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# Glyphosate and health effects – FAQs

## What data and information is examined by the Regulatory Authorities when the safety for human health of glyphosate is assessed?

For human safety evaluation the results of oral, dermal and inhalation toxicity studies following single, repeat and lifetime exposure in rats, mice, rabbits and dogs are assessed. Additionally, there are specific tests that evaluate whether glyphosate has any impact on genotoxicity, neurotoxicity, reproductive and developmental parameters and to assess if glyphosate has any carcinogenicity potential following long term exposure.

## What has been the outcome of Regulatory Reviews conducted to date?

The comprehensive health assessments conducted by public authorities over the past 40 years have consistently concluded that glyphosate does not pose any unacceptable risk to human health. In the European Union, glyphosate was approved in 2002 for a period of ten years. The human health evaluation was based on the results of over 200 toxicology studies. The conclusion reached was that glyphosate meets all the safety requirements laid down by EU legislation on herbicides.

## Does glyphosate alter human DNA?

The several authoritative toxicology reviews of glyphosate conducted have consistently concluded that glyphosate is not genotoxic. Some published papers reporting adverse effects when scrutinized for data integrity and reliability have been found to suffer from a number of deficiencies and/or deviations from internationally validated test methods. On the basis of the studies considered reliable and suitable for hazard and risk assessment, glyphosate is clearly shown not to have genotoxic properties under conditions relevant to humans.

## Is there evidence to suggest that glyphosate can cause cancer?

In the course of glyphosate's 40-year history, glyphosate has been subjected to safety assessments by many regulatory experts and authoritative review panels. None of these reviews involving assessment of long-term studies with rats and mice have suggested any carcinogenic effects linked to glyphosate. A recent review article concluded that no relationship between glyphosate and any

cancer outcome can be drawn from the considerable volume of published epidemiology data.

## Is there a link between exposure to glyphosate and Parkinson's disease?

Multiple studies with glyphosate have failed to demonstrate any evidence of neurotoxicity, including any evidence of Parkinson's-like abnormalities. In the largest epidemiology study to date, which surveyed US farmers (Agricultural Health Study), no increased risk of Parkinson's disease was found. Considering the widespread use of glyphosate, a significant number of cases associated with either acute and/or chronic exposure would be evident if glyphosate was a causative agent of this fairly common disease.

## Is glyphosate detrimental to reproduction and development?

Regulatory requirements dictate that reproduction and developmental toxicity tests be carried out on two mammalian species (rats and rabbits), and include a multi-generation reproduction study. Based on the several studies conducted, the EU, WHO and US-EPA have concluded that glyphosate is not detrimental to reproduction or development in mammals.

## Did the organisation Earth Open Source establish a link between glyphosate exposure and birth defects?

A report published by Earth Open Source contains criticisms of risk assessments for glyphosate conducted by official authorities and highlights certain in vitro studies that reported developmental toxicity. The Regulatory Authorities have found these in vitro studies to be of limited use for regulatory decisions, as they do not reflect realistic exposure conditions for animals and humans and do not take into account the physiological barriers (absorption, metabolism and excretion) that limit exposure. In vitro studies, in which substances are artificially administered directly to embryos, are considered to be less reliable and less relevant for human risk assessments than studies on animals.

## What did the study by Professor Séralini and colleagues establish?

The study conducted by a French university team led by Gilles-Eric Séralini claimed to have found effects including tumour development and a shortened life time in laboratory rats fed a diet containing a glyphosate and genetically modified NK603 maize. Regulatory Agencies and individual scientists have examined the study and criticised its validity, pointing out that the findings are not supported by the data presented; that the conclusions are not relevant for the purpose of safety

assessment; that there are fundamental problems with the study design; that critical information on methodology was absent; and that the data presented does not support the author's interpretations.

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