

MICROBIOLOGY AND DERMATOLOGY*

WITH SPECIAL REFERENCE TO SOME OBSERVATIONS ON FUNGUS INFECTIONS IN THE CAPE

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Dermatologists have a particular interest in medical mycology—a branch of medical microbiology. It is a scientific discipline dealing with many of the problems confronting a dermatologist. Microbiology itself is a mosaic-like science with its roots in botany, zoology, physics and chemistry—briefly in all fields of natural science. The main object of microbiology is the development of prophylactic methods; diagnostic work in the eyes of a microbiologist represents only a step towards the development of preventive methods.

Up to the present time dermatology served to focus attention on fungi as pathogens of man, in spite of the fact that the so-called fungi sometimes were bacteria, as in the case of actinomyces, nocardia and erythrasma.

Microbiology developed pure-culture techniques by means of which the aetiology of fungus infections could be established convincingly. Medical training made it possible to integrate the mycological and the clinical aspects of fungus diseases.

Relationships between dermatology, microbiology and the natural sciences developed naturally through the years. The historical roots of mycology go back to 1677, when Hook

described filamentous organisms in the yellow patches of roses. The discoveries of Bassi in 1835 of the muscardine disease of silkworms and those made shortly afterwards by Remak, Schoenlein and Gruby of the fungus nature of favus and ringworm, are a source of satisfaction to all medical mycologists. Equally important are the investigations of Langenbeck, Berry, Gruby and Robin on candidiasis and the first description of a human-aspergillosis by Virchow in 1856. Virchow also introduced the term mycosis.

Following the historical line, we come to Raimond Sabouraud who studied the very common cutaneous mycoses in detail. Sabouraud's works are noteworthy for their excellent clinical descriptions and mycological observations, but his careful and fair evaluation of the contemporary literature is also of considerable value. The outstanding names in the history of any branch of science are not always those of the men who made the primary observations. Very often they only crystallized ideas which were nearing supersaturation. But Sabouraud gave due credit to earlier workers. In 1910 he codified both his own and their results in the monumental *Les Teignes*, one of the most comprehensive treatments ever given to a group of pathogenic fungi.

In the following decades clinical experience continued, but

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there was little evaluation of results, and the literature was scattered and difficult to interpret. The study of the mycoses became more and more difficult, and the taxonomy of the fungi of medical mycoses seemed to glide down in a bewildering chaos. The result was that this subject, which is intrinsically difficult, has been made repellent to the majority of medical workers. A marked aversion to the study of medical mycology was indeed frequent and persists to a certain extent even today. Many problems of nomenclature were discussed in the medical mycology section of the Fifth International Congress for Microbiology in Rio de Janeiro in 1950, and the conclusions were published in the *International Bulletin of Bacteriological Nomenclature and Taxonomy* in 1952. But even today the view is commonly held that medical mycology is a confused and somewhat esoteric subject. Our opinion is that the apparent confusion must in a large measure be attributed to the neglect into which this branch of medicine has fallen, and to the failure to appreciate the results of modern research. Mainly owing to the abuse of antibiotic treatment there has been an increase in fungus infections and consequently a new increase of interest in medical mycology, especially in the systemic fungus diseases by which the dermatomycoses themselves are overshadowed today.

Little information is available on the incidence of fungal diseases in South Africa. For this we cannot blame the few laboratories which are able to deal with fungus specimens. Long distances should not prevent posting of specimens, since the time spent in transit is not important but even favourable for the cultivation of fungi. To explain the inadequate scientific knowledge about the incidence of fungus infections in South Africa we have to look in other directions: (1) Cultures are made only in special instances, since the clinical appearances are generally sufficient to indicate the line of treatment, (2) the long time necessary for cultivation and identification pours cold water on the continuous interest of the practitioner, (3) inadequate facilities in the Native Reserves, (4) lack of epidemiological interest for dermatophytes, and (5) an insufficient number of medical mycologists.

Considering the increasing importance of fungus infections in the era of antibiotic treatment, it appears advisable to collect facts about the incidence of various mycoses in South Africa. Lurie, from the South African Institute for Medical Research, in 1955 published an article on 'Fungal diseases in South Africa'.¹ The figures given are based entirely on the specimens received at the Institute from a limited area. The relative frequency of the dermatophytes encountered on the Witwatersrand was: *Microsporum canis* 75%, *Trichophyton mentagrophytes* 8%, *Epidermophyton* 5%, *Trichophyton violaceum* 4%, *T. schoenleini* 4% and *T. rubrum* only 0.5% (just one case). The percentage was calculated from a total of 221 positive cultures. These figures do not indicate the total incidence of mycoses in South Africa. They probably only indicate the incidence on the Witwatersrand.

After my arrival in South Africa in March 1959, I was anxious to establish a small mycological unit in my department of medical microbiology at the Karl Bremer Hospital. In this respect I was encouraged by Dr. J. Marshall, head of the Department of Dermatology, who, with all his experience, should rightly be looked upon as a *pater familiae mycologicae*. We got further support from Professor Weber, head of the division of pathology, and finally Dr. Olivier, head of the Subdepartment of microbiology, UCT, a general mycologist, joined our team.

In the period January 1960-June 1961 we obtained a total of 232 positive fungus cultures out of 315 specimens, i.e. in two-thirds of the clinically suggested fungus-cases we were able to grow pathogenic fungi. For routine work we used two media: Sabouraud's and Littman's. We may be able to increase the number of positive results by adding further media to the routine set.

If we compare our results with Lurie's findings, we get a completely different picture. Lurie's dominant species was *M. canis*, followed by *T. mentagrophytes*. In our series *T. mentagrophytes* takes the first place, *T. violaceum* the second, followed by *Epidermophyton floccosum*, *T. schoenleini*, *Cladosporium werneckii* and *Microsporum canis*. There is a remarkable difference in the incidence of dermatophytes on the Witwatersrand as compared to the Western Cape. In

TABLE I. THE DISTRIBUTION OF DERMATOPHYTES IN THE TRANSVAAL AND WESTERN CAPE

Species	Percentage	
	Transvaal	W. Cape
<i>Microsporum</i>		
<i>canis</i>	75	5
other	3.5	3
<i>Epidermophyton</i>	5	15
<i>Trichophyton</i>		
<i>mentagrophytes</i>	8	31
<i>violaceum</i>	4	24
<i>schoenleini</i>	4	5
<i>cladosporium</i>	0	5
Other fungi	0.5	12
Total	100.0	100

general conditions are quite opposite. Fungi which are commonly found on the Witwatersrand occur seldom in the Cape. For instance:

M. canis 75% on the Witwatersrand but only 5% in the Cape. *T. mentagrophytes* 8% on the Witwatersrand but 31% in the Cape.

T. violaceum 4% on the Witwatersrand but 24% in the Cape. *Cladosporium* is not mentioned on the Witwatersrand but its incidence is 5% in the Western Cape. Only the incidences of *Microsporum gypseum* and *T. schoenleini* are about equal.

What is the reason for this striking difference? If we compare Lurie's results and our own with overseas findings, we immediately see the infrequency of *Microsporum audouinii* and *T. rubrum* in South Africa as compared with their incidence in European countries, for instance in Great Britain. *T. mentagrophytes* is well known as a cosmopolitan. *T. violaceum* occurs very seldom in Central and Northern Europe and has, up to the present, not been reported from Australia. It is one of the commonest fungus infections in the Mediterranean area. Reliable statistical material is available from Portugal, where Neves, from the University of Lissabon, and Da Fonseca (University of Porto) investigated more than 3,000 cases of dermatomycoses in 1960.² *T. violaceum* was by far the commonest fungus and *T. rubrum* was extremely uncommon. Levy-Lebhar and Herman, both from Casablanca, reported in 1959 from Morocco that 70-80% of *Tinea capitis* are caused by *T. violaceum* and 10-20% by *T. schoenleini*.³ My personal opinion is that climatic factors in the Mediterranean area are quite similar to ours in the Western Cape. This may explain the higher incidence of *T. violaceum* here, compared to the Witwatersrand. The solution of this problem may be a theme for the newly founded discipline of geomycology.

Götz, of Munich, thinks that there is a close relationship between *T. mentagrophytes* and *T. rubrum* in their epidemiological occurrence. Götz postulated that either one or the other is dominant, owing to intercurrent mutations.⁴

Lurie encountered neither *Piedra nigra*, nor *Tinea nigra* on the Witwatersrand. Our team described the first case of *Piedra nigra* in Africa,⁵ and 5% of our dermatophytes belong to the group of *Cladosporia*, mostly of the American type of *Cladosporium werneckii*. This may be of interest, since the world literature mentions only 14 cases of *Tinea nigra* for the whole period 1947-1957.

SUMMARY

After a survey of the historical development of mycology and the relationships of microbiology and dermatology, the incidence of various dermatomycoses in South Africa, based on a comparison of Lurie's findings on the Witwatersrand and our own experience in the Western Cape, is given. The results are summarized in Table I.

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