TWO NEW STRAINS OF NAEGELRIA FOWLERI ISOLATED FROM
A CASE OF PRIMARY AMOEBOIC MENINGOENCEPHALITIS

Primary amoebic meningoencephalitis (PAME) is an acute fatal disease caused by
amphibous amoebae of the species Naegleria fowleri. One of the first strains isolated from
human clinical or autopsy material is the strain Vitok obtained by Čerová (Čerová L. et al., 1969;

The second strain was isolated from a case of
the same time, another strain of N. fowleri
was isolated from water samples taken from the
brook in which the patient had got the infec-
tion. The water was warmed by the cooling
system of a power station.

The characteristics of the two isolates cor-
respond with those of the strictly virulent
species N. fowleri. Both strains, i.e., that obtained
from the patient’s liquor intra vitam (50/84)
and that isolated from the water samples
(59/84) grow on artificial media at the tem-
peratures of 37°C and 43°C (Griffin J. L., 1972;
Science 178: 869—870) and under aerobic con-
ditions tolerate the presence of trimethoprim
(Čerová L., 1986; Science 290: 1,341). Their
morphology differs from that of the previously
described strains only in the larger variability
in the biometry (Table 1). Both isolates induce
100% mortality in experimental animals (Ta-
ble 2).

The results of biological experiments with lab-
oratory animals confirmed the specific deter-
mination of the isolates. In spite of the fact
that some modern methods are now used in the
systematics of protozoa, the test of pathogenicity
for experimental animals remains a decisive
criterion in the diagnostics of amoebae of the
genus Naegleria with complete (N. fowleri) or
partial (N. minutus) pathogenic abilities. N.
minutus, sub-species italica, which is highly
virulent like N. fowleri, can be used for dif-
ferential diagnosis; however, its temperature max-
imum is only 42°C and lethal dose per mouse
by one order higher (De Jonghe F. et al., 1984; J.
Protistol. 31: 324—331) than that used in our experiments.

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Table 1. Morphometrical comparison of the isolates with Vitok strain (in μm)

<table>
<thead>
<tr>
<th>Strain</th>
<th>Medium</th>
<th>length</th>
<th>width</th>
<th>Cysts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>min.</td>
<td>max.</td>
<td>mean</td>
</tr>
<tr>
<td>Vitok</td>
<td>BCS</td>
<td>15.0</td>
<td>23.6</td>
<td>23.74</td>
</tr>
<tr>
<td>50/84</td>
<td></td>
<td>15.0</td>
<td>29.0</td>
<td>21.32</td>
</tr>
<tr>
<td>59/84</td>
<td></td>
<td>15.0</td>
<td>33.0</td>
<td>24.35</td>
</tr>
</tbody>
</table>

Explanations: BCS — Bacto Casitone with 10% of rabbit serum. Always 25 specimens were measured.

Table 2. Pathogenic effect of the strains on laboratory mice

<table>
<thead>
<tr>
<th>Strain</th>
<th>No. of animals</th>
<th>Mortality</th>
<th>Infection dose of amoebae/ mouse</th>
<th>Mode of infection</th>
<th>Mean day of death (range)</th>
<th>% of positive findings of amoebae in mouse organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/84</td>
<td>8</td>
<td>100%</td>
<td>2 x 10⁶</td>
<td>intranasal</td>
<td>3.4 (3—6)</td>
<td>brain 100%</td>
</tr>
<tr>
<td>50/84</td>
<td>5</td>
<td>100%</td>
<td>3 x 10⁶</td>
<td>intracerebral</td>
<td>4.4 (3—6)</td>
<td>lungs 25%</td>
</tr>
</tbody>
</table>

* — 1 x not tested due to cannibalism.