

Effect of medication is affected by copies of genetic information

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The results may help to explain why certain medications have strong side effects on sperm and eggs, and why certain organisms remain unaffected by environmental changes. This is shown by studies that researchers from the University of Gothenburg, together with researchers from Norway and France, are now publishing in the journal *PLOS Genetics*.

All cells in our bodies contain copies of the [genetic information](#). However, different cells contain different numbers of the complete genetic information. Normal [human cells](#) usually contain two copies of the genetic information, and thus two copies of every gene. Eggs and [sperm](#), however, only contain one set of genes.

"At the same time, the cells of many plants and amphibians contain many more copies of genetic information, and the number of copies can also vary during an organism's development and between different stages of life," explains Jonas Warringer, a researcher at the University of Gothenburg's Department of Chemistry and Molecular Biology.

Research has often overlooked this variation in genetic information. However, Jonas Warringer and his colleagues have now used ordinary baker's yeast to show that the number of copies of genetic information has a decisive effect on the properties of cells.

Jonas and his colleagues collected yeast samples from around the world and created two variants of each yeast culture – one with two copies of the genetic information, and the other with just one copy. The

researchers then examined the properties of these [yeast cells](#), such as their tolerance to cancer medication and [antibiotics](#). The study, which is reported on in the journal *PLOS One*, shows that the number of copies of genetic information has a decisive effect on the properties of cells.

"The cells with two copies of genetic information showed greater tolerance to some substances," continues Jonas, "while in other cases those with only one copy had an advantage. Surprisingly enough, these effects were even maintained in species separated by several billions of generations of evolution, suggesting that they are actually of great importance in nature."

The researchers' discovery may be of considerable significance in terms of knowledge about what lies behind differences between [organisms](#) in nature.

"It may also help to explain why certain medications have particularly strong side effects on sperm and eggs whereas others do not, and why certain organisms are affected by some environmental changes while others are unaffected," he concludes.

More information: www.plosgenetics.org/doi/pgen.1003388

Provided by University of Gothenburg

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