

RINGWORM IN GUINEA PIGS DUE TO *TRICHOPHYTON MENTAGROPHYTES*

By M. D. CONNOLE, B.Sc.*

SUMMARY

Ringworm infection due to *Trichophyton mentagrophytes* var. *granulosum* was recorded in a laboratory colony of guinea pigs. The organism was isolated from 11 samples of hair and skin scrapings but only three were positive on direct microscopic examination.

The source of infection is not known. Lesions on guinea pigs have occurred on several occasions since the establishment of the colony in 1958. No ringworm infection has occurred in persons handling the animals. The hygiene procedures used in this colony are described. Suggestions for eradicating the infection are discussed and the public health aspect mentioned.

I. INTRODUCTION

Infections in guinea pigs due to *T. mentagrophytes* have been reported in Argentina (Negroni 1932), Uruguay (Mackinnon 1949), Cuba (Fuentes and Aboulafia 1955), U.S.A. (Menges and Georg 1956), Germany (Koch and Rieth 1958; Kaffka and Rieth 1960), New Zealand (Manktelow and Russell 1960) and Australia (Mackerras 1953).

This paper records natural infections due to *T. mentagrophytes* var. *granulosum* in the guinea pig colony at the Animal Research Institute, Yeerongpilly.

II. CASE HISTORY

The guinea pig colony consists of breeding cages from which the young are taken at three weeks of age. They are then placed in either stock cages or pens. The bedding (wood shavings) is changed twice weekly. Water tins are washed out weekly with disinfectant solution ("Savlon" concentrate, I.C.I., diluted 1 in 32). All feed and water tins are changed monthly, sterilized and replaced. Cages and trays are changed monthly. The rooms are sprayed twice weekly with pyrethrum insecticide. The walls and floors of pens are washed down monthly with "Savlon" disinfectant solution and scrubbed. Cages are sterilized for 2½ to 3 hours at 149°C in an atmosphere of high humidity and dried.

* Bacteriologist, Animal Research Institute, Yeerongpilly. (Queensland Department of Agriculture and Stock)

The temperature of the rooms during winter months is maintained at 21°-24°C, and during summer months is at the ambient temperature.

Since the colony was established in 1958, lesions have been noticed on guinea pigs on several occasions. These lesions consisted of circumscribed, scaly, erythematous patches of alopecia which were most common on the nose, around the eyes and the ears, or other parts of the head, but occasionally on the back and hindquarters.

At first lesions were considered to be due to injuries caused by fighting or to faulty nutrition. The lesions occurred in animals of three weeks to two years of age. No treatment was attempted. Lesions disappeared spontaneously when the infection had run its course.

On June 15, 1960, skin and hair scrapings collected from a guinea pig with lesions on the head and around the eyes yielded a dermatophyte. Since then a further 14 cases have been cultured.

III. MYCOLOGY

Fifteen specimens of skin scrapings and hairs collected from around the edges of active lesions on 15 animals were examined. Four specimens were negative both microscopically and culturally.

On microscopic examination of the remaining 11 specimens after mounting in 25 per cent. potassium hydroxide solution, three were positive (Table 1). The infected hairs in the positive specimens were rare and thus were not easy to find and the infection was of the ectothrix type consisting of small spores (3-4 μ dia.) and some hyphae. None of the 15 samples was fluorescent under a Wood's lamp.

TABLE 1
MORPHOLOGICAL FEATURES ON CORN MEAL AGAR

Strain	Microscopic Examination	Macroconidia	Microconidia	Spiral Hyphae	Chlamydo spores	Nodular Bodies	Racquet Hyphae
1	—	—	+	—	—	+	—
2	—	—	+	+	—	—	—
3	+	+	+	+	—	—	—
4	—	—	+	+	—	—	—
5	—	+	+	+	—	—	+
6	—	+	+	+	+	—	—
7	—	+	+	+	—	—	—
8	+	—	+	+	—	—	+
9	—	+	+	+	—	—	—
10	—	+	+	+	—	—	—
11	+	+	+	+	—	—	—

Skin scrapings and hairs were cultured on a modified Sabouraud's dextrose agar containing chloramphenicol, cycloheximide and thiamine (Mycosel agar, Baltimore Biological Laboratory, Baltimore, Maryland, with added thiamine, 0.01 mg/ml). All media were incubated at 28°C. Colonies were fast-growing, flat, granular and grey. On the reverse side of the colony, pigment was yellowish to brown. On corn meal dextrose agar, pigmentation was consistently yellowish.

Table 1 gives the morphological features of strains on corn meal agar. Microconidia were abundant, usually round, occasionally pyriform, and grew in clusters or singly from the sides of hyphae. Macroconidia were long, multicelled (3-5), smooth, thin-walled and usually pencil-shaped. Eleven samples were positive culturally, including the three which were positive microscopically, from 15 animals. The isolates were all identified as *Trichophyton mentagrophytes* var. *granulosum*.

IV. DISCUSSION

On the basis of colonial morphology, Georg (1960, p. 17) divided *T. mentagrophytes* into three varieties. *T. mentagrophytes* var. *granulosum* was usually isolated from animal ringworm. When isolated from human ringworm an animal source of infection was suspected. *T. mentagrophytes* var. *quinckeanum* was sometimes seen in animal infections, particularly in mice epizootics. This type has been occasionally isolated from human ringworm where mice were the source of infection. *T. mentagrophytes* var. *interdigitale* was usually associated with chronic tinea pedis of man and only rarely has been isolated from lower animals.

The strains isolated in this investigation had the flat granular type colony of *T. mentagrophytes* which is usually isolated from animal ringworm. The isolation of *T. mentagrophytes* from 11 of 15 animals showing lesions is strong evidence that the lesions were caused by this dermatophyte, and were not due to fighting or to faulty nutrition. In some cases, however, lesions were aggravated by trauma.

The results indicated that microscopic examination alone was of little value in establishing a diagnosis. More intensive examination would have been desirable if microscopic examination was to be relied upon for diagnosis. Cultural techniques, because of the ease of isolation on a selective medium and of the ease of identification of this organism, would be the method of choice.

The strains produced abundant microconidia, numerous spiral hyphae and macroconidia in most cases, but chlamydospores, nodular bodies and racquet hyphae were rarely seen (Table 1).

T. mentagrophytes infections contracted from guinea pigs have been recorded in man on a number of occasions. Koch and Rieth (1958) reported associated human ringworm. Kaffka and Rieth (1960) reported ringworm in a technician who handled guinea pigs and rabbits. Manktelow and Russell (1960) isolated *T. mentagrophytes* from ringworm lesions on three out of four persons who handled laboratory guinea pigs. Morton (1960) reported seven cases of tinea corporis due to *T. mentagrophytes* contracted by laboratory workers who handled infected mice and guinea pigs. No person in contact with guinea pigs at this Institute is known to have contracted ringworm.

T. mentagrophytes is frequently found in human ringworm in this country (Morton 1960). Ridley, Wilson, and Harrington (1961) in a survey of dermatophytes in Queensland found that 16.4 per cent. of human infections were due to *T. mentagrophytes*. It is quite possible that infections may originate unknowingly from guinea pigs kept as pets or as laboratory animals. This fungus can be present on skin or hair without obvious ringworm lesions (Manktelow and Russell 1960). Arthrospores of *T. mentagrophytes* in skin scrapings may remain viable away from the host for 18 months (McPherson 1957). *T. mentagrophytes* has been isolated from the soil (Emmons 1951).

In our colony, transmission or infection could be maintained by the breeding sows, by other infected guinea pigs and by infected hairs and skin fragments. Contact with infected wild rodents is very unlikely.

The eradication of *T. mentagrophytes* infection in laboratory animals presents difficulties. Mass medication with griseofulvin could be attempted. Stock pens, cages, trays, feed tins, etc. would have to be thoroughly disinfected. Aerosol disinfection of the closed rooms would be desirable. An alternative to griseofulvin medication would be to discard the old stock and start a new colony with fresh young delivered by caesarean section. These procedures should afford some degree of protection against ringworm infection provided strict precautions are then taken to prevent the re-introduction of infection.

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