IN BRIEF

TECHNIQUES & APPLICATIONS

Miniaturizing antifungal drug discovery

Nanoscale culturing of microbial cells is still largely underdeveloped, particularly in the diagnostics and drug discovery fields. A new study now reports the development of a microarray platform for the growth of 1,200 individual 30 nl *Candida albicans* biofilms in a chemically inert alginate matrix. These 'nano-biofilms' had morphological, architectural and growth characteristics that were similar to conventional macroscopic *C. albicans* biofilms. The tool was used for antifungal drug screening and allowed the rapid identification of three novel antifungal drug candidates. The platform is easily adaptable for the culture of other microorganisms and has the advantages of cutting down on time, cost and reagent use.

ORIGINAL RESEARCH PAPER Srinivasan, A. *et al.* High-throughput nano-biofilm microarray for antifungal drug discovery. *mBio* **4**, e00331-13 (2013)

ANTIMICROBIALS

ROS enables aminoglycoside entry but not lethality

It has been suggested that reactive oxygen species (ROS) are central to the bactericidal activity of antibiotics through the destabilization of Fe–S clusters, leading to excessive ROS production and subsequent cell death. This idea was based on the observation that *Escherichia coli* mutants lacking the major Fe–S cluster biogenesis system, ISC, are resistant to both the aminoglycoside gentamicin and the β-lactam ampicillin. A new study now shows that Fe–S clusters are required for killing by aminoglycosides only and that the mechanism involved is ROS independent. In contrast to cells using ISC, cells using the alternative Fe–S cluster biosynthesis machinery, SUF, had a defective proton motive force (PMF). Uptake of aminoglycosides is strongly dependent on a functional PMF. Thus, by switching to the use of SUF, entry of the antibiotic is impeded, and the cell survives. Accordingly, Fe–S cluster machineries have a central role in aminoglycoside killing, but this seems to be limited to their effect on antibiotic uptake, rather than the generation of ROS.

ORIGINAL RESEARCH PAPER Ezraty, B. *et al.* Fe-S cluster biosynthesis controls uptake of aminoglycosides in a ROS-less death pathway. *Science* **340**, 1583–1587 (2013)

BIOFILMS

eDNA directs traffic flow

Pseudomonas aeruginosa biofilms expand in interstitial spaces by twitching motility, forming an intricate network of interconnected trails along which cells preferentially migrate. However, the factors involved in coordinating such self-organizing behaviour were unknown. Here, Gloag *et al.* show that cells migrating outwards from the biofilm create furrows in the underlying substrate that guide following cells towards the leading edges of the biofilm. They also found that extracellular DNA (eDNA) is crucial for this behaviour; in the presence of DNaseI, formation of the network was inhibited, a significant proportion of cells became stationary, and those that retained motility lacked coordinated movements. Thus, eDNA facilitates efficient trafficking of cells and is particularly important for coordinating assembly of the advancing cell aggregates at the leading edges, which forge into neighbouring trails and generate a highly interconnected network.

ORIGINAL RESEARCH PAPER Gloag, E. S. *et al.* Self-organization of bacterial biofilms is facilitated by extracellular DNA. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1218898110 (2013)