

# How robots could solve the antibiotics production crisis

November 14 2017, by Eriko Takan

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A WHO report in February listed a worrying number of pathogens that threaten our health because there are fewer and fewer drugs that can treat the infections they cause. Indeed, since their 1960s heyday, the production of novel antibiotics has declined markedly and it's been 30 years since a major new class of antibiotics for clinical use has been discovered. There are even cases of resistance to Vancomycin, used by doctors as an antibiotic of last resort.

There are many reasons why the production of [antibiotics](#) has declined. Like all other drugs, they are expensive to develop, and the work required to find new viable compounds becomes more complex and time-consuming as time goes on. Between 80 and 90 per cent of antibiotics are derived from soil dwelling bacteria, actinomycetes. Until recently, scientists believed the possibilities of antibiotics production from many of these microbes were close to exhaustion.

But thanks to the huge technological advances in recent years, our team at the University of Manchester's Synthetic Biology Research Centre, SYNBIOCHEM, has been able to marry the strengths of [biology](#) with the power of engineering to find new ways to deal with this problem. Genome sequencing has provided new possibilities of finding potential antibiotic production pathways that are asleep in the genome of potentially every bacterium. Using synthetic biology we are able to rewrite the DNA sequences of the antibiotic biosynthesis pathways and introduce different enzymes for other organisms and then express the result in a given host. Actinomycetes, E. coli, and even yeast can have a

part to play in this process and our analysis has shown that using this route, there are many potential pathways to make new compounds.

The problem is, manipulating the biosynthesis pathways and the host takes much time and effort. That is why robotics is so exciting as it allows us to carry out this type of research – which involves large volumes of repetitive tasks. While a single person can make and test ten compounds in, say, a year, a robot can make thousands. Thanks to our pioneering technologies, we believe that at the Manchester Synthetic Biology Research Centre, SYNBIOCHEM, there is a strong chance we will be in a position to trial new antibiotics created from synthetic biology in the near future. Our work with the Alderley Park Antimicrobial Resistance Centre,- a joint private-public initiative to support and accelerate the development of new antibiotics, is an incredibly important part of the mix, so these drugs can be brought to market quickly.

Provided by University of Manchester

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