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Discovery and directed evolution of a glyphosate tolerance gene.

Castle LA, Siehl DL, Gorton R, Patten PA, Chen YH, Bertain S, Cho HJ, Duck N, Wong J, Liu D, Lassner MW

Science 2004 May 21 **304**(5674):1151-4 [[abstract on PubMed](#)] [[citations on Google Scholar](#)]

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Faculty Member

Niklaus Ammann

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PLANT BIOLOGY



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Comments

Gene shuffling, known for some years, is now used to engineer herbicide resistance genes which show in the lab a sufficient resistance against glyphosate. This could open new development pathways in obtaining herbicide resistances with new genes. It still has to be shown whether efficacy under field condition is sufficient.

Evaluated 22 Sep 2004

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This report describes a heroic directed evolution project, with the final product having substitutions at approx. 20% of the native amino acid positions. N-acetyl transferase activity versus glyphosate was improved by nearly 10,000x, and the new enzyme shown to confer glyphosate tolerance in plants. Factors of 10 improvement in enzymes via directed evolution may have become routine; this effort required eleven iterations and bringing together many of the state-of-the-art tools.

Evaluated 4 Jun 2004

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Niklaus Ammann: Faculty of 1000 Biology, 22 Sep 2004 <http://www.f1000biology.com/article/id/1019304/evaluation>

Mark Nelson: Faculty of 1000 Biology, 4 Jun 2004 <http://www.f1000biology.com/article/id/1019304/evaluation>

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