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Scanning Electron Microscopy of Scales from Pityriasis Amiantacea

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The scanning electron microscope has been used to examine scales taken from the scalp of 3 patients with pityriasis amiantacea alone, 3 psoriatic patients with pityriasis amiantacea and one patient with both atopic dermatitis and pityriasis amiantacea. Samples from 2 patients were additionally studied by different fixation techniques and in the frozen hydrated state, but no cementing of the scales could be observed. There was no evidence of an infective agent.

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The aetiology of pityriasis amiantacea (PA) is obscure; the clinical features may be seen alone or in patients with psoriasis, seborrhoeic dermatitis and lichen planus (1). In this study, scales were examined by the scanning electron microscope using a variety of preparative techniques to see if any cementing substance could be visualized.

PATIENTS AND METHODS

Samples of scalp scale were collected from patients who presented as out-patients with the characteristic appearance of PA, see Table I. The samples were taken from the centre of patches by clipping the hair close to the scalp under the adherent scales. Initial fixation was in buffered 10% formalin, then after washing in distilled water the samples post-fixed in 1% (w/v) osmium tetroxide for several hours. After washing the samples were dehydrated through a graded series of ethanol solutions before critical point drying in carbon dioxide. The samples were mounted on aluminium stubs with colloidal silver adhesive, sputter-coated with 20 nm platinum and examined in a Jeol JSM-35CF scanning electron microscope operating at 10 kV.

In addition, samples from 2 patients (nos. 6 and 7) were processed by either omission of the formalin fixation in the process detailed above or cryofixation as described by Jones & McHardy (2).

RESULTS

The electron microscopy findings in the three groups of patients with PA showed marked similarities. All showed overlapping scales which were adherent to the hair encasing them like a sheath (Fig. 1). Parakeratosis was evident (Fig. 2). No cementing substance was apparent between the scales after standard chemical fixation (Fig. 3). Frozen hydrated specimens (Fig. 4) had a similar appearance to chemically fixed samples (Figs. 1–3).

Table I.

Patient no.	Diagnosis	Age	Sex
1	PA only	6	M
2	PA only	8	m
3	PA only	31	F
4	PA and psoriasis	14	M
5	PA and psoriasis	14	F
6	PA and psoriasis	19	F
7	PA and atopic dermatitis	18 months	F

DISCUSSION

The diagnosis of PA is clinical. Alibert is credited with the initial description (3). As part of a detailed study of 71 patients, Knight biopsied 18 patients and summarized the histological features as spongiosis, parakeratosis and variable acanthosis (4). The inflammatory infiltrate was lymphocytic.

A predisposition to PA in patients with psoriasis has been claimed (5) but not substantiated in another series (6) which had a greater proportion of patients with seborrhoea.

For many decades the patchy nature of the condition has prompted a search for an infective aetiology but although yeasts have been demonstrated (7) and cultured (8) no specific pathogen has been identified (4). In this study, the first to use scanning electron microscopy of this condition, no infective agent has been demonstrated. The material studied was hair and scale taken from within the plaques. Therefore, despite the fact that the scanning electron microscope only reveals features on the surface of the sample examined, because the samples came from within larger plaques our investigations were visualizing areas deep within the overall accumulation of scales. Once it was apparent that no cementing substance was visible between the scales processed by standard fixation, two alternatives were used to assess whether the preparation method had removed material. Scales were placed directly into the lipid fixative osmium tetroxide to assess if any lipid had been removed in the formaldehyde step. The cryofixation method retains water-soluble material and this was used to

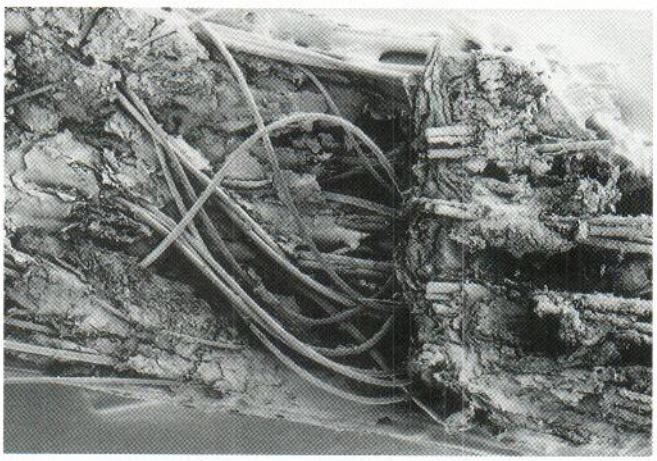

Fig. 1. Entangled hairs ensheathed by scales from patient no. 5. Specimen prepared by standard fixation method. Magnification ×11.

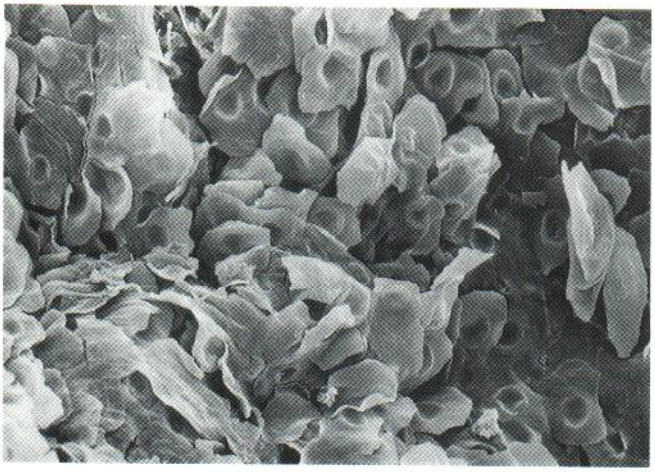

Fig. 2. Marked parakeratosis in scales from patient no. 4. Specimen prepared by standard fixation method. Magnification ×280.

assess if any water-soluble material had been removed before the formaldehyde had time to take effect. There were no significant differences in the appearance of the scales whichever of our preparative methods was employed. In this study we could find no morphological evidence for an intercellular cementing substance causing accretion in these cells.

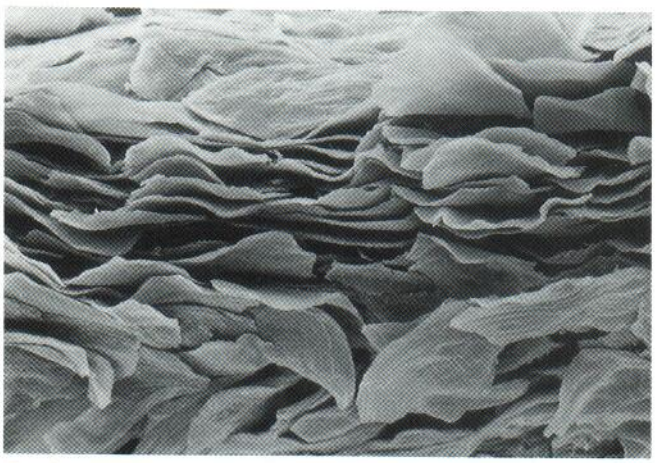

Fig. 3. Preparation from patient no. 2 showing layers of scales but no evidence of cementing substances. Specimen prepared by standard fixation method. Magnification ×650.

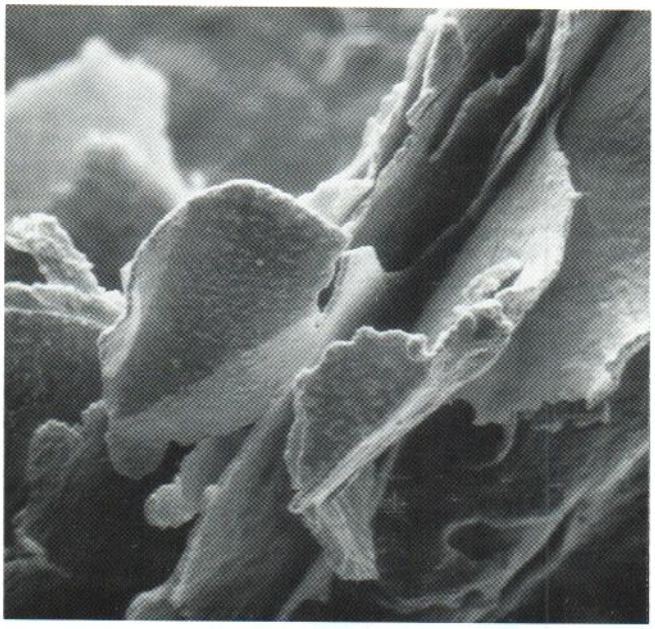

Fig. 4. Scales from patient no. 6 prepared by cryofixation technique. No evidence of cementing substance was visible. Magnification ×900.

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