Resistance to surface active drugs of wild type strains and newly isolated mutants of Neurospora crassa.

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Abstract
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Resistance to surface active drugs of wild type strains and newly isolated mutants of *Neurospora crassa*.

Surfactant-resistant mutants of *Neurospora crassa* were isolated following UV irradiation of cot (C102, mating type a) by a single step selection. These surfactants were dequalinium chloride, cetyltrimethyl ammonium bromide and benzalkonium chloride. Three nuclear genes for surfactant resistance were identified. These genes are designated surfactant resistant - 1 (sar-1), sar-2, and sar-3.

Mutants of the three genes differed in their responses to the surfactants both in their growth characteristics and their resistance specificities. sar-1 and sar-3 are closely linked to mating type on linkage group I, whereas sar-2 is not yet located but segregates independently of sar-1 and sar-3. When transferred to plates containing Vogel's minimal medium supplemented with drugs, all of the resistant mutants show a lag phase of very slow non-adapted growth during which deformed hyphae and hyphal leakage occurs. Following this lag phase, fully adapted drug resistant growth is established. The morphology of the mutants on drug-supplemented medium indicates that changes in the cytoplasmic membrane might be necessary before the resistant phenotype develops.

Two laboratory wild type strains were also studied for resistance to these same surfactants. A gene located in linkage group I that confers resistance to some surface active drugs was found in the wild type Em A f. 1534 (obtained from B. R. Smith), but not in Em A f. 1535 (obtained from B. R. Smith); this gene was designated sar-1. In an attempt to determine the origin of the sar-1 allele, a number of antecedents of the wild type Em A f. 1534 were tested for resistance to the above mentioned surfactants. The sar-1 allele of Em A f. 1534 is closely linked to mating type (Table 1), which is clear when the pedigree is examined (Figure 1). The Emerson wild type (Em 5256 A), Abbott 4 (FGSC 1757) was almost certainly the source of this allele. The resistant pattern shown by the Lindgren wild type strain 25a (FGSC 353) and 1A (FGSC 354) are similar to that of the Emerson Em 5256 A strain. However, more studies are needed to be sure that these strains carry authentic sar-1 alleles. The sensitive sar-1 allele clearly originally came from Abbott 12a (FGSC 1758) strain.

**Table 1**

Random spore analysis of cross between drug resistant and drug sensitive wild types

<table>
<thead>
<tr>
<th>Cross</th>
<th>Progeny</th>
<th>Progeny</th>
<th>Ratios</th>
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<tr>
<td></td>
<td></td>
<td>CTAB</td>
<td>mt.</td>
<td>NO.</td>
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<tr>
<td>Em A f. 1535 X</td>
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<td>a 92</td>
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<td></td>
<td>77:101</td>
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<tr>
<td>Em A f. 1534</td>
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<td>73</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

- - Department of Agriculture and Biology, Nuclear Research Center, Tuwaitha, Baghdad, Iraq, and University of Aberdeen, Scotland.