

## **Health Bits and Pieces (HFN 35:3)**

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#### **Chemotherapy and Metastasis**

It is well established that radiation can cause cancer, and recent studies have shown that cancer surgery, even biopsies, can trigger metastasis in cancer patients. New research now shows that some chemotherapy drugs can trigger metastasis as well.

Scientists from Albert Einstein College of Medicine have found that drugs commonly used to treat breast cancer can actually cause cancer cells to spread throughout the body. The researchers found that malignant cells can combine with the white blood cells called “macrophages” and augment passage for cancer cells into the bloodstream. The technical name for the clustering of those three types of cells is “tumor microenvironment of metastasis (TMEM).” The researchers found that when they gave the chemotherapy drug Paclitaxel and several other drugs to lab mice it set off a chain of events that allowed the cancer to spread. In 20 patients with breast cancer the tumor microenvironment was as much as five times *more* hospitable to cancer cells after drug treatment. If the drugs are used prior to surgery, which is the norm, the patients would be exposed to an even higher risk of life-threatening metastatic disease.

Another study analyzed human data and found that the gene ATF3 is over-expressed in patients treated with chemotherapy, compared to patients who were not. The ATF3 gene is a transcription factor activated by stress and is implicated in the mechanism of cellular stress and is found in many types of cancer cells. According to these findings, Paclitaxel might have a carcinogenic effect by activating this gene. The ATF3 gene seems to help distribute the “seeds” (cancer cells) and fertilize the “soil” (the tissues) by improving the tissue microenvironment for cancer cells to develop and flourish.

*Karagiannis G, Pastoriza J, Wang Y, et al., “Neoadjuvant chemotherapy induces breast cancer metastasis through a TMEM-mediated mechanism,” Science Translational Medicine 05 Jul 2017; Vol. 9, No. 397, eaan0026 doi: 10.1126/scitranslmed.aan0026; Chang Y, Jalgaonkar S, Middleton J, Hai T, “Stress-inducible gene Atf3 in the non-cancer host cells contributes to chemotherapy-exacerbated breast cancer metastasis,” Proceedings of the National Academy of Sciences USA, 2017 Aug 22; 114(34): E7159-E7168; doi: 10.1073/pnas.1700455114. Epub 2017 Aug 7.*

#### **Glyphosate in Water**

In the 1990s, regulators at the U.S. Environmental Protection Agency determined that 1.75 mg per kilogram of bodyweight per day is the safe allowable daily intake level for glyphosate. According to the EPA website, glyphosate is among a list of “Regulated Drinking Water Contaminants.” But the website also says that long-term exposure to glyphosate at only 700 ppb can cause people “problems with their kidneys or reproductive difficulties.” It states that there is a risk of exposure in drinking water due to “runoff from herbicide use.”

Total exposure is much greater than industry scientists and U.S. regulators originally estimated. Independent research shows that probable harm to human health begins at really low

levels of exposure – at only 0.1 ppb of glyphosate. 0.1 ppb is the permitted level for glyphosate and all other herbicides in European Union tap water.

EPA, *Drinking Water Contaminants – Standards and Regulations, Table of Regulated Drinking Water Contaminants*, at <https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants#Inorganic>; Mesnage R, Arno M, Costanzo M, Malatesta M, Seralini G, Antoniou M, “Transcriptome profile analysis reflects rat liver and kidney damage following chronic ultra-low dose Roundup exposure,” *Environmental Health*, 2015;14:70, at. <http://ehjournal.biomedcentral.com/articles/10.1186/s12940-015-0056-1>.

## Round it Down! Glyphosate in Food

Laboratory studies have measured the quantities of glyphosate in common snack foods. Co-laboratory Director Vu Lam of Anresco Laboratories in San Francisco says, “We use LC/MS/MS to detect Glyphosate and AMPA. With our modifications to various methods, we are able to detect many levels of contaminants in food products at levels as low as 5 ppb, and even lower.”

Here are a few samples of glyphosate levels: Cheerios – 1125.3 ppb, Wheaties – 31.2 ppb, Corn Flakes – 78.9 ppb, Special K – 74.6 ppb, Ritz Crackers – 270.24 ppb, Oreo Original – 289.47 ppb, Lay’s Potato Chips – 452.71 ppb, Fritos Corn Chips – 174.71 ppb, 365 Organic Golden Round Crackers – 119.12 ppb.

<https://detoxproject.org/food-testing-results/>

## Glyphosate in Humans and Animals

Scientists found that “chronically ill humans had significantly higher glyphosate residues in urine than healthy humans” in a study on humans and livestock. People who eat conventional diets have much higher glyphosate residues than those who eat organic food. In a study published in the *Journal of Environmental & Analytical Toxicology*, researchers state that “Glyphosate was significantly higher in humans [fed] conventional [food] compared with predominantly organic [fed] humans. Also the glyphosate residues in urine were grouped according to the human health status. Chronically ill humans had significantly higher glyphosate residues in urine than healthy humans.”

German scientists investigating the increased incidence of botulism disease in cattle over the past 10-15 years have found that glyphosate and Roundup<sup>®</sup> were toxic to beneficial gut bacteria that inhibit the growth of the botulism-causing bacterium *Clostridium botulinum*, but non-toxic to the botulism-causing bacteria themselves. In other words, glyphosate supports the growth of botulism-causing bacteria. The conclusion of the researchers was that ingestion of glyphosate-contaminated feed could be a significant factor predisposing poultry to diseases caused by *Clostridium botulinum* and could also possibly explain the now-widespread contamination of poultry products with pathogenic Salmonella and *E. coli* strains.

Recent independent peer-reviewed studies found that low doses of Roundup<sup>®</sup> or glyphosate-based herbicides were likely to damage the liver and kidneys of rats at ultra-low-dose levels “in the range of what are now generally considered ‘safe’ for humans.”

Krüger M, Schledorn P, Schrödl W, Hoppe H, Lutz W, et al., "Detection of Glyphosate Residues in Animals and Humans," *Journal of Environmental and Analytical Toxicology*, 4:210 (2014); Krüger M, Shehata A, Schrödl W, Rodloff A, "Glyphosate suppresses the antagonistic effect of *Enterococcus* spp. on *Clostridium botulinum*," *Anaerobe*, 2013;20:74-78, at <https://www.ncbi.nlm.nih.gov/pubmed/23396248>; Shehata A, Schrödl W, Aldin A, Hafez H, Krüger M, "The effect of glyphosate on potential pathogens and beneficial members of poultry microbiota in vitro," *Current Microbiology*, 2013;66(4):350-8, at <http://link.springer.com/article/10.1007%2Fs00284-012-0277-2>; Larsen K, Najle R, Lifschitz A, et al., "Effects of Sublethal Exposure to a Glyphosate-Based Herbicide Formulation on Metabolic Activities of Different Xenobiotic-Metabolizing Enzymes in Rats," *International Journal of Toxicology*, 2014, at <https://www.ncbi.nlm.nih.gov/pubmed/24985121>.

## **Fat Intake Reduces Risk of Cardiovascular Disease**

Fats get a bad rap in conventional medicine because many doctors instruct patients to reduce fat intake even though there are great benefits from consuming healthy fats and oils. According to a recent study published in *The Lancet*, researchers demonstrated that a diet high in fat consumption was associated with a lower mortality than a diet high in carbohydrate intake, which was connected with an *increased* risk of mortality. The study extended over ten years and included 135,335 individuals 35 to 70 years of age from 18 countries in 5 continents. The researchers evaluated the relationship between the consumption of total fat, each type of fat, and carbohydrate intake with total mortality and cardiovascular disease. Surprisingly, a higher intake of *saturated* fat was associated with a reduced risk of stroke. This study should help to demolish the myth that fats are a causal or contributing factor to increased risk of cardiovascular disease mortality.

There was also a review just published in *Circulation* last June in which researchers demonstrated that lowering saturated fats and increasing unsaturated fats, both polyunsaturated and monounsaturated, was associated with lower rates of cardiovascular disease.

Dehghan M, Mente A, Zhang X, et al., "Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study," *The Lancet*, 2017; Aug 28. pii: S0140-6736(17)32252-3; doi: 10.1016/S0140-6736(17)32252-3; Sacks F, Lichtenstein A, Wu J, et al., "Dietary Fats and Cardiovascular Disease: A Presidential Advisory From the American Heart Association," *Circulation*, 2017 Jul 18;136(3):e1-e23; doi: 10.1161/CIR.0000000000000510. Epub 2017 Jun 15.

## **Resveratrol Improves Arterial Rigidity in Diabetics**

Resveratrol is a red-wine polyphenol with powerful antioxidant and anti-inflammatory properties. Resveratrol activates sirtuins, proteins activated by caloric restriction that have anti-sclerotic effects on the arterial wall.

In a study published last July in the *International Heart Journal*, researchers demonstrated improved arterial flexibility in patients with Type-II diabetes mellitus. This study consisted of 50 patients who received either 100 milligrams of resveratrol or a placebo for 12 weeks. The researchers assessed body weight, body mass index, a comprehensive metabolic panel, HbA1c, a lipid profile, oxidative stress markers, blood pressure, and cardio-ankle vascular index, a predictor of future cardiovascular disease. All of the patients followed the same diet and exercise routine. After 12 weeks, the cardio-ankle vascular index and systolic blood pressure significantly decreased in the resveratrol group compared to the placebo group. Oxidative stress also decreased in the resveratrol group.

*Imamura H, et al., "Resveratrol Ameliorates Arterial Stiffness Assessed by Cardio-Ankle Vascular Index in Patients With Type 2 Diabetes Mellitus," International Heart Journal, 2017 Jul 13; doi: 10.1536/ihj.16-373.*