What to Know about Genetically Modified Organisms (GMOs)

GMOs are genetically altered to display preferred traits for consumers or producers.

Some plants are genetically modified to be resistant to weed killers, or herbicides.

As a result, more chemicals are being passed on to consumers!

Chemicals found in herbicides can pose a health risk, especially to children.

Since these crops are not killed by herbicides, farmers can apply even more chemicals to their fields to control weeds.
Glyphosate-based weedkillers

- Detected on 90% of GM soy samples
- Detected in 27/109 samples of packaged bread
- Detected in oats and oat products
- Probable carcinogen (IARC, Class 2B)
- Studies find evidence of:
  - Hormone disruption
  - Neurotoxicity
  - Antibiotic resistance
  - Birth defects
~90% of corn and soy grown in the U.S. is genetically modified.
The Pesticide Treadmill

Glyphosate Use 1992-2013

Use by Year and Crop

Estimated use in million pounds


- Other crops
- Pasture and hay
- Alfalfa
- Orchards and grapes
- Rice
- Vegetables and fruit
- Cotton
- Wheat
- Soybeans
- Corn
Glyphosate usage in the U.S.

Estimated Agricultural Use for Glyphosate, 1992
EPest-Low

Estimated use on agricultural land, in pounds per square mile
- < 4.52
- 4.52 - 21.12
- 21.13 - 88.06
- > 88.06
- No estimated use

Estimated Agricultural Use for Glyphosate, 2013 (Preliminary)
EPest-Low

Estimated use on agricultural land, in pounds per square mile
- < 4.52
- 4.52 - 21.12
- 21.13 - 88.06
- > 88.06
- No estimated use

USGS Pesticide National Synthesis Project
Simple Steps to Avoid Genetically Modified Organisms (GMOs)

Check Labels

GMOs are not required to be labeled. Instead, look for these non-GMO labels:

- USDA Organic
- Non GMO Project Verified

Did you know that 90% of corn and soy planted in the U.S. are GMOs? Avoid foods that are most likely to be genetically modified.

Shop at Farmers Markets

Ask your local producers if they use genetically modified seeds.

Grow Your Own Produce

Start growing at home or join a community garden.

Region 2 Pediatric Environmental Health Specialty Unit serving NJ, NY, PR and USVI Toll-free at: 866-265-6201

The Pediatric Environmental Health Specialty Unit program is funded (in part) by the cooperative agreement award number U61TS000237-01 from the Agency for Toxic Substances and Disease Registry (ATSDR). The findings and conclusions of this presentation have not been formally disseminated by the ATSDR and should not be construed to represent an agency determination or policy. Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing funds to ATSDR under Inter-Agency Agreement number DW-7592301301-0. Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications.
Food Packaging: Endocrine Disrupting Chemicals

- Substances that change the way hormones act in your body
- Present in many every day products
- Linked to reproductive defects, cognitive and behavioral problems, cancer, obesity, and metabolic defects
Bisphenol A and Bisphenol S

- Act like Estrogen
- May affect the thyroid
- Associated with:
  - Altered child behavior
    - Hyperactivity and impaired learning
    - Conduct disorder
  - Early puberty
  - Increased body weight
  - Cardiovascular disease and diabetes
Bisphenol A exposure through canned soup

Figure. Geometric Mean Specific Gravity–Adjusted Urinary Bisphenol A Concentration After a Week of Soup Consumption by Treatment Sequence

Phthalates

- Anti-androgenic (testosterone)
- Act like estrogen
- Interferes with thyroid hormone
- Inflammatory

- Health effects:
  - Reproductive defects
  - Increased breast cancer risk
  - Obesity
  - Asthma, allergy, eczema
  - Cognitive and behavioral deficits
Dietary phthalate exposure in children from high fat meats and dairy

EPA RFD: 20µg/kg day
Unexpected results in a randomized dietary trial to reduce phthalate and bisphenol A exposures

Table 4. DEHP concentrations in foods used in Arm 1 dietary intervention.

<table>
<thead>
<tr>
<th>Category</th>
<th>Food</th>
<th>DEHP concentration (ng/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>Butter</td>
<td>595</td>
</tr>
<tr>
<td></td>
<td>Heavy cream</td>
<td>488</td>
</tr>
<tr>
<td></td>
<td>Milk</td>
<td>673</td>
</tr>
<tr>
<td></td>
<td>Cheese</td>
<td>396</td>
</tr>
<tr>
<td></td>
<td>Egg yolk</td>
<td>39</td>
</tr>
<tr>
<td>Meats</td>
<td>Beef</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Pork</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Lamb</td>
<td>49</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>Peanut butter</td>
<td>164</td>
</tr>
<tr>
<td>Cane sugar</td>
<td>Cane sugar</td>
<td>&lt;34</td>
</tr>
<tr>
<td>Honey</td>
<td>Honey</td>
<td>&lt;28</td>
</tr>
<tr>
<td>Oats</td>
<td>Oats</td>
<td>32</td>
</tr>
<tr>
<td>Spices</td>
<td>Salt/pepper</td>
<td>&lt;26</td>
</tr>
<tr>
<td></td>
<td>Cayenne pepper</td>
<td>707</td>
</tr>
<tr>
<td></td>
<td>Star anise</td>
<td>&lt;210</td>
</tr>
<tr>
<td></td>
<td>Ground coriander</td>
<td>21400</td>
</tr>
<tr>
<td></td>
<td>Cumin</td>
<td>&lt;181</td>
</tr>
<tr>
<td></td>
<td>Ground cinnamon</td>
<td>958</td>
</tr>
<tr>
<td></td>
<td>Canola oil</td>
<td>&lt;28</td>
</tr>
</tbody>
</table>

Microwaving and storing food in plastic wrap or containers

Plastic numbers 3, 6, and 7

Floor tiles and school supplies with PVC/Vinyl

Buying/drinking bottled water

Excessive handling of thermal receipts with BPA

Reusing disposable plastic beverage bottles

Canned foods or baby formula

#3 Vinyl (PVC) Plastic Wrap
Plastics labeled “BPA FREE” – which is now the law for baby bottles and sippy cups.

Glass containers or stainless steel reusable water bottles.

Wax paper bags and parchment paper or cloth.

Electronic receipts (via email, text).

PVC/Vinyl-Free Flooring and School Supplies.

Fresh or frozen produce; breast feed or use powdered infant formula.

Glass, Pyrex or porcelain to microwave and paper towels to prevent splatter.

Tap water.
A Consumer’s Guide to Food Shopping

Top 7 Tips for Food Shopping Smart

- Don’t trust terms like “natural” or misleading “healthy” images; always read the ingredients list carefully.
- Purchase USDA certified organic or Non-GMO Project Verified products when possible to avoid exposure to pesticides.
- Shop the “clean fifteen”; avoid the “dirty dozen” (http://www.ewg.org/foodnews/index.php).
- Shop farmer’s markets or join a Community Supported Agriculture program (CSA) where you can meet the farmer and ask about pest control and agricultural practices.
- Choose meat and dairy products raised without antibiotics and synthetic hormones.
- Choose fresh, whole foods; avoid packaged foods with artificial flavor, color, and preservatives.
- Choose fresh or frozen; avoid canned foods that may be lined with chemicals that interfere with hormones.

http://tceee.icahn.mssm.edu/outreach/translational-research-and-fact-sheets/
Simple Steps

- Avoid the Dirty Dozen and embrace the Clean Fifteen
- Avoid #3, 6, and 7 plastics (5, 4, 1, 2 all the rest are bad for you!)
- Use fewer products
- Read labels; avoid “greenwashing”
- Avoid aerosolized sprays and loose powders
- Ventilate
- Wash hands with plain soap and water
- Leave your shoes at the door
- Reduce dust: wet mop, HEPA vacuum
- Make your own cleaners with baking soda, vinegar, and lemon juice
Simple Steps, Broad Impact

– **Support companies** that are reducing the use of toxic chemicals and untested ingredients
– Support companies that **disclose all ingredients**
– Support **research** on the effects of common chemicals – science is needed to inform policy.
– Support legislation that protects children from harmful environmental exposures.
– Utilize your social networks to **educate others**!
The Good News

- Parents are the best advocates!
- Consumer pressure works (BPA, Mars candy, Kraft, General Mills, J&J, P&G, Walmart, Target)
- Accelerating research and emerging green chemistry
- Many chemicals of concern are not persistent
- Benefits of good nutrition, exercise, nature, and positive social environment
Thank You!