Effect of Deferoxamine Mesylate on the Growth of Mucorales

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Dear Sir,

Opportunistic fungal infections, such as phycomyco-sis, occur with distressing frequency among patients exposed to modern cytotoxic and immunosuppressive treatments [1] or suffering from chronic diseases complicated mainly by acidosis (diabetes mellitus, renal insufficiency, etc.) [2]. Up to now, 13 reports have been published on maintenance of dialysis patients who developed severe or even fatal infections induced by the Mucorales [3–15]. Twelve of them discussed possible association of mucormycosis and deferoxamine (DFO) [4–15]. DFO has been suspected of acting as a siderophore for the Mucorales and potentiating their generally very low virulence [7–10].

Several reports [16–23] have dealt with the effects of DFO on the growth of various clinical isolates of both bacteria and fungi. However, no studies have been reported with respect to Phycomycetes; we, therefore, investigated, in vitro, the possibility that the two metals involved in dialysis – aluminum and/or iron – either alone or in combination, and with or without DFO, might influence the growth of various Mucorales.

The Mucorales used were strains stored at the Faculty of Engineering, Hiroshima University; they were not isolated from patients developing mucormycosis. The strains were cultured in a potato-agar medium at 37 °C for 10 days. For the culture we used Czapek-Dox agar without FeSO₄·7 H₂O sterilized by steam under pressure. FeSO₄·7 H₂O, Fe₂(SO₄)₃, Al₂(SO₄)₃ and/or DFO, sterilized by means of a 0.45-μm Millipore filter, were added to this agar to obtain the 12 different media used. A spore suspension (80 μl containing about 70,000 spores) of one of the respective strains was spotted onto each disc. After incubation for 16 h (for 40 h with *Absidia lichtheimi*, *Absidia ramosa*, and *Mucorpusillus*) at 37 °C, the diameter of the growth around the disc was measured with a zone reader.

In all Mucorales investigated (table 1) growth was not influenced under the specific conditions employed. All Mucorales grew well in media where both metals (Fe and Al) were absent, but no growth promotion was observed after addition of one or both metals. The presence or absence of DFO did not influence growth, either towards promotion or inhibition.

Based on our results, we do not consider DFO to

Table 1. Growth of the Mucorales in the different media

Media

Fungi

Absidia lichtheimi HUT 1027
Absidia ramosa HUT 1040
 +
Mucor hiemalis HUT 1131
 +
Mucor pusillus HUT 1185
 +
Rhizopus oryzae HUT 1226
 +
Rhizopus microsporus HUT 1257

The numbers represent diameters (in mm) of the cultures after 16 and 40 h, respectively. + = With DFO; – = without DFO.

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possess a direct growth-promoting action as a sidero-phore in the Mucorales strains investigated and presume that other causes and mechanisms must be sought for the pathogenicity of the Mucorales.

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