STUDIES OF AMOEBAE

OF THE GENUS *NAEGLERIA*

by

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SUMMARY

Primary amoebic meningoencephalitis (PAME) is a disease of man caused by the free-living amoebo-flagellate, Naegleria fowleri. This thesis is a study of the genus with particular reference to this species.

The growth requirements of the genus were studied, and it was found that the presence of other living cells was not essential. This was an area of controversy even though Cerva in 1969 and Fulton in 1970 had already achieved axenic culture of these organisms. The ability of Naegleria to grow on commonly isolated gram negative bacteria was not able to be used to distinguish between species.

A method for isolating Naegleria (Jamieson & Anderson, 1973) from water, soil and dust samples which is suitable for routine laboratory surveillance of swimming pools and water supplies in "risk" areas (i.e. areas in which cases of PAME have been reported) was developed. This method is now being used by two other public health laboratories. Nineteen strains of Naegleria and seven strains of Acanthamoeba pathogenic to mice were isolated using this technique. The pathogenic isolates of Naegleria were the first ever made from a probable source of infection of a case of PAME; in fact, they were the first pathogenic Naegleria to be isolated from the environment.

Ether vapour was shown to lyse trophozoites of Naegleria and is therefore considered to be unsuitable as an anesthetic for pathogenicity testing in mice. Efforts to infect mice with N. fowleri by the oral and ocular routes were unsuccessful.

An agglutination test (Anderson & Jamieson, 1972b) was developed as an aid in the classification of Naegleria. The use of this test revealed the existence of a diversity of serotypes within the genus.

The anti-fungal antibiotic clotrimazole was found to have significant activity against N. fowleri in vitro (Jamieson & Anderson, 1974) but it was unable to protect mice from infection, even though adequate serum levels were achieved (Jamieson, 1975).

As a result of the work involved in this study, the public water supplies to "risk" areas of South Australia have been more heavily chlorinated and no N. fowleri have been isolated since adequate levels of chlorine were established.

Three cases of PAME occurred during this study. In 1971 a 14 year old Aboriginal boy from Mount Morgan, Queensland was successfully treated with amphotericin B (Anderson & Jamieson, 1972a). In1972 a five year old boy and a seven year old girl, both from Port Augusta, died from PAME despite treatment with this drug. The diagnoses were confirmed here by isolation of N. fowleri from cerebrospinal fluid. Laboratory studies of the isolates were conducted by myself. These three cases are not reported in the body of the thesis because the course of the disease has already been adequately documented by Dr. R.F. Carter (1968).

DECLARATION

This thesis does not contain any material previously accepted for the award of any degree or diploma at any University. Nor to the best of my knowledge does it contain any material previously published or written by any other person without due acknowledgement.

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