

**SEAPHS**  
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California Environmental Protection Agency  
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Re: Proposed No Significant Risk Level (NSRL) for the chemical glyphosate to be adopted into regulation in Title 27, California Code of Regulations, section 25705.

Dear members California Environmental Protection Agency,

**There are no safe levels of glyphosate.**

**Glyphosate is a synthetic amino acid and analogue of our canonical amino acid glycine and participates in plant and animal biology**

**One microgram of glyphosate technical acid ( N-phosphonylmethyl glycine) contains 3.561 trillion molecules each capable of integrating with a protein altering shape, folding and function.**

I am a US scientist and hazardous chemicals materials consultant and expert on the subject of Glyphosate. I am one of few people to have received all of the Monsanto's trade secret sealed studies on glyphosate from the US EPA. The federal agency supplied these documents in excess of 100,000 pages to me under the FOIA with special consideration for my research into this chemical. I now have six peer-reviewed papers on the subject of glyphosate and several more papers on the glyphosate in progress, a short list to some of these studies links are appended. The full series of peer-reviewed glyphosate papers may be found at ResearchGate in the author file under Anthony Samsel.

I call on the California Environmental Protection Agency to immediately ban the chemical glyphosate based on the latest scientific research conducted here in the USA. Glyphosate has recently been found to integrate with structural proteins as well as animal i.e. human enzymes which include digestive enzymes pepsin, trypsin and lipase as well as lysozyme. Such ligation and integration has serious biological consequence especially in human health. Additionally, crystallization experiments to determine the chemical structure glyphosate with human and animal enzymes have and are continuing to be conducted.

Glyphosate-Lysozyme, as well as Glufosinate-Lysozyme have formed crystals in the lab. They have been run on Beamline x-ray diffraction equipment and data are now being assessed to solve the structure problems which will show just where glyphosate is liganding to these enzymes. We now know that this enzyme-glyphosate ligation is real, it happens. This has far reaching implications to both human and animal health. Lysozyme catalyzes the hydrolysis of residues in peptidoglycan a main component of the

cell wall of gram-positive bacteria. So, interference with this enzymes may lead to disruption of bacterial homeostasis as bacterial, yeast microbial pathogenic overgrowth. The innate immune system (IIS) is part of our immune system though not providing long-term immunity. Rather, the IIS responds to pathogens and recruiting the immune cells to infection sites by cytokines or small proteins which participate in cell signaling i.e. autocrine endocrine, paracrine. Cytokines are produced in a wide variety of cell types including Fibrocyte / fibroblasts which promote wound healing. So disruption of Lysozyme may directly impact fibrocystic cytokines.

Monsanto claims glyphosate to be safe to animals and humans because they do not possess the Shikimate pathway, a pathway way which is disrupted by glyphosate in plants, archaea and bacteria. Glyphosate is known to disrupt the enzyme EPSP synthase (5-enolpyruvylshikimate-3-phosphate synthase) **However, this statement is NOW inherently false** as glyphosate was found by Samsel in 2016 to inhibit human digestive enzymes and others found in animals and humans. Glyphosate is a PROTEASE INHIBITOR i.e. digestive enzymes etc .... Such disruption of human enzymes is well known to lead to a host of modern diseases.

Again, Lysozyme is an antimicrobial enzyme that is an integral part of the innate immune system of humans and other animals.

Monsanto found significant tissue damage to all glands and organs in their 2-year long-term studies of glyphosate in mice and rats. Tissue damage stimulates the production fibrocytes. Glyphosate reaches the end of the line in the capillaries in the Extra Cellular Matrix (ECM) where it escorted one molecule at a time into the cell where it participates in protein synthesis and excreted by the cell.

Fibroblasts also produce the structural proteins i.e. the collagens, elastin, GLYCOSAMINOGLYCANS and the glycoproteins of the ECM ... so glyphosate is along for the ride even bridging assembling strands of proteins affecting shape folding and function.. Glyphosate should not be part of any biology.

Also fibrocytes and fibroblasts are differing states of the same cell the fibroblasts of which are involved in IMMUNE REGULATION via TAF-derived elements of the ECM and modulators. These ECM components like TSP-1 are associated at the sites of chronic inflammation and CARCINOMAS. This is where glyphosate causes many funky cancers, as its association with the FIBROBLASTS.

I have published results of lab analysis and experiments on glyphosate integration with structural proteins, as well as proteinaceous enzymes. I also have new lab data from crystallization experiments of glyphosate with enzymes that I can supply the agency. I am available to answer questions that the CA EPA may have regarding the real dangers of glyphosate to public health and the environment. Glyphosate chemically bonds with proteins causing misfolding and malfunction.

Protein function involves **ligation** of ions and both small and large molecules through random collisions. The ligation involves the wrapping of the substrate around the protein which changes its shape and blocks its ability to function ... This is one of the many ways glyphosate functions in biology.

In March a peer-reviewed paper was published entitled: **Glyphosate pathways to modern diseases VI: Prions, amyloidosis and autoimmune neurological diseases.** The paper notes that based on Monsanto's own studies and data that glyphosate bioaccumulates in all cells and tissues including eggs and the milk of all animals fed a diet of glyphosate residues. The data developed by Samsel in this paper also supports these conclusions, but goes beyond Monsanto's findings. Bioaccumulation information extracted from MONSANTO documents is contained on page 14 of this Glyphosate VI paper. I have analyzed tissues from pigs and cattle in the food supply as well as horses and found all tissues contaminated with glyphosate, particularly high levels in the bones and also horses hooves.

I have recently followed glyphosate from horse feed into the keratin of the animal's hooves. I have identified structural defects in the keratin protein found in collapsing hooves of horses. These animals eating contaminated feed have glyphosate bioaccumulating in all tissues. I have found it circulating in their blood, their urine, manure and keratin in the hooves... The only way glyphosate can become part of the protein keratin is by cell secretion with the protein hence the defective proteins.

The synthetic amino acid Glyphosate is a structural analog of our canonical amino acid glycine... It is a relatively small molecule which can travel anywhere glycine travels. It bonds to structural proteins as well as many enzymes particularly digestive enzymes .... This causes malabsorption and intestinal issues and cascades of disease consequence. Inhibiting our enzymes is not without significant consequence... Based on this alone glyphosate should be banned. No chemical should be allowed in food or water that disrupts enzymology, none.

Glyphosate disruption and inhibition of digestive enzymes leads to malabsorption and serious health consequences. One example: **Glyphosate's disruption and inhibition of Lipase defeats Beta-cell secretion of insulin....** Glucose induces lipolysis and Glyphosate's inhibition of lipase limits lipolysis and diacylglycerol lipase activity in the pancreatic islets.... Monsanto found problems with the pancreatic islet tumors as well as structural destruction of this and other glands and organs related to glyphosate integration with structural proteins.

From my lab experiment with Lipase and Glyphosate using HPLC MSMS detection it appears that glyphosate irreversibly inhibits lipase. *So, glyphosate would necessarily disrupt lipase's regulatory role in beta-cell stimulus secretion... see Glyphosate VI.*

Lipase participates in cell signaling, inflammation and metabolism. Pancreatic lipase is the catalyst for the hydrolysis of dietary lipids which include fats, oils and triglycerides. Triglyceride triester is metabolized for utilization as glucose and three fatty acids...

Glyphosate integration with lipase inhibits its function which could induce excessive bioaccumulation of fatty material in the blood vessels, gut, liver, spleen and other organs as well as mimic lysosomal acid lipase deficiency. It would also allow for an increase in triglycerides in the blood and lead to numerous disease cascades including malabsorption, fatty liver disease, jaundice, failure to thrive in infants, calcification of the adrenal gland, anaemia, hypercholesteremia, biliary dysfunction, decreased HDL, increases in LDL, blood clots, fat enlarged hepatocytes, liver fibrosis and failure.

Glyphosate integrates with the digestive pepsin and this has serious implications with acid reflux and lung disease among others. Monsanto pathologists found that glyphosate caused symptoms in the laboratory rats similar to COPD. I would note my early papers on glyphosate and gastrointestinal disease as well as this article:

#### **ROLE OF PEPSIN IN REFLUX, LUNG DISEASE**

"Although acid is indeed one of the culprits in cases of gastroesophageal reflux disease (GERD), a growing body of evidence suggests that pepsin, an enzyme, is the substance that causes the most damage when the reflux extends beyond the upper esophagus and reaches the pharynx, larynx and lungs. Once present in sufficient amounts, studies have shown, pepsin can cause significant damage by adhering to laryngeal cells and breaking down proteins, among other injurious effects (published online November 10, 2011. *Int J Otolaryngol*. doi:10.1155/2012/646901). Thus, it's not surprising that pepsin has been linked to serious lung disease, including acute exacerbations of idiopathic pulmonary fibrosis (*Eur Respir J*. 2012;39:352-358)." [Otolaryngologists Research Role of Pepsin in Reflux, Lung Disease - ENTtoday](#)

The fact that glyphosate integrates with human enzymes should be reason enough to ban this chemical completely. There should be no glyphosate or glufosinate in the food supply nor in drinking water, air or soil. Glyphosate is a synthetic amino acid that should have no place in biology.

We are but one biosphere, what affects one affects all.

Kind regards,

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"In the past the world suffered grievously from lack of knowledge, today it suffers from its rejection." ~ Dr. Arthur D. Little

Samsel Glyphosate papers:

[https://www.researchgate.net/publication/316601847\\_Glyphosate\\_pathways\\_to\\_modern\\_diseases\\_VI\\_Prions\\_amyloidoses\\_and\\_autoimmune\\_neurological\\_diseases](https://www.researchgate.net/publication/316601847_Glyphosate_pathways_to_modern_diseases_VI_Prions_amyloidoses_and_autoimmune_neurological_diseases)

[Glyphosate pathways to modern diseases V: Amino acid analogue of glycine in diverse proteins \(PDF Download Available\)](#)

[Glyphosate, pathways to modern diseases IV: cancer and related pathologies \(PDF Download Available\)](#)