ULTRASTRUCTURE OF CUTANEOUS LICHEN PLANUS LESIONS EVIDENCED IN VARIOUS TYPES OF DISEASE CORRELATED WITH TISSUE LEVELS OF GELATINASE-B

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INTRODUCTION

Lichen planus (LP) is a common inflammatory disease of the skin presenting with characteristic violaceous, polygonal, pruritic papules. The disease may also affect the mucosa, hairs and nails. LP occurs worldwide with no racial predilection. The cause of LP is not known, but immunologic mechanisms triggered by poorly defined antigenic stimulations play a pivotal role in the pathogenesis of the disease. Cell-mediated immune response is believed to play the major role in the pathology of the disease. Histologically, LP is characterized by basal layer vacuolization, acanthosis, hypergranulosis, and a lymphocytic infiltrate mostly localized at the dermal-epidermal interface [1, 2]. MMPs have been shown to participate in extracellular matrix degradation playing an important role in basal membrane damage in LP contributing to keratinocyte damage and lichenoid-interface reaction [3, 4, 5]. This study aimed at an ultrastructural characterization of keratinocyte damage in LP correlating this with levels of expression of gelatinolytic activity caused by metalloproteinase-9 (MMP-9).

MATERIALS AND METHODS

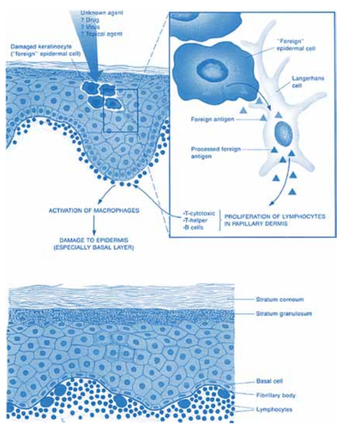
For this study the following LP cases were used: LP pemphigoides (7), hypertrophic LP (3), and follicular (2). Skin biopsies were processed conventionally and examined in a JEOL 1011 transmission electron microscope. MMP-9 expression was detected immunohistochemically.
The levels of gelatinase expression were distinguished semiquantitatively.

RESULTS

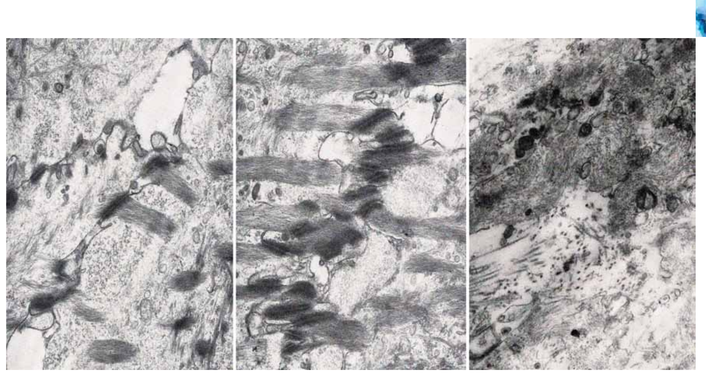
LP pemphigoides demonstrated intact basal keratinocyte cell membrane, and the lamina densa lining blister cavity correlating with moderate basal MMP-9 expression of weak intensity. Hypertrophic type demonstrated good preservation of keratinocytes and their junctions along with strong basal and suprabasal MMP-9 expression of moderate intensity. Both types demonstrated diffuse and strong MMP-9 immunostaining in dermal lymphohistiocytic infiltrate. A hypertrophic type revealed an increase of expression within dermal sweat glands comparing with LP pemphigoides. A diffuse and strong epidermal and follicular MMP-9 staining was noticed in the follicular variant of LP.

CONCLUSIONS

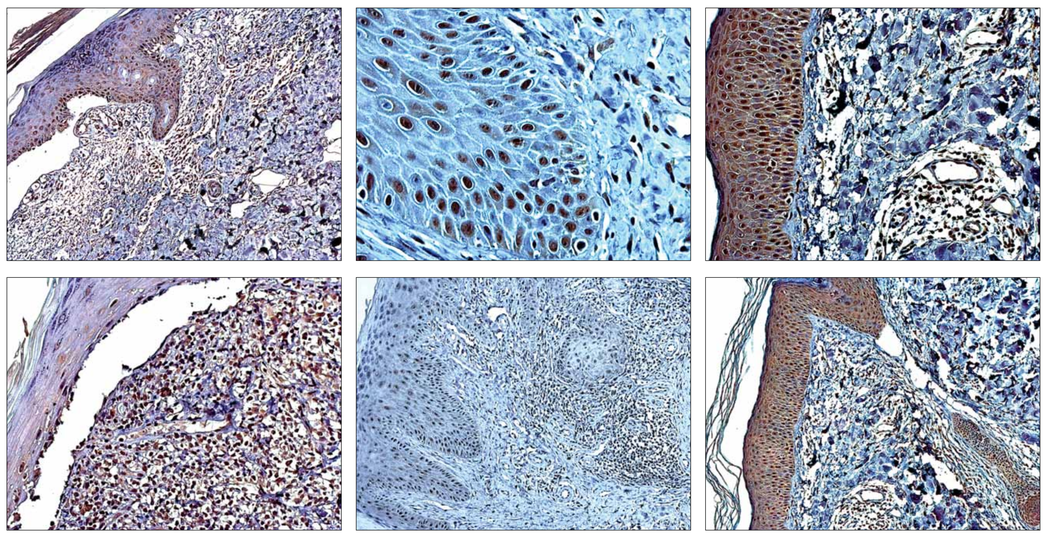
Our findings suggest that action of MMP-9 is directed toward epidermal/dermal interface, and cells of inflammatory infiltrates localized subepidermally keep a strong action potential regarding remodeling of extracellular matrix and basement membrane components. It evidences that inflammatory cells are constant producers of MMP-9 in LP. Lowering of MMP-9 expression in the case of LP pemphigoides can be explained by severe damage of the keratinocytes within the stratum malpighii due to bulla formation, still the inflammatory infiltrate appeared to be heavily stained. EM revealed multiplication, irregular folding or dislocation of the basal lamina, fragmentation with degenerative changes of basal keratinocytes. Tonofilaments in the basal and spinosal keratinocytes are increased, desmosomes are preserved. The above mentioned changes correlate with the levels of expression and distribution of gelatinolytic activity characterized by MMP-9 immunohistochemistry.



Outlines of pathogenetic events, modified from *Rubin's Pathology: Clinicopathologic Foundations of Medicine*



LP: Electron micrographs demonstrating str. spinosum keratinocytes with preserved desmosomes and irregularly dilated intercellular spaces; the upper dermis revealing cellular fragments, organelles, and collagen.



Mild epidermal and strong expression of MMP-9 in inflammatory infiltrate demonstrated in LP pemphigoides, original magnification x 100 and 200.

Expression of MMP-9 in hypertrophic LP appearing through malpighii layer, dermal infiltrates, vascular beds, and sweat glands; original magnification x 400 and 100.

Epidermis and hair follicles appearing to be heavily decorated with the anti- MMP-9 antibody in the follicular variant of LP, original magnification x 200 and 100.

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Expression of MMP-9 in various clinical types of cutaneous LP and LS.

Disease / Skin structure	Horny layer	Granular layer	Spinous layer	Basal layer	Infiltrate	Hair follicle	Sebaceous gland	Blood capillaries	Sweat gland
Hypertrophic lichen planus	0/+	0	+ +/ + + +	+ +/ + + +	+ + +	+ + +	0	+ +	+ + +
Follicular lichen planus	0	0	+ +/ + + +	+ +/ + + +	+ + +	+ + +	0	+	+ + +
Lichen planus pemphigoides	0	0	0/+	+	+ + +	+ +	0	0/+	+ / + +

Poster was supported by ERDF Project "Promotion of international cooperation activities of Riga Stradins University in Science and Technologies", agreement No. 2010/0200/2DP/2.1.1.2.0/10/APIA/VIAA/006