THE SIGNIFICANCE OF THE EPIDERMAL SWEAT DUCT UNIT IN
THE GENESIS OF PUSTULAR PSORIASIS (ZUMBUSCH) AND THE
MICROABSCESS OF MUNRO-SABOURAUD

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Abstract. Serial sections were made from material derived
from 3 patients with pustular psoriasis and from 5 patients
with psoriasis vulgaris. The former were examined by light
microscopy and fluorescence microscopy and the latter by
light microscopy alone. In all sections the spongiform pus­
tules and the microabscesses of Munro-Sabouraud were
found to be situated at the acrosyringium. The cells support­
ing the lining membrane of the sweat duct were found to be
involved in the spongiform process. The view is expressed
that this causes the sweat duct to collapse, the wedge-shaped
or crescent-shaped pustules being thus formed.

A quantitative relationship between pustular psori­
asis (p.ps.) and the microabscess of Munro-Sabour­
aud has been assumed for quite some time (7, 8, 9)
and careful studies of these lesions have confirmed
this assumption (1, 2, 3, 4). The general opinion is,
that the migration of leucocytes through the epi­
dermis is involved in the epidermal destruction in
p.ps. Pinkus (12) assumed that the papillary capil­
lary temporarily squirt serum and leucocytes into
the epidermis and then returns to normal, and that
this rhythmic activity of the affected papillae elicits the
dermal action in psoriasis. He emphasized, however,
that "the possibility remains that some abnormal­
ity in the epidermis elicits the dermal action". This
latter remark appears to be of importance in the
light of the observations made by Rupec (13) in an
ultramicroscopic study of p.ps. He expressed the
view that cytolysis of the epidermal cells liberates
chemotactic agents, thus provoking invasion of the
affected epidermal region by leucocytes and com­
pleting the picture of the spongiform pustule. This
interpretation of the sequence of events involved in
the origin of p.ps. conflicts diametrically with the
generally accepted view that p.ps. represents an
advanced exudative stage of psoriasis vulgaris. It is
interesting to note that cytolysis of epidermal cells
has been reported to occur in psoriasis vulgaris.
The view has been expressed that cytolysis gives rise

1 This work was presented at the meeting of the National
Medical Assembly on December 2, 1972, in Stockholm.

MATERIAL AND METHODS

Three typical cases of p.ps. type Zumbusch and 5 cases of
psoriasis vulgaris were investigated. Under local anaesthesia
with a 1% xylocain solution a single isolated pustule from
each p.ps. patient was excised and divided into two equal
parts. One part was fixed in a 10 % formaldehyde solution, cut into serial sections and stained
with haematoxylin-eosin. The other part, fixed in the same
solution, was immersed in Michaelis's buffer solution (pH
6.5) for 5 minutes, stained 5 minutes with a 0.01 % solution
of acridine orange at pH 6.5 and finally rinsed in the buffer
solution. Thereafter it was passed quickly through a 98 %
solution of alcohol and was immersed in xylol for 2 hours.
Lastly it was mounted in Eukitt, a non-fluorescent medium,
and cut into serial sections. With this staining method the
cytoplasm of normal epidermal cells takes on a brilliant
orange-yellow fluorescence owing to the presence of RNA.
Horny structures show an indirect fluorescence due to the
The presence of metachromatic substances. In the upper stratum corneum the loose horny material fluoresces an orange-yellow; the dense horny material in the lower stratum corneum takes on a green fluorescence. Acantholytic and dyskeratotic cells have been reported to take on a green fluorescence (5, 6, 11, 15, 16). Serial sections were made to investigate whether there was a morphologic relationship between the spongiform pustule and the epidermal sweat duct.

The slides were examined by both light and fluorescence microscopy. The fluorescence microscope was of the type Ortoplan, the light source being an HBO mercury-lamp. A fluorescent illuminator devised by Ploen was employed using the filters 2 mm UG11 4 mm, BG 38 and S 470.

In order to investigate whether there was a similar morphologic relationship between the epidermal sweat duct and the microabcesses in psoriasis vulgaris, five serial sections of the material derived from the psoriatic patients were stained with haematoxylin-eosin and examined with a conventional light microscope.

**RESULTS**

Frequent histological features were wedge-shaped pustules (Figs. 1-4). The base of the pustule was made up of the horny layer and the vertex projected into the epidermis. A keratin-like membrane (hyaline cuticle) was often seen between the pustule and the adjacent epidermis (Figs. 2, 3). Like the horny layer, this membrane took on a yellow or green fluorescence (Fig. 2). The epidermis in the vicinity of the membrane showed a spongiform disintegration (Figs. 2, 3, 4). Fig. 1 shows a transverse section of a part of the epidermal sweat duct situated at the vertex of the wedge-shaped pustule. Its lumen is completely obstructed by keratinous material. All spongiform pustules were seen to be situated around a duct, as is illustrated by Figs. 1, 5, 6, and 8. In a...
large pustule three crescent-shaped fibrillar keratin formations were seen which appeared to be remnants of small pustule walls which had been fused together in the formation of the large pustule (Fig. 2). Figs. 2 and 7 show various levels of the sweat duct extending to the centre of the pustule.

Filamentous material of varying thickness, amorphous material and remnants of cells lacking nuclei took on a green fluorescence intermingled with yellow (Fig. 2). The microabscesses were seen to be situated at the orifice of the sweat duct in all excisions. Figs. 9, 10, 11 show microabscesses in three
of them. In one instance 92 sections were required to detect a microabscess and this was situated at the orifice of the sweat duct. Mild spongiosis and exocytosis of the epidermis adjacent to the microabscesses were frequent findings (Fig. 10).

DISCUSSION

The findings in the present investigation confirmed the existence of a pathogenetic relationship between the spongiform pustule and the epidermal sweat duct unit. The explanation of the wedge-shaped or crescent-shaped pustule is that the cells supporting the lining membrane of the sweat duct undergo a degenerative process, thereby becoming detached from each other. As a result, the epidermal sweat duct collapses, a pattern resembling that seen in pustular miliaria being thus formed. The difference between pustular miliaria and the spongiform pustule is that the eliciting factor in the former has been shown to be the obstruction of the horny portion of the sweat duct whereas no such changes have been observed in p.ps. Figs. 3 and 4 show the biphasic structure of the pustule, the part below the cuticle being the spongiotic one, the part above the cuticle containing a collection of leucocytes, keratinous material and cell debris.

Acantholytic cells stained with acridine orange have been reported to show a green fluorescence (5, 6, 11). Isolated cells, cell debris and filamentous

Fig. 6. A spongiform pustule is seen around a disintegrated intra-epidermal part of the sweat duct.

Fig. 7. The epidermal part of the sweat duct (arrow) in the centre of the large pustule which is shown in Fig. 2. The spongiotic part of the pustule is situated adjacent to it (two arrows).
Fig. 8. A tiny spongiform pustule situated at the orifice and the partly disintegrated intra-epidermal part of the sweat duct (arrow).

Fig. 9. A microabscess situated at the orifice of the sweat duct (arrow).

Fig. 10. A microabscess situated at the orifice of the sweat duct (arrow) and mild spongiosis and exocytosis adjacent to the latter (two arrows).

*Acta Dermato-Venereologica (Stockholm)* 54.
material taking on a green or yellow fluorescence were found in all sections of material from p.ps. As a green or yellow fluorescence is typical of horny material this finding indicates that a dyskeratosis-like process also occurred in the spongiform pustule. This assumption accords with the findings of Rupec (13). The abrupt transition of the spongiform pustule into the surrounding epidermis showing no exudative changes (Figs. 1, 2) argues against the view that an exudative process elicits the formation of the pustules in p.ps.

In agreement with Rupec (13) we believe that a metabolic disturbance in the epidermis is the primary eliciting factor in p.ps., the exudative changes, including the migration of leucocytes being a secondary phenomenon. This also holds good for the formation of microabscesses which reflect a quantitatively minor process.

ACKNOWLEDGEMENTS
We thank Associate Professor J. Wasserman and Dr Lars A. Linder, Stockholms Microbiological Institute, for advice and technical assistance during the fluorescence photography. This study was supported by a grant from the Swedish Psoriasis Union and the Edvard Welander Foundation, Stockholm.

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Received April 10, 1973
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Acta Dermatovener (Stockholm) 54