

## INHIBITORY EFFECTS OF CERTAIN COMPOUNDS ON MICROSPORON AUDOUINI

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Tinea capitis, or ringworm of the scalp, is a disease that has been present in our country for many years, although it was not until the last fifteen years that it reached epidemic proportions. Today it has become an increasingly important health problem in the public schools. This paper will deal with one species of ringworm, *Microsporon audouini*, the cause of over 80 percent of the cases among children. Much research has been done in an effort to find a cure for this disease, but, although there are many chemicals which show some promise, there is none which has given the desired result—complete cure in a short period of time. The present research was to test different compounds on the fungus, *in vitro*, to try to find a more promising treatment.

### PAST TREATMENTS

Among the compounds tried in the past were podophyllin resin, saturated fatty acids, salicylanilide, iodine, thymol, and asterol dyhydrochloride. These are a few of the more successful, but they, for various reasons, have been discarded. Some took too long to effect a cure and others cured the ringworm but had dangerous after-effects on the patient. Ringworm caused by *Microsporon audouini* seems to clear up

when the individual reaches puberty. This was deemed indicative of a connection with the sex hormones, so administration of certain hormones was tried but results were disappointing. This treatment tended to upset the body balance and had little or no effect on the fungus.

There is one treatment which holds promise in curing the most stubborn cases. This is the use of X-ray. It causes spontaneous epilation of the hair, and is impractical in the majority of cases because the cost is high and there are few technicians who are trained to administer X-rays safely.

### MATERIALS AND METHODS

A sample of *Microsporon audouini* was obtained from a child whose head showed the fluorescence characteristic of the fungus under a Wood's lamp filter. The sample was placed on a petri dish containing Sabouraud maltose agar. This medium is an excellent substrate for the propagation of molds, especially the parasitic fungi concerned with scalp lesions. The nitrogen-containing Neopeptone and maltose satisfy the nutritional requirements of *Microsporon audouini*. After about a week, growth was noticed. The spores germinated and gave rise to a rather

fine septate mycelium which became distended and developed chlamydospores. Later the mycelium developed pluri-septate spindle spores at their extremities. The colony appeared as a snow-white downy-looking mass. The center of the colony was elevated with radiating furrows extending out from it. As the colonies grew older, they darkened and produced a reddish-brown pigment which diffused into the medium. Under Wood's light the culture fluoresced with bright, clear green dots. From these characteristics, it was determined that the fungus involved was *Microsporon audouini*.

Various methods of inoculating new plates were tried, but the one found most satisfactory was to sterilize an inoculating needle and transfer a bit of the mold with spores to the new dish. Growth is more rapid and there is less chance for contamination if this method is followed.

A .75 cm. hole was cut in the center of each plate to be treated. The compound to be tested was placed in this hole, and the agar was inoculated in six places around the margin of the plate to insure even growth or inhibition of growth. The plates were incubated at room temperature for three to five days. At the end of this time the area of inhibition from the center of the plate was measured and recorded. Each test was run in duplicate.

The compounds chosen for testing purposes were ones which, according to available literature, had not been tried against this species. The first group tested were the antibiotics, chloromycetin, terramycin, and penicillin. The powder form of each of

these was dissolved in distilled water to the saturation point. The plates were inoculated and the compounds to be tested placed in the center of each plate. After five days growth, the mold had covered all of the plates, indicating that these antibiotics seemed to have little or no effect on this mold.

The next group of compounds tried included sodium chloride, copper sulfate, sodium carbonate, and ethyl alcohol. The plates were inoculated in a similar fashion. The only compound which showed any inhibitory effect was copper sulfate. The area of no growth measured 4.0 cm. in diameter.

A five percent dilution of phenol was tried on the fungus with fairly favorable results. There was a diameter five centimeters wide of inhibition. Dilutions of four percent, three percent, two percent, one percent, and .5 percent phenol were then tried to determine the effectiveness of smaller dilutions. The results of these smaller dilutions are as follows:

5.—5 cm.	2.—3.7 cm.
4.—4.7 cm.	1.—2.1 cm.
3.—4.2 cm.	.5—1.2 cm.

#### SUMMARY

In all, eight different compounds were tested against *Microsporon audouini*. Six of these—chloromycetin, terramycin, penicillin, sodium chloride, sodium bicarbonate, and ethyl alcohol were ineffective against the fungus. Copper sulfate was partially effective. Six dilutions of phenol ranging from 0.5 percent to 5 percent were tried and a definite relationship between strength of solu-

tion and inhibitory efficacy was noted. As dilution was increased effectiveness decreased.

Further research might include trying these chemicals in different bases to increase their effectiveness.

Higher percentages of phenol, perhaps up to ten percent could be tried. If a compound is found to be fungicidal it should then be tested on laboratory animals for possible damage of tissues.

#### REFERENCES

- BEHRMAN, HOWARD T., *The scalp in health and disease*: St. Louis, C. V. Mosby Co., 1952.
- DOUGHERTY, JOSEPH M. and LAMBERTI, ANTHONY J., *Textbook of bacteriology*: St. Louis, C. V. Mosby Co., 1950.
- DUBOS, RENE J., *Bacterial and mycotic infections of man*, Philadelphia, J. B. Lippincott, 1948.
- SAVILL, AGNES, *The hair and scalp*, Baltimore, Williams and Wilkins, 1952.