus
Paraneoplastic Pemphigus	DSG 3 DSG 1 BPAG1 Periplakin Envoplakin Desmoplakin Plectin	Suprabasal Acantholysis + Interface with basal vac. change and dyskeratotic keratinocytes	A. IgG +/- IgM > C3 at BMZ in smudged pattern >>> B. IgG > C3 at ICS	NPS	- Commonly associated neoplasms NHL > CLL > Castleman's <b>- IIF Rat Bladder Epithelium</b>
IgA Pemphigus	Desmocollin 1	Subcorneal Pustules or suprabasilar acantholysis with neutrophils	<b>Crisp Deposition at ICS with IgA</b>	NPS	- Only IgA Intercellular Pattern - Positive DIF differentiates from Subcorneal Pustular Dermatitis
Pemphigus Vegetans	DSG 3 +/- 1	Suprabasal Acantholysis	Crisp Deposition at ICS with IgG > C3 deposition	NPS	- Subtype of Pemphigus vulgaris
Pemphigus Erythematosus	DSG 1	Subcorneal Acantholysis	IgG > C3 at ICS + Granular IgG, IgM, C3 at BMZ	NPS	- Remember as a hybrid of P. Fol. + Lupus Eryth. DIF - ANA Positive

### Basement Membrane Zone (BMZ) Deposition

Disease	Target	Histopathology	DIF	Bx Site	Hints
<b>Pemphigoid Group</b>					
Bullous Pemphigoid	NC16A domain of BPAG2 & BPAG1	Subepidermal blister with eosinophils	Thin, Continuous Linear Pattern along the BMZ with C3 > IgG	NPS	- Unable to differentiate BP and HG on DIF. - BP of Pregnancy=HG
Herpes Gestationis	NC16A domain of BPAG2 & BPAG1	Subepidermal blister with eosinophils	Thin, Continuous Linear Pattern along the BMZ with C3 > IgG	NPS	- See above under Bullous Pemphigoid
Cicatricial Pemphigoid	C-terminal of BPAG2  Laminin 5  Ocular subtype: beta-4-integrin	Subepidermal blister with eosinophils	Thin, Continuous Linear Pattern along the BMZ +/- appendageal structures with C3 (50%) > IgG (25%); IgA (20%); IgM	NPS	- Histology + DIF may involve appendageal structures - Possible Laminin 5 association with malignancy
<b>Non -Pemphigoid</b>					
Epidermolysis Bullosa Acquisita (EBA)	Collagen VII	Subepidermal Blister  Multiple possible presentations including pauci-inflammatory, neutrophilic, lymphocytic, etc.	Multiple Deposits at BMZ  Broad, Homogeneous Linear Deposition at the BMZ With IgG > C3; IgA (2/3); IgM (1/2)	NPS	- EBA and BP may appear identically histologically and with DIF <b>- Salt Split Skin shows primarily dermal deposits</b>
Bullous Systemic Lupus Erythematosus (SLE)	Collagen VII	Subepidermal blister with neutrophils	Two Patterns: 1. Multiple linear deposits at BMZ similar to EBA (60% of cases) 2. Multiple granular deposits at BMZ	NPS	Responds well to treatment with dapsone
Linear IgA Disease	LAD1 Antigen (BPAG2; 97 kDa portion)	Subepidermal blister with neutrophils	Homogeneous Linear Deposition Pattern at BMZ <b>w/ IgA &gt;&gt;&gt; C3</b>	NPS	

### Basement Membrane Zone (BMZ) plus Blood Vessels Deposition

Disease	Target	Histopathology	DIF	Bx Site	Hints
Porphyria Cutanea Tarda	None	Pauci Inflammatory Subepidermal Blister with "Festooning"	BMZ + Superficial Dermal Blood Vessels with IgG/A/M; C3; fibrin	NPS	- Blood vessels with impressive broad/thick pattern on DIF <b>- Uroporphyrinogen III decarboxylase defect</b>
Pseudo Porphyria	None	Pauci Inflammatory Subepidermal Blister with "Festooning"	BMZ + Superficial Dermal Blood Vessels with IgG/A/M; C3; fibrin	NPS	- DIF Identical to PCT - Drugs: <b>Naproxen</b> , Lasix, Thiazides <b>- Porphyrins are normal</b>
Erythropoietic Protoporphyrria	None	Eosinophilic thickened deposits around vessels in upper/mid dermis	BMZ + Superficial Dermal Blood Vessels with IgG/A/M; C3; fibrin	NPS	- DIF Identical to PCT <b>- Ferrochelatase defect</b>



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## Direct Immunofluorescence Patterns (continued)

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## Basement Membrane Zone (BMZ) plus Papillary Dermis Deposition

Disease	Target	Histopathology	DIF	Bx Site	Hints
Dermatitis Herpetiformis	Unknown	Subepidermal blister with neutrophils Dermal Papillae with neutrophils	BMZ + Papillary Dermis with <b>Granular IgA</b> > C3 present in tufts or linear pattern	NPS	- HLA DR3; HLA DQ2 - Tissue Transglutaminase is not proven as the initiating bullous target in DH

## Other Forms of Deposition

Disease	Target	Histopathology	DIF	Bx Site	Hints
Lichen Planus Pemphigoides	Primarily BPAG2 (NC16A domain; MCW4 portion) BPAG1	Lichenoid papules show typical lichen planus histopathology Tense bullae show histology pattern suggestive of BP	Linear BMZ (Granular IgG and C3 along shaggy BMZ) + Cytoid Body Deposition ( <b>IgM; fibrinogen &gt; IgA, IgG, C3</b> )	NPS	Clinically, BP + LP Contrast to bullous lichen planus w/ blister development at site of LP due to inflammation

Key:

- NPS = Normal Perilesional Skin Biopsy
- DSG 3 = Desmoglein 3 (130 kDa); DSG 1 = Desmoglein 1 (160 kDa);
- BPAG1 = Bullous Pemphigoid Antigen 1 = Bullous Pemphigoid 230 (kDa)
- BPAG2 = Bullous Pemphigoid Antigen 2 = Bullous Pemphigoid 180 (kDa)
- Plakin family:
- Desmosomes: Periplakin (190 kDa), Envoplakin (210 kDa), desmoplakin (250 kDa)
- Hemidesmosomes: BPAG1 (230kDa), plectin (500 kDa)
- Laminin 5 = Laminin 332
- NHL = Non Hodgkin's Lymphoma; CLL = Chronic Lymphocytic Leukemia

## References

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