

Bacteria shed light on toxic medicine

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A new method developed in Wageningen should facilitate the early testing of drugs, reducing costs and the need for animal testing.

Many of the medical drugs that are developed do not make the grade in the end because they turn out to have toxic side effects. And this is usually only discovered in the last phase, when there is enough of the drug available for a trial. By that time years of investment have gone into the drug.

Wageningen University molecular biologist Walter Westering has developed a method for testing potential new medicines for possible [toxic side effects](#) at a very early stage, when there are just a few milligrams of the substance available. Westering, who used to work for MSD (formerly Organon), received his PhD on 4 February 2011 from Professor Ivonne Rietjens of the Toxicology department.

The most common side effect identified at Organon is genotoxicity, or DNA damage. Westering set out to find in vitro testing methods that could be carried out faster so as to test many potential drugs for genotoxicity. "The big advantage of early testing is that you can still adjust the [chemical structure](#) to make a substance less toxic and more effective."

Gene toxicity can come about when substances stick to the DNA or react to proteins that are important for cell division. This leads to subtle gene mutations or less subtle chromosome damage, causing complete [chromosomes](#) to break in two or even to change in numbers. The Ames

test is a classic test on [bacteria](#) strains, for identifying gene mutations. As soon as [DNA damage](#) occurs, the bacteria set about repairing it. To do this they make use of certain genes.

In his PhD research, Westering equipped these bacteria with the luciferase gene, taken from the firefly. When the bacteria start carrying out repairs, you see them light up. This is very easy to measure and you do not need a large amount of the substance to do this test. Westering: "Of the ten genotoxic candidates, we can now track down eight at an early stage. In the end we will not need to do as much [animal testing](#), thanks to these new tests."

Provided by Wageningen University

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