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Variations of *Pityrosporum Orbiculare* in Middle-aged and Elderly Individuals

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Bergbrant I-M, Faergemann J. Variations of *Pityrosporum orbiculare* in middle-aged and elderly individuals. *Acta Derm Venereol* (Stockh) 1988; 68: 537-540.

Pityrosporum orbiculare was cultured from clinically normal skin in 60 adults, 30 to 80 years of age. Antibody titers against *P. orbiculare* in serum and lipid measurements were also estimated. There was a parallel between a reduction in number of cultured organisms and an increase in age ($p=0.002$, multiple linear regression analysis). The lipid content of the skin in older people was lower than that in young and middle aged ($p=0.0002$). This may be an explanation for the decrease in number of *P. orbiculare* on the skin in elderly individuals. Antibody titres decreased significantly as age increased ($p=0.02$). One explanation may be a reduced stimulation of the immune system due to a drop in the number of organisms. *Key words:* Age variations; Cultures; Antibodies; Lipid content. (Received April 5, 1988.)

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The lipophilic yeast *Pityrosporum orbiculare* is not only a member of the normal human cutaneous flora (1-3), but also the etiological agent of pityriasis versicolor (4) and *Pityrosporum folliculitis* (5). There are also many studies indicating an association between *P. orbiculare* and seborrheic dermatitis (6). The genus *Pityrosporum* includes the lipophilic yeast *P. orbiculare (ovale)* and the non-lipophilic member *P. pachydermatis*. Earlier, *P. orbiculare* and *P. ovale* were thought to be two different species, but there are now several reports in favour of their being identical (1, 7, 8) and that the oval and round forms simply represent different stages in a cell cycle.

P. orbiculare is rare in normal skin of infants and small children, but increase after puberty (9). The colonization probably starts during the period when the sebaceous glands become active. With quantitative cultures of *P. orbiculare* variations in number of organisms between various skin locations have been described (10); the highest density was on the chest. Patients with pityriasis versicolor had even on normal-looking skin a higher number of organisms (11).

Serum antibody titres against *P. orbiculare* are significantly higher in adults than in children (12). One study found higher titres in patients with pityriasis versicolor than in controls (13), but the reverse was found in another study (12).

It was described earlier (14) that the lipid secretion is approximately the same in men and women until the age of 50. Thereafter the sebaceous secretion remains high in men, whereas the values for women decrease (14).

Quantitative cultures for *P. orbiculare* or antibody titres against the organism have never been studied in older people. The aim of the present investigation was to study these

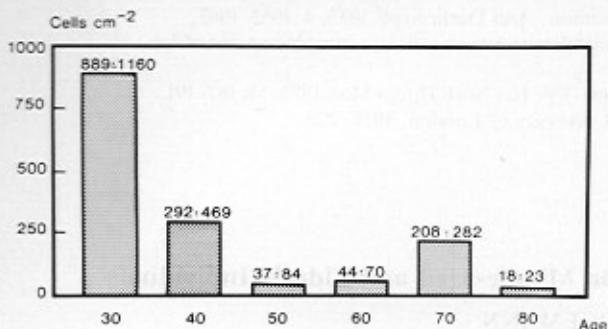


Fig. 1. Numbers of cultured *Pityrosporum orbiculare* cells in various age groups (mean number \pm SD).

parameters in middle-aged and older individuals and to see if any correlation was present between the number of *P. orbiculare* and the amount of lipids on the skin.

MATERIAL AND METHODS

Characteristics of subjects

Sixty volunteers, 40 females and 20 males, distributed in the following six age groups were studied: 29–31, 39–41, 49–51, 59–61, 69–71 and 79–81 years. The volunteers were either healthy staff members, students or patients with basalioma, actinic keratosis or small leg ulcers. They were not permitted to use soap or topical treatment for 24 h before sampling was done. Serum samples were taken from 57 of the individuals. Lipid measurements assay were randomly taken in half of the subjects from each of the groups.

Quantitative culture of *P. orbiculare*

The technique for quantitative cultures was described in detail earlier (11). Samples were collected from the chest using a stainless steel ring, a glass rod and 0.075 M phosphate buffer, pH 7.9, containing 0.1% Triton X-100 (1 ml). Samples (0.1 ml) from three washes were inoculated on to a glucose–neopeptone–yeast extract agar medium containing olive oil (2%), Tween 80 (0.2%) and glycerol monostearate (2.5 g l^{-1}). Plates were incubated at 37°C and examined after 10 days. The chest was chosen as sampling site because the highest number of organisms earlier has been found on this skin area (10).

Indirect immunofluorescence technique on sera

Antibodies against *P. orbiculare* were estimated as earlier described (8) using fluorescein isothiocyanate (FITC)-labelled antihuman IgG (DAKO, Copenhagen, Denmark, lot 034, F202). *P. orbiculare* ATCC 42132 cells were used as the antigen.

Lipid measurements

Measurement was done with Sebumeter SM 410 (Courage-Khazaka Electronic, Köln) (15–17). Briefly, samples were taken from the forehead skin of the volunteers using a plastic strip pressed firmly against the skin for 30 s. Immediately after the samples were taken, results were measured photometrically and expressed as $\mu\text{g cm}^{-2}$. Sebum measurements were taken from the forehead because it would be possible to correlate our data with earlier findings.

Statistics

The Newman-Keuls test was used to compare the results between the groups and multiple regression analysis to express the variations between age and the various parameters measured.

RESULTS

Quantitative cultures of *P. orbiculare*

There was a significant difference ($p < 0.05$, Newman-Keuls) between the mean number of *P. orbiculare* from the 30-year-old individuals and the 40–80-year-old individuals (Fig. 1). The number decreased significantly with increasing age ($p = 0.002$, multiple regression analysis).

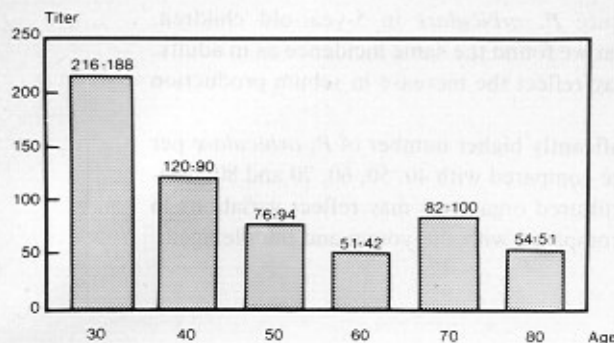


Fig. 2. Antibody titres in serum against *Pityrosporum orbiculare* in various age groups (titre \pm SD).

IIF-technique on sera

The mean antibody titres against *P. orbiculare* on sera from individuals of various age groups are shown in Fig. 2. The titres decreased with increasing age ($p=0.002$).

Lipid measurement

The amount of lipid on the forehead skin decreased after 40 years of age ($p=0.0002$) (Fig. 3). There were also significantly smaller amounts of lipid on the skin in men than in women ($p<0.0001$), but the number of men was low (6 men, 24 female).

DISCUSSION

Antibodies in serum against *P. orbiculare* have been found in patients with pityriasis versicolor and *Pityrosporum* folliculitis and in healthy individuals of various ages (12, 13). No variation in antibody titre was found between various strains or the round and oval forms of the organism (8). The antibody titre is probably correlated to the degree of colonization with *P. orbiculare*. In the present study we found significantly lower antibody titres in sera from the older subjects, who also had the lowest numbers of *P. orbiculare*.

The major skin surface lipid sources for *P. orbiculare* in the human skin are triglycerides and free fatty acids produced by the sebaceous glands and cholesterol and cholesterol esters from decomposition of keratinized cells (18). In our study, we found the same variation in lipid content in various ages as earlier described (14, 19). We measured the amount of lipid on the forehead 24 h after washing. This result reflects the total amount of lipid on the skin, which is probably of greater importance for the growth of *P. orbiculare* than is sebum production. Earlier studies have found a higher lipid content on the skin in men than in females after the menopause. We found a lower lipid content in men, but this may be due to the fact that our material included only 6 men compared with 24 women.

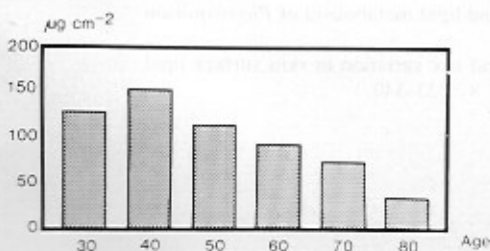


Fig. 3. Lipid content in various age groups.

In an earlier study we were able to culture *P. orbiculare* in 5-year-old children. However, it was first in 15-year-old children that we found the same incidence as in adults. This variation in incidence of *P. orbiculare* may reflect the increase in sebum production seen during prepuberty and puberty (9).

In the present investigation we found a significantly higher number of *P. orbiculare* per cm² on the skin in individuals of 30 years of age compared with 40, 50, 60, 70 and 80-year-old individuals. The variations in number of cultured organisms may reflect variations in the lipid content of the skin in older people, compared with the young and middle aged.

ACKNOWLEDGEMENTS

For skilful technical assistance we wish to thank Birthe Hellman. Part of this study was made possible by a grant from the Edward Welander Foundation.

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