

SOFTWARE SPEEDS UP SEARCH FOR NEW ANTIBIOTICS

WUR researcher Marnix Medema and colleagues have developed software that hugely speeds up the search for new antibiotics by screening the genes of thousands of bacteria in one go.

Antibiotic resistance is increasing worldwide. At the same time, it is taking longer to find new antibiotics. 'The low-hanging fruit has already been plucked,' says Bioinformatics researcher Marnix Medema. Most antibiotics are based on substances that bacteria and fungi produce naturally to protect themselves, mainly from other microorganisms. While many antibiotics have already been discovered, they only make up a small proportion of all the potential substances. For the DNA of bacteria shows that they are capable of producing many substances that are as yet unknown. But finding the most valuable substances is like looking for a needle in a haystack: until

recently, researchers could only discover new antibiotics by testing bacteria one by one in the lab.

Now Medema and his Mexican and American colleagues have developed software that goes through that haystack at lightning speed. The software, called BiG-SCAPE and

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CORASON, automates the process of genome mining. First the DNA is determined for various bacteria and entered into the computer. Then the software searches for gene clusters that are known to be involved in the production of antibiotics. It compares

the clusters with one another and groups them so that they can be searched effectively to find new genes with the potential to make antibiotics. Medema: 'The software shows at a glance which bacteria and genes have the potential to produce as yet undiscovered molecules.'

'In the past, such computer analyses could only be performed on the genes of one individual bacterium,' says Medema. 'Our programme can analyse thousands of bacteria in one go.' That was quite a challenge because it requires an awful lot of processing power to compare those millions of genes. That would normally take a computer months but smart programming has brought it down to less than one day. Medema says the software has other applications too, such as searching for new anti-cancer drugs, nutritional supplements or crop protection agents. The software is available free of charge. **® TL**