

A taste of their own medicine: Demuris

Screening Actinomycetes for novel broad-spectrum antibiotics

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Introduction

One of the great healthcare issues of our time is the problem of antibiotic resistance. This is compounded by the lack of discovery of new antibiotics in the past 30 years.

Many currently used antibiotics are derived from bacteria, and a large number of them have come from bacteria in the phylum Actinomycetes (*Actinobacteria*) - see Fig. 1

My project therefore involved screening 75 bacterial strains from this phylum to try and identify novel broad spectrum antibiotics.

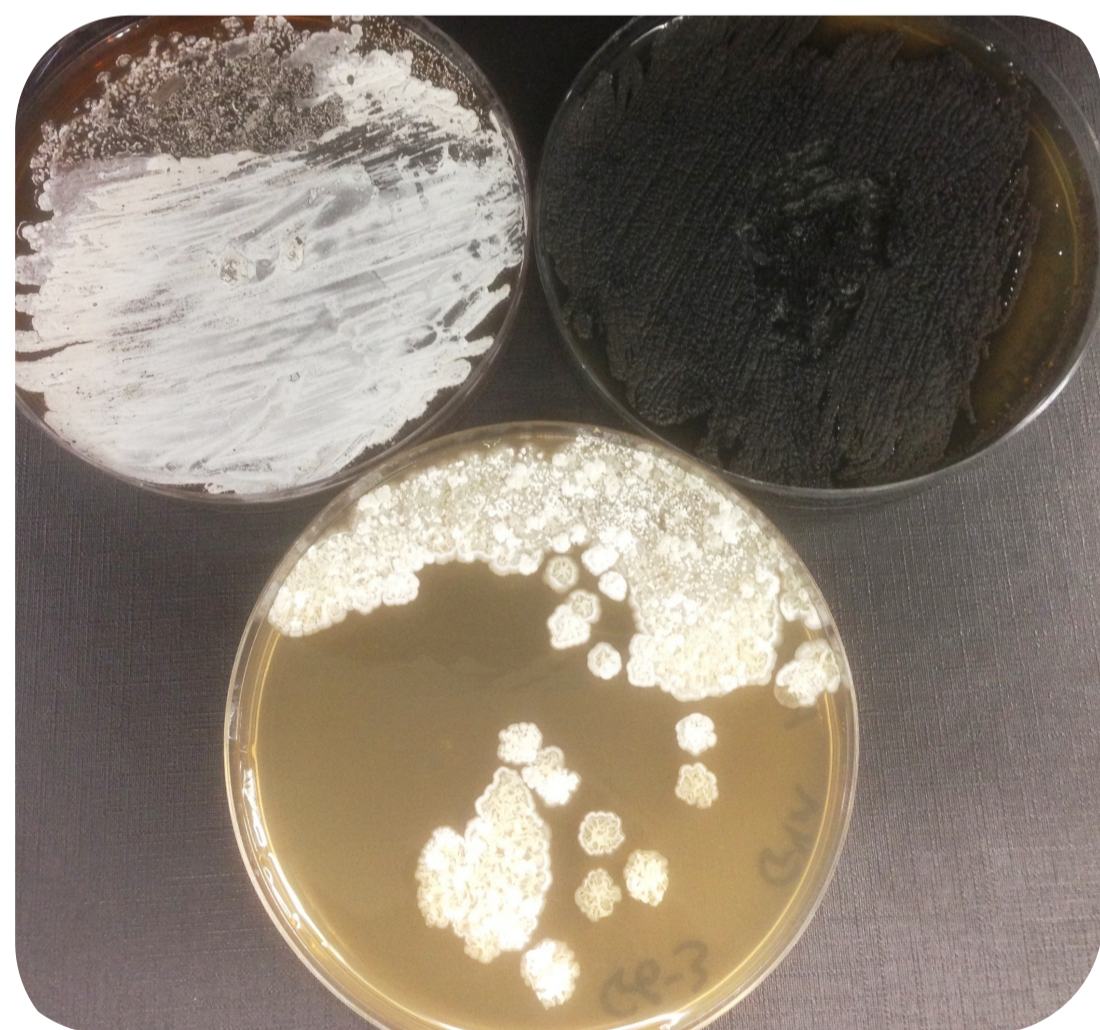


Fig. 1
 Three *Actinomycetes* growing on GYM agar to demonstrate the morphological diversity of the phylum

Aims

- Identify strains producing broad spectrum active compounds
- Isolate active compounds

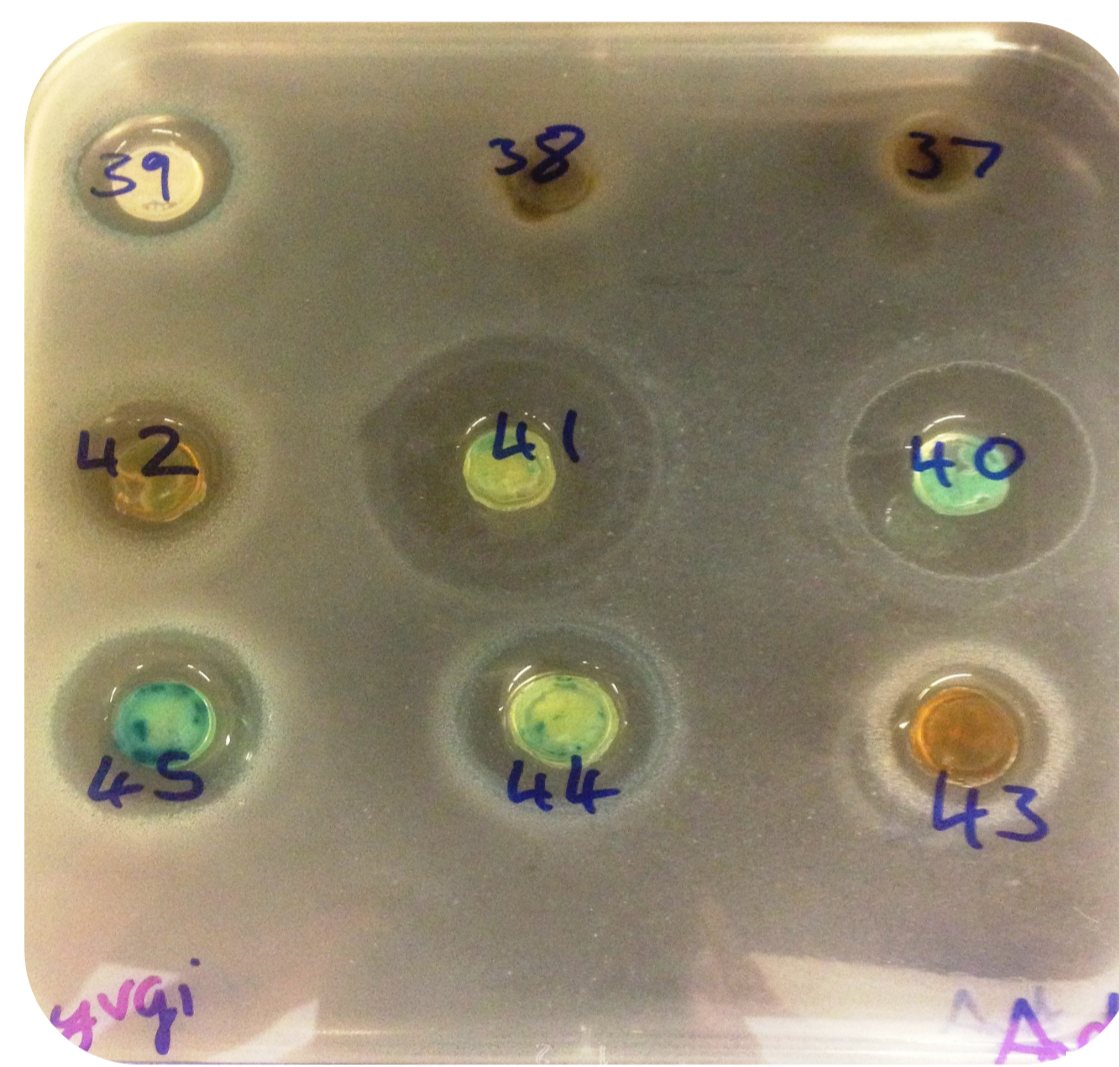


Fig. 2
 Initial plug test of strains against a *Bacillus subtilis* reporter strain. Zones of clearing indicate a positive result

Initial screening

After culturing the bacterial strains, plug tests were performed, which tested the ability of the strains to inhibit the growth of an *E.coli* reporter, a *B.subtilis* reporter and *S.pombe*.—see Fig. 2

Plugs that were active against the two bacteria but not *S.pombe* were carried on to the next stage. (*S.pombe* active strains could be toxic to humans)
 47 strains were carried forward

Active compound isolation

Positive plates were crushed and the residual water extracted. Methanol was added and then extracted after 24 hours. These extracts were then all tested against the *E.coli* and *B.subtilis* reporter strains—see Fig. 3

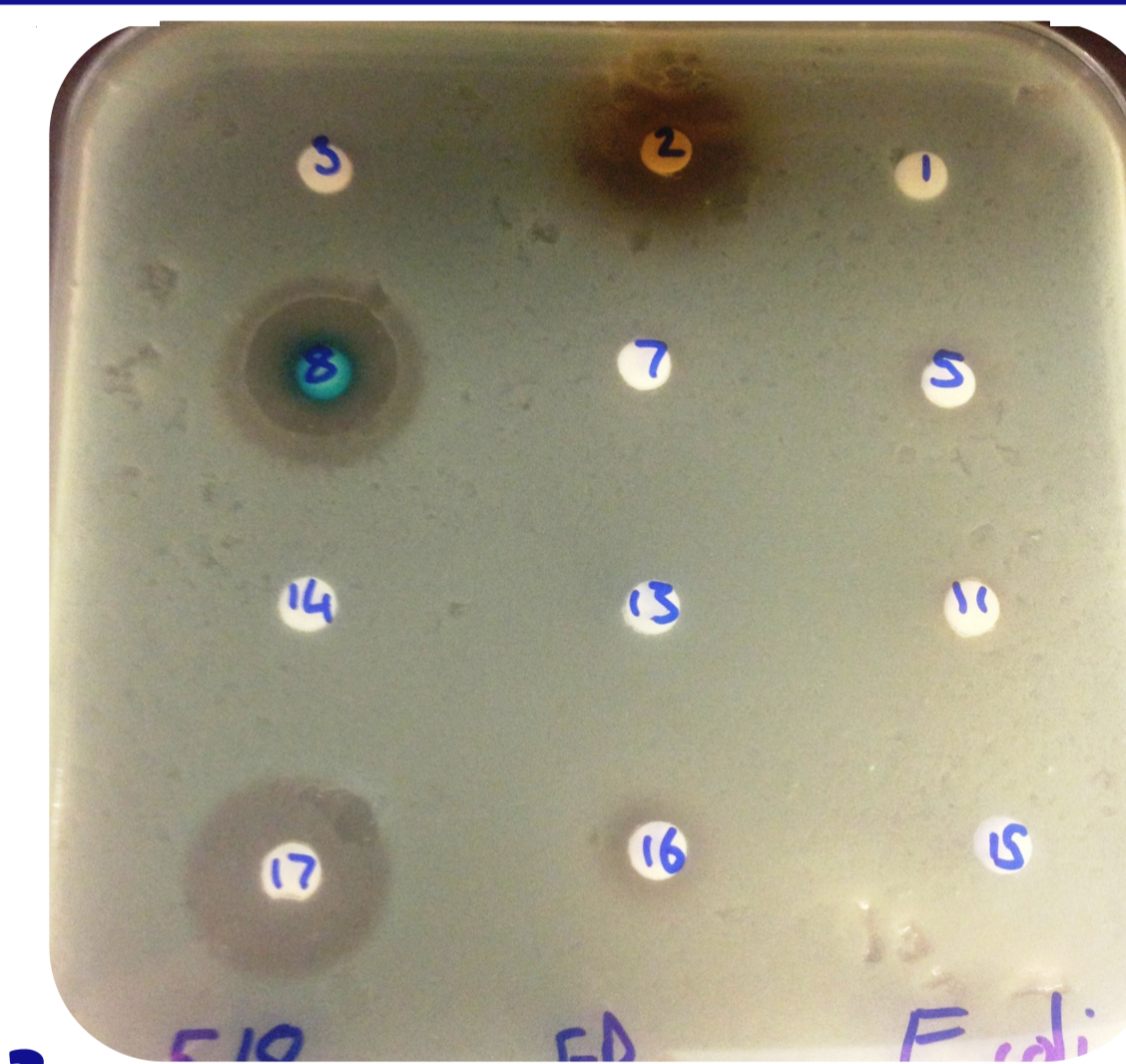


Fig. 3
 Water extracts were freeze dried to concentrate any compounds. The above plate shows three such extracts with activity against *E.coli*

Results and future work

4 freeze dried water extracts were active against both reporters, most of the other extracts were active against *B.subtilis* only. Future work would involve isolating active compounds further and more rigorous testing of anti-microbial activity and toxicity to humans.

Conclusion

- 47 strains producing broad spectrum active compounds
- 4 active compounds isolated

