

Baby hormones hacked by glyphosate

Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life? They should not be called “insecticides”, but “biocides” [Rachel Carson].

Think twice about using pesticides

Glyphosate is the active ingredient of broad-spectrum glyphosate-based herbicides (GBH), which are now the most heavily applied herbicides in the world. Glyphosate was first commercialised as Roundup® in 1974, and its initial use in agriculture was limited to preharvest spraying. However, since the introduction of genetically engineered glyphosate-tolerant crops on the United States market in 1996, the agricultural use of GBH has increased 300-fold [Benbrook 2016].



Without and with the use of herbicides

In 2015 the International Agency for Research on Cancer classified glyphosate as a probable human carcinogen. The European Food Safety Authority, following the German Federal Institute for Risk Assessment evaluation, has since declared that glyphosate is unlikely to pose a carcinogenic hazard to humans and the European Chemicals Agency has stated that the available scientific evidence did not meet the criteria to classify glyphosate as a carcinogen, as a mutagen or as toxic for reproduction [Pussemier & Goeyens 2020].

The possible effects of GBH on human health are still subject to intensive public debate on both its potential carcinogenic as well as non-carcinogenic effects. It appears, however, that people easily forget other adverse health effects, including the potential effects on the endocrine system, when the discussion focuses all too often on cancer.

Could glyphosate be a hormone hacker?

Residues of glyphosate and its primary metabolite aminomethylphosphonic acid (AMPA) are commonly detected in air, soil, water and food. It is usually accepted that human glyphosate exposure in the general population is widespread, with recent studies reporting increasing glyphosate and AMPA levels in urine samples from adults [Fagan et al. 2020]. Urinary glyphosate levels are considered good exposure markers because glyphosate is highly hydrophilic, does not bio-accumulate, and is poorly metabolised.

The study, performed by Manservisi et al. [2019], has found that exposure to GBH, including Roundup®, caused reproductive and developmental effects in both male and female Sprague Dawley rats at a dose of 1.75 mg per kg body weight and per day, which is currently considered safe in the United States. Exposure was associated with androgen-like effects, in particular in females, including a statistically significant increase of anogenital distance (AGD) in both males and females, a marked delay of first oestrous and increased testosterone in females. Moreover, hormonal status imbalances were more pronounced in Roundup-treated rats after prolonged exposure.

AGD, the distance between the anus and the genitals, is a sensitive marker of prenatal endocrine disruption, affecting the genital tract development. Exposure to different chemicals including pesticides has already been linked to altered AGD and other adverse endocrine effects [Dalsager et al. 2018].

Recently, a team of international scientists has released a peer reviewed pilot study that suggests the AGD of baby girls is becoming more male-typical, due to their mothers being exposed to glyphosate during pregnancy [Lesseur et al. 2021]. These scientists examined the concentration of glyphosate and its breakdown product AMPA in urine collected in mid-pregnancy in relation to AGD at birth, and found that higher exposure to these pesticide-derived chemicals was associated with a longer (more male-typical) AGD in girls. This association is very reminiscent of the one earlier observed in the rodent study.

These preliminary findings suggest that glyphosate is an endocrine disruptor with androgenic effects in humans. Given the increasing glyphosate exposure worldwide, this is a sign on the wall and we must take it very seriously. Shanna Swan and Jia Chen, who are both lead authors of the paper and Professors at the Department of Environmental Medicine and Public Health of the Icahn School of Medicine at Mount Sinai in New York, conclude that GBH are of significant public health concern because of their widespread and sharply increased usage. Unfortunately, there is still a relative knowledge dearth about their non-cancerous effects, in particular in developing children.

Planning a lifetime together is a noble ambition. Let us try to live up to it!

The inadequate regulation of these chemicals is a major problem. Unlike drugs, which must have a proven record of safety and efficacy before they are admitted to the market, chemicals, including pesticides and many others, are largely presumed innocent before the start. They are considered safe until proven otherwise. This means manufacturers can use chemicals in a wide array of consumer products with little oversight or restriction. Swan [2021] says *it is a bit like the Wild West, lawless and*

untamed. In addition, completed as well as ongoing studies rarely deal with the potentially cumulative or synergistic effects these substances can have when they are mixed inside the human body. Once they are inside us, pesticides cause damage in a variety of ways.

It is today that we need to take care of our youth and that we must prepare for the future of our children and grandchildren. Tomorrow may be too late.

References

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