

GM Food: A Crime against Humanity?

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Abstract—Modern agriculture controls weeds by spraying Roundup containing water and Glyphosate onto crop fields. To enhance Glyphosate penetration through weed leaves, POEA is usually included in Roundup. POEA stands for polyoxyethyleneamine. But weeds alone cannot be sprayed and the POEA enters the leaves of adjacent corn and soybean crops as an emulsion of NP globules that finally reside in the plant crop. NP stands for nanoparticle. Upon ingestion of GM food, metabolic heat in the gut is generally thought to increase the NP temperature. GM stands for genetically modified. But this finds basis in classical physics when in fact QM governs NPs in particular. QM stands for quantum mechanics and requires the heat capacity of NPs to vanish. Conservation of heat in NPs therefore cannot occur by an increase in temperature and instead proceeds by emission of UV radiation. Nearby DNA are damaged and if the scrambled genes are not repaired by the immune system may lead to birth defects, autism, and cancer. Indeed, the UV radiation from NPs supports experiments over the past decade showing NPs damage DNA. Whether altering the DNA of the people of the world by NPs in GM food is discussed as a crime against humanity.

Index Terms—GM food, DNA damage, UV radiation, nanoparticles, classical physics, quantum mechanics

I. INTRODUCTION

Herbicide-resistant weeds now threaten more than 60 million acres of US farmland. To control weeds, the non-selective herbicide Glyphosate including adjuvants to enhance the penetration through weed leaves is widely sprayed on crop fields. But it is not possible to spray weeds alone, and therefore Glyphosate enters crop plants and eventually resides in soy and corn crops.

Herbicide adjuvants [1] include POEA and an AP which is usually kept confidential by manufacturers. POEA stands for polyoxyethyleneamine and AP for application principle, e.g., in Monsanto's Roundup, the declared AP is Glyphosate while POEA is considered an adjuvant. However, the FDA only regulates the toxicity of APs. Adjuvants like POEA are considered chemically inert and not regulated. Moreover, if the AP in the bulk is shown to not be toxic, the NPs of the bulk are not considered toxic. NPs stand for nanoparticles having dimensions < 100 nm.

Regardless, studies [2] based on various Roundup formulations strongly suggest that toxicity was due to adjuvants present in the formulations and not the Glyphosate. In fact, POEA alone was found more toxic.

Upon human ingestion of GM foods, most Glyphosate and POEA are excreted, but residues remain in the gut. Of great concern is whether the residues are harmful to human health. Donald Huber, the well-known critic of GM foods claims [3] a pathogen is produced from Glyphosate that harms human health, e.g., residents living close to sprayed GM soybean fields in Argentina developed cancers and birth defects. However, GM food proponents differ, by arguing science is still looking for, but not found Huber's pathogen to establish the causal link between Glyphosate and various human health problems. But a single pathogen linking GM food to the diversity of health problems, e.g., birth defects, autism, is not likely caused by a single pathogen, but rather by a mechanism that produces different pathogens.

In GM foods, one such mechanism is the DNA damage from NPs. Consistent with adjuvants enhancing the penetration of Glyphosate through weed and crop plant leaves, experiments [4] show POEA upon mixing in water forms an emulsion of globular NPs that adhere to and forms films on surfaces. Extended to this paper, the toxicity of POEA would allow the globular NPs attach to and disrupt cell walls allowing Glyphosate to enter the cell and damage the DNA. If not repaired, the DNA damage would scramble genes leading to the variety of observed health problems.

But DNA damage by NPs is not new. In 2003, lung cancer based on *in vivo* and *in vitro* models [5, 6] show NPs induce oxidative stress and inflammation. At that time, the mechanisms of how NPs caused the oxidative stress were not understood, but thought related to their large S/V ratios. S/V stands for surface-to-volume. In 2008, DNA damage was [7] linked to cancer by ROS from metabolic processes. ROS stands for reactive oxygen species including the highly reactive hydroxyl radicals. The ROS correlate with the activation of p53 and proteins that accompany DNA repair thereby mimicking the UV irradiation-related carcinogenesis pathways. UV stands for ultraviolet. But how NPs produce UV energy of at least 5 eV to create the hydroxyl radicals has never been identified in the literature.

In 2010, NPs were first proposed [8, 9] to produce EM energy at UV levels to create the ROS. EM stands for electromagnetic. Indeed, NPs were shown to create the ROS by providing a natural low-level source of continuous EM radiation beyond the UV. The source of EM radiation transferred to the NPs was considered to be molecular collisions, but since then has been superseded by any form of NP heating from the surrounding tissue. At UV levels, the NPs have EM energy at 5 eV levels to create the ROS that damage nearby DNA.

What this means is ROS are no longer necessary to explain DNA damage by NPs as UV irradiation alone activates the carcinogenesis pathways. However, the NP pathways linked to cancer are still based on ROS and not UV radiation. Indeed, silver NPs commonly used as a bactericide were linked [10] to ROS in the protein interaction of the human LoVo cell line and found to depend on NP size. The 100 nm NPs indirectly effected serine/threonine protein kinase (PAK) and mitogen-activated protein kinase (MAPK), and phosphatase 2A pathways; whereas, the 20 nm NPs directly affect cellular stress and generation of ROS and protein carbonylation. However, the presence of Ag⁺ ions suggest the NPs are producing necessary UV radiation > 5 eV to ionize silver. Indeed, the bactericidal action of silver NPs suggests UV radiation is being produced that causes [11] chromosomal damage in human hepatocarcinoma cells (HepG2) rather than by the ROS from the release of Ag and subsequent oxidation to Ag⁺.

In all living systems, the UVC at 254 nm is a lethal level for DNA damage as the pyrimidine dimers are formed [12] that block DNA replication. If the scrambled genes in humans are not repaired, diseases of birth defects, autism, and cancer may then evolve. After all, the collateral damage of silver NPs as a bactericidal agent should not be expected to not damage DNA.

II. PROPOSAL

The causal link between GM foods and diverse human health problems is proposed to be the scrambling of genes in DNA by UV radiation from NPs of POEA globules that diffuse through the cell wall. But upon attaching to cell walls, the UV radiation may ionize cell walls allowing Glyphosate to enter and damage the DNA. But DNA damage need not be limited to GM food that upon ingestion produces NP globules of POEA. Indeed, the beneficial effects of NPs in nano-medicine, e.g.,

Drug delivery vehicles,
Antimicrobial agents,
Treating cancer in photodynamic therapy.

are placed in question unless the attendant DNA damage by UV radiation from the associated NPs leading to health problems is justified .

III. THEORY AND ANALYSIS

Upon ingestion of GM food, the globular NPs of POEA damage nearby DNA by converting metabolic heat into low-level UV radiation, the theory and analysis of which are presented as follows.

A. Heat Capacity

The mechanism of UV radiation from POEA NPs may be simply understood. Classically, NP atoms have the heat capacity to conserve heat by increasing in temperature. But QM governs the nanoscale. QM stands for quantum mechanics. The Planck law of QM for the atom at 300 K from [13] is shown in Fig. 1.

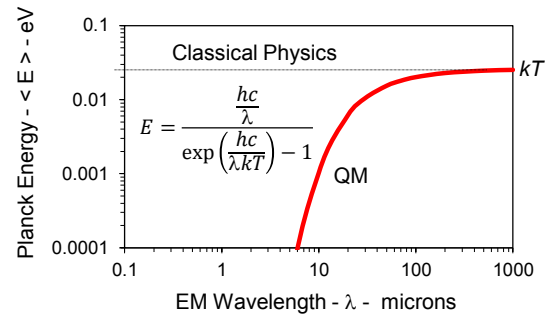


Fig. 1 Planck law of the Atom at 300 K
In the inset, E is Planck energy, h Planck's constant, c light speed, k Boltzmann's constant, T temperature, and λ the EM confinement wavelength

For $\lambda > 100$ microns, Fig. 1 shows both QM and classical physics allows the atom in macroscopic matter to have kT energy and increase in temperature upon absorbing heat. But for EM confinement $\lambda < 100$ microns, QM differs from classical physics as the kT energy decreases, and for $\lambda < 100$ nm, the atoms have no heat capacity to conserve heat by an increase in temperature.

Although the Planck law is known for over a century, nanotechnology today continues to assign finite heat capacity to NPs. In nanoparticle mass spectrometry, 20-50 nm carbon NPs are trapped in a quadrupole ion trap [14] and heated with lasers. Based on classical physics, NP temperatures increase to 3000 K, the high temperatures thought verified by comparing the measured NP mass loss rate with the temperature estimated from known sublimation rates vs temperature data for bulk polycrystalline graphite. But Fig. 1 shows the heat capacity for carbon NPs vanishes while that for bulk graphite at $\lambda > 100$ microns is finite. Hence, high temperatures do occur in the bulk, but NPs cannot change in temperature. Lack of temperature change suggests mass loss in NPs is caused by fragmentation under Coulomb repulsion from repulsive charge between NP atoms as electrons are lost from QED induced EM radiation by the photoelectric effect.

B. EM Confinement

QM by the Planck law requires the NP atoms have vanishing heat capacity thereby precluding conservation by temperature changes. For heat capacity to vanish, the NP atoms must somehow be placed under nanoscale EM confinement.

Indeed, it is self-evident NP surfaces lack any evident physical mechanism that could be construed as EM confinement. However, NPs have high S/V ratios that confine absorbed heat almost entirely to their surfaces, the surface heat itself placing the NP atoms under EM confinement over nanoscale wavelengths. Simple QED then conserves the surface heat by creating EM radiation standing between diametrically opposite NP surfaces. But once the surface heat is expended in producing the standing EM radiation, the EM confinement vanishes and the EM radiation is free to escape to the surroundings.

C. QED

Simple QED differs from the far more complex relativistic QED [15] by Feynman and others. Briefly stated: Simple QED conserves heat supplied to a NP absent heat capacity by creating standing EM radiation between diametrically opposite NP surfaces having half-wavelength $\lambda/2 = d$, where d is the diameter of the NP. The Planck energy E of the standing EM radiation is:

$$E = h \left(\frac{c}{n} \right) / \lambda = \frac{hc}{2nd} \quad (1)$$

where, the velocity of light c is corrected for the slower speed in the solid state by the refractive index n of the NP.

QED induced EM radiation differs from the speculative multi - IR photon [16] processes that excite dopant atoms to cause UV emissions, i.e., the QED radiation depends only on the NP size and refractive index. DNA damage from QED induced EM radiation is therefore always expected as the absorption of heat by a NP is excited from (1) at EUV wavelengths $\lambda = 2nd$. EUV stands for extreme ultraviolet. Dopant NP atoms in lower quantum states are excited by EUV fluorescence [17] as the NP gives up some EUV energy by radiationless processes. Indeed, surface plasmon resonance of NPs in the VIS commonly thought caused by electron oscillation is instead a lower quantum state of the NP excited by EUV fluorescence.

Simple QED is experimentally supported in numerous UCNP experiments [16] over the past decade. UCNP stands for up-conversion nanoparticles. UNCNP are NPs doped with UV sensitive molecules that upon NIR excitation emit UV radiation. The UVB emission [18] at 360 nm or 3.45 eV for 22 nm NaYF₄ NPS is thought caused by the unlikely combination of at least 4 NIR photons at 975 nm. QED differs. Taking the refractive index of NaYF₄ as $n = 2$, QED induces the heat absorbed from NIR irradiation to produce EUV at $\lambda = 88$ nm or 14 eV. Since the EUV at 14 eV > UVB emission at 3.45 eV, fluorescence induces the UVB emission. Unlikely multi-photon processes are avoided.

D. POEA Surfactant

The FDA classifies Glyphosate as the AP in Roundup and claims [2] it is not toxic for human cells, except when mixed with inert components such as POEA adjuvants. However, POEA causes AK and SD in human cells. AK stands for membrane damage and SD for mitochondrial activity leading to cell mortality. POEA globules may diffuse through cell walls, although the mechanism by which AK and SD occur is not identified in the literature.

1) AK and SD Mechanism.

The proposed AK and SD mechanism is the EM radiation from NPs of POEA globules. Although the literature does not show NP globules in Roundup, POEA globules are known [4] to aggregate in water and adhere to glass surfaces to form nanoscale films.

By analogy, POEA globules may adhere to human cell surfaces and diffuse or burrow through the cell wall as illustrated in Fig. 2.

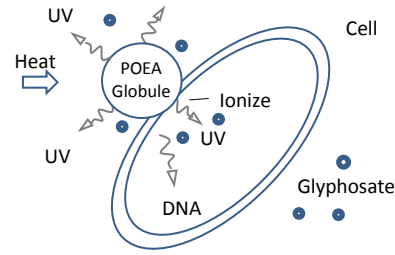


Fig. 2. POEA Globule producing UV Radiation damaging DNA by diffusing through or disrupting cell wall

In the POEA globules, metabolic heat is converted to EM radiation beyond the UV allowing burrowing to occur by ionization of the cell wall. Glyphosate then may enter the disrupted cell wall to damage the DNA. However, the DNA may also be damaged by UV radiation from POEA globules that simply diffuse through cell walls.

2) Energy of QED induced EM radiation

The EM radiation energy depends on the POEA globule size. For a POEA of ethylene amine [19] having refractive index $n = 1.51$, the Planck energy E of QED induced radiation in terms of the diameter d of the POEA globules is shown in Fig. 3.

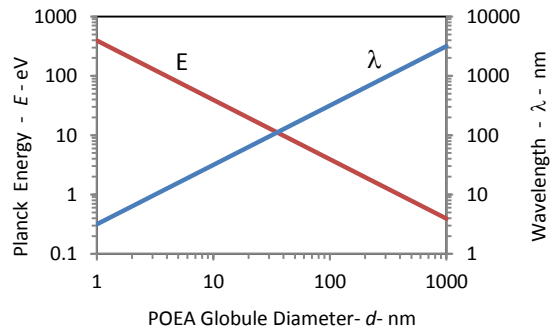


Fig. 3. POEA Globule Energy and Wavelength Planck energy E and wavelength λ vs. NP diameter d

3) Toxicity

Toxicity of Glyphosate in human cells is enhanced by the disruption of membrane walls by ionizing QED induced EM radiation. Fig. 3 shows the Planck energy E varies from 20 to 4 eV for POEA globule diameters d from 20 to 100 nm, respectively. Hence, the QED radiation from POEA globules is more than sufficient to ionize wall molecules thereby enhancing the toxicity [1, 2] of Glyphosate by burrowing through cell walls.

V. DISCUSSION

Recently, a letter [20] signed by over 100 Nobel Laureates was made public urging Greenpeace to review its claims that crops and foods worldwide are not improved with biotechnology, recognize the contrary claims of scientific bodies and regulatory agencies, and abandon their campaign against GM food in general and Golden Rice in particular.

Greenpeace has led the opposition to Golden Rice, which has the potential to reduce or eliminate much of the death and disease caused by VAD having the greatest impact on the poorest people in the world. VAD stands for vitamin A deficiency. The WHO estimates over 250 million people suffer from VAD which compromises the immune system, putting children at great risk.

The Laureates ask the governments of the world to reject [21] Greenpeace's campaign against Golden Rice and GM foods in general and oppose Greenpeace's actions and accelerate the access of farmers to modern biology, especially GM seeds improved through biotechnology. The letter argues that Greenpeace by misrepresenting the risks of GM food based on emotion and dogma is contradicted by science, and therefore must cease and stop.

The letter campaign was organized by Richard Roberts, and Phillip Sharp, both co-winners of the 1993 Nobel Prize in medicine for the discovery of DNA sequences known as introns. Roberts told *The Washington Post*:

“We’re scientists. We understand the logic of science. It’s easy to see what Greenpeace is doing is damaging and is anti-science”

The letter [20] concludes with the Laureates alleging Greenpeace by denying GM food has placed millions of people in the developing world at risk of VAD by asking the terse question:

How many poor people in the world must die before we consider this a “crime against humanity”?

Clearly, emotion and dogma do not belong in science *even* by Nobel Laureates. The letter by the Laureates supporting the GM food industry refuting Greenpeace's actions is somewhat hypocritical in that the letter itself is not based on scientific arguments, but on emotion and dogma from the GM food industry perspective.

Regardless, it is unlikely the Laureates did not know their signature to the letter would support the GM food industry argument against Greenpeace, thereby raising the question as to whether the Laureates based on their scientific expertise knew the letter was false and signed the letter for personal reward, but

Is there a scientific argument that the Laureates knew or should have known that GM food may damage human health?

If so, a jury would find the Laureates signed the letter known to be false, an unfortunate act as the Nobel Laureates hold the highest esteem in science.

A. Scientific Argument

Unlike Huber’s pathogen, the scientific argument linking GM food to human health requires a causal relation. In this paper, the causal relation is the DNA damage from toxic UV radiation produced from NPs of POEA globules heated in the gut.

Certainly, the Laureates knew UV radiation damages the DNA, but today a UV source inside the body is not known. Nevertheless, the Laureates by their standing

should know that NPs in GM food lacking heat capacity can only conserve metabolic heat by low level UV emission – UV an unequivocal cause of genotoxicity.

B. Legal Argument

Prior knowledge is the legal basis of a crime against humanity. Even if the Laureates did not know QM requires NPs to conserve metabolic heat by emitting EM radiation beyond the UV, the Laureates knew or should have known experiments have shown for decades that NPs damage the DNA of all living cells.

If the immune system can repair the DNA damage, there is no problem. But if not, the scrambled genes may lead to cancer and birth defects including a variety of health problems.

C. Summary

Greenpeace is most certainly not guilty of a crime against humanity. To the contrary, the GM food industry is alleged guilty of a crime against humanity, especially the poor people of the world more exposed to GM foods as the DNA damage caused by the UV radiation from NPs used to enhance crop production scrambles their genes, and if not repaired by immune systems may give rise to the wide range of health problems observed today

The Nobel Laureates by signing the letter in support of GM foods knew or should have known the scientific basis of the letter was false and therefore are alleged complicit in the crime of the GM industry against humanity. The Laureates should retract their signatures.

The GM food industry should stop its campaign against the Greenpeace claim that GM food is harmful to human health as DNA damage from NPs cannot be scientifically denied. The GM food industry should label the NPs in their products to allow the consumer to make an informed decision on its purchase.

VI. CONCLUSIONS

1. QED induced radiation from NPs is a consequence of QM that denies the atom the heat capacity under nanoscale EM confinement to allow conservation of metabolic heat by an increase in temperature thereby requiring conservation by upconversion to EM radiation beyond the UV that damages nearby DNA.

2. The causal link between ingested GM foods and human health is the scrambling of genes in DNA damage by UV radiation from NPs of POEA globules in Glyphosate residues. Only genotoxicity can link GM food to human health because the diversity of problems, e.g., cancer, Parkinson’s disease, birth defects, and autism cannot be explained by a single pathogen.

3. In human health, NPs provide an important link between DNA damage by UV radiation beyond the UVC within the body. Currently, UV induced DNA damage is thought to only occur in the skin exposed to solar radiation at UVB levels. The far more DNA damaging solar UVC does not even reach the Earth because of ozone absorption in the upper atmosphere. But NPs as a

UVC source within the body are always in direct contact with DNA pose a serious health risk. NPs should therefore be recognized by the FDA as perhaps, the prime cause of human health problems.

4. The beneficial effects of NPs in nano-medicine should always include companion test results of associated DNA genotoxicity. The FDA is recommended to initiate a thorough review of genotoxicity of NPs in nano-medicine.

5. GM food containing globular POEA or any of the more common forms of NPs including silica, TiO₂, carbon nanotubes, etc. upon absorbing metabolic heat in the gut produce low-level UVC which damages the DNA.

6. Although the scientific method in this paper is analytical based on experimental data in the literature, resolution of whether heated NPs produce UV radiation by QM or simply increase in temperature by classical physics requires an extensive experimental program specific to GM foods for verification. Initially, fluorescent UV emission data for common NP materials of various sizes heated in a water bath at 37 C would be followed by DNA damage correlation with the size of NP materials. It is recommended the FDA and EPA direct this effort. Alternatively, the author solicits corroboration with interested private parties.

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Thomas V. Prevenslik is a retired American living in Hong Kong and Berlin. Because classical physics does not work at the nanoscale, he developed a theory of QED based on QM. By this theory, heat absorbed by NPs is deposited almost entirely in their surfaces because of high surface-to-volume ratios. Thus, NP atoms are placed under high EM confinement over nanoscale wavelengths that by the Planck law of QM precludes the atoms from having the heat capacity to conserve heat by changes in temperature. Instead, QED converts the surface heat into standing EUV radiation inside the NPs. Any NP quantum states having lower transition frequencies than the EUV frequency of the NP are excited by fluorescence with emission of the lower state to the surroundings. In the instant topic of toxicity of NPs in GM food, the emission of standing EUV radiation at UV levels damages nearby DNA and by scrambling genes forms the causal link between NPs and diverse human health problems.

