



# REALTIME LABORATORIES GLYPHOSATE EXPOSURE ANALYSIS

## WHAT IS GLYPHOSATE?

Glyphosate is the main active ingredient for many broad-spectrum herbicides. The increased use of glyphosate in agriculture, recreational areas, and home gardens has increased 25-fold in the last 30 years<sup>1</sup>. This has led to increased detection of glyphosate and its by-product aminomethylphosphonic acid (AMPA) in soil and water<sup>2</sup>. There are over 750 different herbicides that contain glyphosate, which has made it difficult to avoiding using products that contain it. The US EPA has raised the admissible glyphosate level in soy seeds from 2 ppm to 40 ppm<sup>3</sup>.

Human exposure is mainly through food. Glyphosate has been detected in human blood, urine, umbilical cord blood, and breast milk. The US National Nutrition Examination Survey found the herbicide in 80% of urine samples<sup>4</sup>, however, the amount present varies widely. Although, no safe limits have been set on glyphosate exposure, it would be advisable to limit exposure as much as possible.

Glyphosate exhibits its herbicidal action through inhibition of the shikimate pathway enzyme EPSPS. Class I EPSPS are sensitive to the effects of glyphosate and are found in all plants and bacteria. However, glyphosate-resistant PSPS (Class II) appear to be more prevalent in opportunistic pathogens and may contribute to dysbiosis.

### HEALTH EFFECTS ATTRIBUTED TO GLYPHOSATE EXPOSURE<sup>5-6-7</sup>

- Cancer
- Kills beneficial bacteria in the gut
- Endocrine disrupter causing problems with hormone pathways



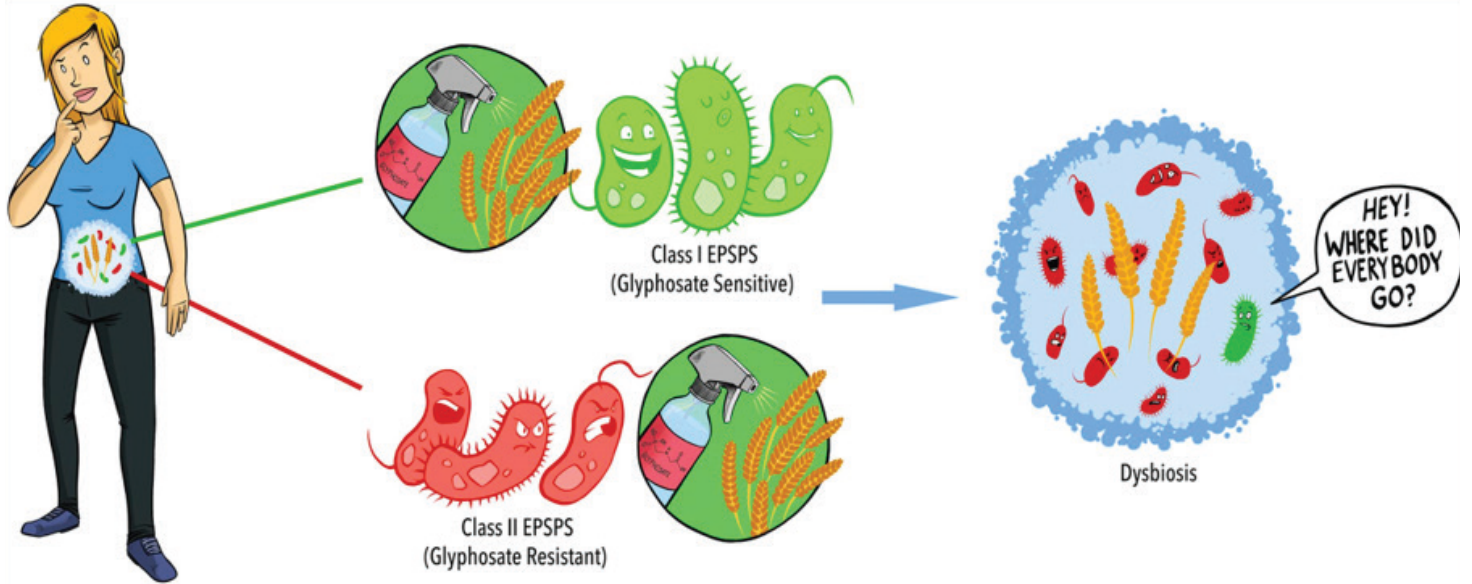
## PATHOGENIC (BAD) BACTERIA GOES UP WITH GLYPHOSATE EXPOSURE

- Salmonella
- Clostridium Perfringens
- Clostridium Botulinum
- Actinomyces
- Fusobacterium



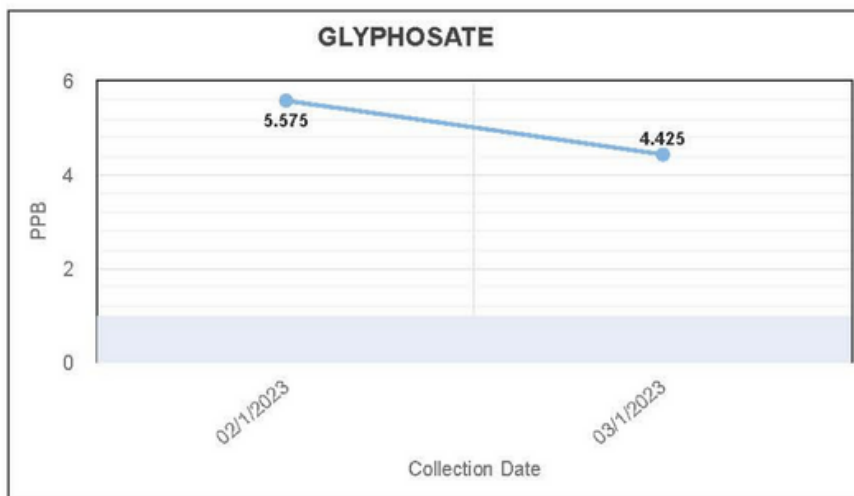
## BENEFICIAL (GOOD) BACTERIA GOES DOWN WITH GLYPHOSATE EXPOSURE

- Bifidobacterium
- Lactobacillus
- Firmicutes
- Bacteroidetes



## RTL SAMPLE REPORT

Code	Test	Specimen	Result	Reportable Range
P1001	Glyphosate	Urine	4.425 ppb	1.0 - 40 ppb



## SPECIMEN REQUIREMENTS

- 2ml of Urine
- Results in Days
- Affordable Testing
- Easy, & Convenient
- Combine with Other Testing

Accession No	Collection Date	Result
030123	2023-03-01	4.425
020123	2023-02-01	5.575

1. U.S. Department of the Interior. 2. Puigbo, P., Leino, L. I., Rainio, M. J., Saikonen, K., Saloniemi, I., & Helander, M. (2022). Does Glyphosate Affect the Human Microbiota? *Life (Basel)*, 12(5). doi:10.3390/life12050707 3. Bukowska, B., Wozniak, E., Scinska, P., Mokra, K., and Michalowicz, J. (2022). Glyphosate disturbs various epigenetic processes in vitro and in vivo - A mini review. *Sci Total Environ* 851, 158259. 10.1016/j.scitotenv.2022.158259. 4. Ospina, M., Schutze, A., Morales-Agudelo, P., Vidal, M., Wong, L. Y., & Calafat, A. M. (2022). Exposure to glyphosate in the United States: Data from the 2013-2014 National Health and Nutrition Examination Survey. *Environ Int*, 170, 107620. doi:10.1016/j.envint.2022.107620 5. Marino, M., Mele, E., Viggiano, A., Nori, S.L., Meccariello, R., and Santoro, A. (2021). Pleiotropic Outcomes of Glyphosate Exposure: From Organ Damage to Effects on Inflammation, Cancer, Reproduction and Development. *Int J Mol Sci* 22, 10.3390/ijms22212606 6. Rueda-Ruzafa, L., Cruz, F., Roman, P., and Cardona, D. (2019). Gut microbiota and neurological effects of glyphosate. *Neurotoxicology* 75, 1-8. 10.1016/j.neuro.2019.08.006 7. Zhang, L., Rana, I., Shaffer, R.M., Taioli, E., and Sheppard, L. (2019). Exposure to glyphosate-based herbicides and risk for non-Hodgkin lymphoma: A meta-analysis and supporting evidence.