in the detection and characterization of soft tissue metastasis. *Mol Clin Oncol* 2014; 2: 761-6.
2. Kubota R, Yamada S, Kubota K, Ishiwata K, Tamahashi N, Ido T. Intratumoral distribution of fluorine-18-fluorodeoxyglucose in vivo: high accumulation in macrophages and granulation tissues studied by microautoradiography. *J Nucl Med* 1992; 33: 1972-80.
3. Brown RS, Leung JY, Kison PV, Zasadny KR, Flint A, Wahl RL. Glucose transporters and FDG uptake in untreated primary human non-small cell lung cancer. *J Nucl Med* 1999; 40: 556-65.
4. Battistella M, Trabelsi S, Terrier-Lacombe MJ, Leboulleux S, Robert C. Hypermetabolic dermatofibroma on Positron Emission Tomography/Computed tomography with 18F-FluoroDeoxyGlucose : a misleading false positive in the follow-up of a metastatic melanoma. *Eur J Dermatol* 2008; 18: 461-2.
5. Kitamura K, Hatano E, Higashi T, *et al.* Proliferative activity in hepatocellular carcinoma is closely correlated with glucose metabolism but not angiogenesis. *J Hepatol* 2011; *55*: 846-57.
6. Kim BS. The 18F-FDG PET/CT finding of a condyloma acuminata mimicking primary anorectal carcinoma in an HIV-infected patient. *Clin Nucl Med* 2013; 38: e402-3.
7. Wada T, Kubota K, Minamimoto R, *et al.* FDG uptake by a condylomata acuminata in an HIV-infected patient mimicked urine contamination. *Clin Nucl Med* 2012; 37: 420-1.
8. Kishimoto T, Mabuchi S, Kato H, Kimura T. Condyloma acuminata induces focal intense FDG uptake mimicking vaginal stump recurrence from uterine cervical cancer: a case report. *Eur J Gynaecol Oncol* 2013; 34: 99-100.
9. White R, Donnellan S, Leong T. Complete resolution of urinary bladder condyloma acuminatum following definitive chemoradiotherapy for anal cancer. *BJU Int* 2011; 108: 38-41.

doi:10.1684/ejd.2014.2498

Anti-laminin γ1 pemphigoid associated with ulcerative colitis and psoriasis vulgaris showing autoantibodies to laminin γ1, type XVII collagen and laminin-332

Anti-laminin γ1 pemphigoid is a novel autoimmune subepidermal bullous disease characterized by the presence of circulating immunoglobulin (Ig) G autoantibodies to laminin γ1, a common constituent at various basement membrane zones (BMZs). Although an association between various subepidermal blistering diseases and inflammatory bowel disease (IBD) has been reported, there have been no previous reports on an association between anti-laminin γ1 pemphigoid and IBD. Here, we demonstrate a case of anti-laminin γ1 pemphigoid associated with ulcerative colitis (UC), in whom circulating autoantibodies against laminin γ1, laminin-332 and the C-terminus of type XVII collagen (BP180) were detected.

A 65-year-old Japanese man was referred to our hospital for worsening widespread tense blisters with pruritus over the entire body. He had previously been diagnosed with psoriasis vulgaris and UC. The symptoms of UC, namely fever, bloody stool and abdominal pain, had recently worsened, with the subsequent appearance of blisters. Clinical examination revealed prominent oedematous erythema, tense blisters and erosions with a few scattered milia on the entire body *(figure 1A)*. No mucosal involvement was observed. Histopathology of a lesional skin biopsy specimen demonstrated subepidermal blisters with infiltration of eosinophils and neutrophils at the dermoepidermal junction and in the papillary dermis *(figure 1B)*. Direct immunofluorescence (IF) of the lesional skin showed linear deposition of IgG and complement component 3 at the epidermal BMZ *(figure 1C)*. Indirect IF detected circulating IgG autoantibodies, which bound to both the epidermal and dermal sides of 1M sodium chloride-split normal human skin at titre 1:20 *(figure 1D)*. Enzyme-linked immunosorbent assay using recombinant protein of the NC16a domain of type XVll collagen showed a negative result. To determine the target antigen of the patient autoantibodies, immunoblotting (IB) analyses were performed as previously described [1–3]. The results showed the presence of three distinct circulating IgG autoantibodies against laminin γ1, the C-terminus of type XVII collagen and the α3 and γ2 subunits of laminin-332 *(figures 1E-G)*. After initial treatment with oral prednisolone 1 mg/kg/day, the skin lesions rapidly healed with milium formation. When prednisolone was tapered to 0.4 mg/kg/day, tense blisters reappeared. Additional administration of mizoribine 2 mg/kg/day ameliorated the skin lesions, and thereafter prednisolone was gradually

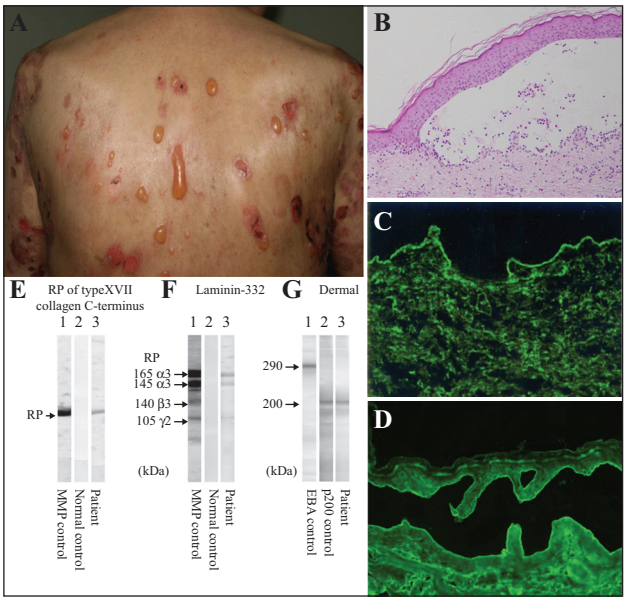

Figure 1. Clinical manifestations, histopathological findings, IF results, and the results of IB analyses. **A)** Tense blisters, erosions and erythema were seen on the whole body. **B)** Histopathological findings of subepidermal blisters with eosinophilic and neutrophilic infiltration. **C)** Direct IF for IgG deposition. **D)** Indirect IF of 1M sodium chloride-split normal human skin. **E)** IB of recombinant protein (RP) of the C terminus of type XVII collagen. Positive IgG reactivity with by positive MMP control (lane 1) and our patient (lane 3), but not by negative control (lane 2). **F)** IB of purified human laminin-332. Positive IgG reactivity with the 165-kDa and 145-kDa α3, the 140-kD β2 and the 105-kDa subunits of laminin-332 by positive MMP control (lane 1), but not normal control (lane 2). Our patient reacted with the 165-kDa and 145-kDa α3 and the 105-kDa γ2 subunits (lane 3). **G)** IB of normal human dermal extract. Positive IgG reactivity of epidermolysis bullosa acquisita (EBA) control with the 290-kDa type VII collagen (lane 1). Anti-laminin γ1 pemphigoid control (p200) (lane 2) and our patient (lane 3) reacted with the 200-kDa laminin-γ1.

tapered to 0.15 mg/kg/day. Prednisolone 0.15 mg/kg/day and mizoribine 2 mg/kg/day controlled the bullae and erosions well.

While anti-laminin γ1 pemphigoid reacts with laminin γ1, autoantibodies to the C-terminus of type XVII collagen and laminin-332 are detected in anti-BP180-type and anti-laminin-332-type, respectively, of mucous membrane pemphigoid (MMP). Although both of these MMP autoantibodies were detected in the IB assays, the present case showed no mucosal involvement. In addition, the tense blisters and urticarial skin lesions resembling bullous pemphigoid, rapid response to systemic treatments, coexistence of psoriasis vulgaris, and non-scarring resolution of skin lesions were consistent with the characteristics of anti-laminin γ1 pemphigoid [4]. Altogether, these findings indicated that the diagnosis of anti-laminin γ1 pemphigoid was appropriate in this case.

The current classification of autoimmune blistering diseases based on targeted antigens may be relatively inappropriate in some cases, as in the present case in which several autoantigens were detected. This issue is likely to occur more frequently because of the increasingly concomitant use of various sensitive techniques. Appropriate diagnosis should be determined not only from the results of serological analysis but also from clinical features.

It has been reported that approximately 30–50% of anti-laminin γ1 pemphigoid cases are associated with psoriasis vulgaris [4–6]. Our patient had concurrent psoriasis vulgaris and UC with anti-laminin γ1 pemphigoid. Furthermore, blister formation occurred in conjunction with worsening of the UC symptoms. Concurrence of IBD and subepidermal bullous dermatosis, including linear IgA bullous dermatitis, pemphigoid group and epidermolysis bullosa acquisita, has been reported [7]. However, to our knowledge, there are no previous reports describing concurrent anti-laminin γ1 pemphigoid and UC. Several major laminin trimers containing the laminin γ1 subunit exist in the intestinal BMZ [8]. IBD results from a breakdown of the epithelial layer and exposure of the components of the BMZ to the immune system. Accordingly, we speculate that laminin γ1 was first processed by intestinal inflammation in the present case. The laminin γ1 fragments may promote the production of anti-laminin γ1 autoantibodies, resulting in BMZ separation in the skin. ■

Disclosure. *Financial support: none. Conflict of interest: none.*

[1] Department of Dermatology, Hirosaki University Graduate School of Medicine, 5 Zaifu-cho, Hirosaki 036-8562, Japan
[2] Department of Dermatology, Kurume University School of Medicine,
[3] Kurume University Institute of Cutaneous Cell Biology, Fukuoka-Ken 830-0011, Japan
<akasakae@cc.hirosaki-u.ac.jp>

Eijiro AKASAKA[1]
Hajime NAKANO[1]
Ayumi KOREKAWA[1]
Tomohisa FUKUI[1]
Takahide KANEKO[1]
Hiroshi KOGA[2]
Takashi HASHIMOTO[3]
Daisuke SAWAMURA[1]

1. Ishii N, Yoshida M, Hisamatsu Y, *et al.* Epidermolysis bullosa acquisita sera react with distinct epitopes on the NC1 and NC2 domains of type VII collagen: study using immunoblotting of domain-specific recombinant proteins and postembedding immunoelectron microscopy. *Br J Dermatol* 2004; 150: 843-51.
2. Nie Z, Hashimoto T. IgA antibodies of cicatricial pemphigoid sera specifically react with C-terminus of BP180. *J Invest Dermatol* 1999; 112: 254-5.
3. Hisamatsu Y, Nishiyama T, Amano S, Matsui C, Ghohestani R, Hashimoto T. Usefulness of immunoblotting using purified laminin 5 in the diagnosis of anti-laminin 5 cicatricial pemphigoid. *J Dermatol Sci* 2003; 33: 113-9.
4. Dainichi T, Koga H, Tsuji T, *et al.* From anti-p200 pemphigoid to anti-laminin gamma1 pemphigoid. *J Dermatol* 2010; 37: 231-8.
5. Chen KR, Shimuzu S, Miyakawa S, Ishiko A, Shimizu H, Hashimoto T. Coexistence of psoriasis and an unusual IgG-mediated subepidermal bullous dermatosis: identification of a novel 200-kDa lower lamina lucida target antigen. *Br J Dermatol* 1996; 134: 340-6.
6. Dainichi T, Kurono S, Ohyama B, *et al.* Anti-laminin gamma-1 pemphigoid. *Proc Natl Acad Sci USA* 2009; 106: 2800-5.
7. Shipman AR, Reddy H, Wojnarowska F. Association between the subepidermal autoimmune blistering diseases linear IgA disease and the pemphigoid group and inflammatory bowel disease: two case reports and literature review. *Clin Exp Dermatol* 2012; 37: 461-8.
8. Spenlé C, Hussenet T, Lacroute J, *et al.* Dysregulation of laminins in intestinal inflammation. *Pathol Biol (Paris)* 2012; 60: 41-7.

doi:10.1684/ejd.2014.2499

Osteomalacia induced by a phosphaturic mesenchymal tumor secreting fibroblast growth factor 23

Tumor-induced osteomalacia (TIO) is a rare paraneoplastic condition characterised by the presence of a tumor, hypophosphatemia caused by renal phosphate wasting and low serum concentration of 1,25-dihydroxyvitamin D [1,25$(OH)_2$D], with clinical and histological evidence of osteomalacia [1-4]. Hypophosphatemia subsequently causes muscle weakness, bone pain and multiple fractures [1]. Most cases of TIO are associated with mesenchymal tumors secreting fibroblast growth factor 23 (FGF23) [1], which was recently identified as an important factor involved in the development of hypophosphatemic rickets and osteomalacia. We report a case of TIO with a subcutaneous tumor. Interestingly, the osteomalacia dramatically improved after resection of the tumor.

A 28-year-old Japanese man presented with a 5-year history of pain in the lower back and right knee, which gradually worsened over time. Bone mineral density (BMD) was 0.649 g/cm^2. Serum chemistry showed low phosphate (1.7 mg/dl) and intact parathormone (13.4 pg/mL), increased alkaline phosphatase (599 U/L), and decreased reabsorption of phosphatase. The level of 1,25-$(OH)_2$D3 was within the normal range (45.8 pg/mL). FGF23 was elevated in the peripheral blood (1340 pg/mL). From these results, tumor-induced osteomalacia was suggested, but the tumor could not be localized. An F-18 fluorodeoxyglucose positron emission tomography/computed tomography (PET/CT) test showed no remarkable changes. Venous blood samplings for FGF23 were performed from both right and left dorsal, femoral and median veins, and a significantly higher level of FDF23 (9900 pg/mL) was detected from the left dorsal vein than from the other veins, sug-