

## Seeds, Food & Health in the age of Genetic Engineering: An Overview

### I. Growing plants (Gardening)

#### A. Home Gardens – Heirloom Gardening

1. Purchase from seed companies and seed collection groups– certified non-GMO through genetic testing (best)
2. Food for a family
3. Food shared at farmer’s markets
4. Resources (a few examples, not a comprehensive list)
  - Baker creek seeds <http://www.rareseeds.com/>
  - Seeds of Change <https://www.seedsofchange.com/home.aspx>
  - Rescuing ancient seeds from Syria (2015)  
<https://www.theatlantic.com/science/archive/2015/09/rescuing-ancient-seeds-from-a-war-torn-city/406978/>
5. Heirloom Gardening
  - Plants produce seeds and those seeds produce more plants.
  - No packaged chemicals used (e.g., box pesticides or herbicides)

#### B. Commercial Gardens (Farms)

1. Often very large, many acres.
2. Often one crop
3. Must be profitable
4. Seed costs controlled by seed producers (large volume seeds)
  - Seed prices <https://emergence.farmersbusinessnetwork.com/corn-seed-prices-by-state>
5. Commercial Organic Farms are increasing in numbers as consumers demand better food, free of chemicals and GMOs

#### C. Herbs

1. Classified as both Culinary and Medicinal (a few examples, not a complete list)
  - a) Dandelion (www.organicfacts.net )
  - b) Thistle
  - c) Rosemary
  - d) Thyme
  - e) Oregano
  - f) Basil
  - g) Turmeric
  - h) Ginger
2. Classified as Medicinal only (do not eat)
  - a) Foxglove (Digitalis sp.)
3. Easily grown under many conditions (pots, raised garden beds, in-ground gardens, etc.)
4. sometimes classified as weeds and targeted by herbicide chemical companies
  - a) Dandelion (www.organicfacts.net )
  - b) Thistle
  - c) CAUTION: Do not eat “weed” herbs from the yard or side of the road unless you know that those have never been sprayed.

#### D. Other plants used as food with medicinal qualities

1. Classified as both Culinary and Medicinal
  - a) Beets,
  - b) Garlic,
  - c) Onions,
  - d) Beets, Garlic, Onions,
2. Classified as Medicinal only (do not eat)
  - a) Foxglove (*Digitalis* sp.)

#### E. What can we do to ensure that we are able to collect and share seeds that produce plants with more seeds?

1. Learn about Herbs (a few resources)
2. Learn to grow Herbs and Veggies
3. Learn how to collect and store seeds.
4. Share seeds.
5. Teach Children to grow plants and share seeds.
6. Allow the “weed” herbs to grow (soil improvement) and do not spray with herbicides.

#### F. Two ways to modify or generate genetically “new” plants:

1. Traditional Hybrids = Traditional Plant Breeding that results in
  - a) Genetically Unique Plants, often a cross between 2 heirloom varieties.
  - b) Hybrids do not produce “true” (plants from seeds usually do not look like the plant from which the seeds originated; e.g., roses, tomatoes, etc.,)
  - c) Heirloom plant seeds produce “true” (seeds produce plants that look like parent with desired fruit, etc.--- e.g., black-eyed peas)
  - d) Technology-facilitated (greenhouses or sterile tissue culture rooms, or combinations of both) to produce hybrids.
  - e) Hydroponics is usually technology-based, but there are variations.
2. Laboratory Science, Genetic Manipulations (often called GMOs, sometimes see “GE” for genetically engineered—read the label on a bag of chips, any kind with corn)
  - a) adding foreign genes (inserting genes into a plant, e.g., bt gene, or gene for herbicide resistance, etc.)
  - b) Editing Genes – CRISPR
    - “Fixing” mutations
    - Turning genes “off” that are normally “on”. For example, stop apples from rotting by turning “off” the gene “responsible” for degradation.
    - Turning genes “on” that are normally “off”.
  - c) CRISPR resources
    - The next generation of genetically modified organisms may be generated using CRISPR [https://www.washingtonpost.com/news/wonk/wp/2017/06/13/how-one-company-plans-to-change-your-mind-about-genetically-edited-food/?utm\\_term=.aea71da1e0ff](https://www.washingtonpost.com/news/wonk/wp/2017/06/13/how-one-company-plans-to-change-your-mind-about-genetically-edited-food/?utm_term=.aea71da1e0ff)
    - Apples that don’t brown. <https://www.technologyreview.com/s/609080/gm-apples-that-dont-brown-to-reach-us-shelves-this-fall/>

- d) GMO resources
  - GMO crops can escape into heirloom crop fields <http://gmwatch.org/en/news/latest-news/17625>
  - GMO wheat in Washington State <https://www.ecowatch.com/monsantos-unapproved-gmo-wheat-growing-washington-1954609745.html>
  - GMOs are banned in Russia <https://www.rt.com/business/403932-russia-organic-food-export-gmo/>
  - Crops now grown as GMOs (and heirlooms) <https://gmoanswers.com/current-gmo-crops>
  - GMOs are found in many foods <http://beyondpesticides.org/dailynewsblog/2017/07/labeling-genetically-engineered-food-look-like-usda-seeks-input/>

## G. Herbicides

1. Used to kill GMO plant competitors (“weeds”) that do not have the herbicide-resistance gene (GMOs are protected).
2. Used to reduce the amount of time that it takes to harvest non-GMOs
  - a) frequently on Commercially grown non-GMO Wheat
  - b) NON GMO wheat without Glyphosate is Organically grown
3. Common Herbicides used with GMOs – Glyphosate
  - a) Glyphosate, active ingredient in Roundup™
  - b) Glyphosate. Dr. Thierry Vrain, former genetic engineer and soil biologist with Agriculture Canada, spoke with us today about his concerns with genetically engineered crops (GMOs) and more importantly, the use of Glyphosate (RoundUp). Dr. Vrain’s background in the field of genetic engineering (for 30 years), makes him an expert on this gene technology. He explained how a cell is genetically engineered and what happens after this random insertion process through a gene gun and how it can have unknown effects. <https://www.youtube.com/watch?v=bN3LXjijlg&t=15s>  
Published on Oct 21, 2015
  - c) Damaging to soil-friendly bacteria <http://sustainablepulse.com/2017/10/07/cornell-university-research-shows-glyphosate-damages-soil-friendly-bacteria/#.Wd1g0ltSyUn>
  - d) What do we really know about glyphosate?  
<http://news.nationalgeographic.com/2015/04/150422-glyphosate-roundup-herbicide-weeds/>
  - e) BIOINTEGRITY website <http://biointegrity.org/#>
4. Common Herbicides used with GMOs – Dicamba
  - a) Herbicide resistance in weeds <http://www.capitalpress.com/Oregon/20170725/sugar-beet-growers-battle-glyphosate-resistant-kochia>
  - b) Dicamba drift in Arkansas <https://www.reuters.com/article/us-usa-pesticides-arkansas/arkansas-one-step-from-ban-on-controversial-herbicide-next-summer-idUSKCN1BW33A>
  - c) Dicamba drift, in general <https://www.alternet.org/food/how-monsanto-devastating-thousands-farms-across-20-states#.WblhEymN2MY.twitter>
  - d) Dicamba drift Statistics provided by University of Missouri  
<https://ipm.missouri.edu/IPCM/2017/8/Update-on-Dicamba-related-Injury-Investigations-and-Estimates-of-Injured-Soybean-Acreage/>

5. Trend with GMOs is an increase – NOT decrease --- in herbicide use
  - a) Overview [http://non-gmoreport.com/articles/largest-ever-study-finds-gm-crops-increased-herbicide-use-28-percent/?utm\\_content=buffer6bdb2&utm\\_medium=social&utm\\_source=twitter.com&utm\\_campaign=buffer](http://non-gmoreport.com/articles/largest-ever-study-finds-gm-crops-increased-herbicide-use-28-percent/?utm_content=buffer6bdb2&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer)
  - b) Video about herbicides <https://www.youtube.com/watch?v=uDum7GGuOTA>

## H. Health

1. Common Herbicides used with GMOs – Glyphosate
2. Mechanism of glyphosate in the body. Implicated in disease. (Dr. Stephanie Seneff, MIT) <https://people.csail.mit.edu/seneff/>
3. Glyphosate toxicity in grazing animals, described by a Veterinarian. <http://doctorted.ca/animal-production-news/without-prejudice/>
4. **Gut Bacteria (“probiotics”)** provide signals that can alter what is “expressed” from our DNA. In other words, these beneficial bacteria are able to modify the instructions that are sent from DNA to the cells, tissues and organs, and nervous system. <http://www.sciencedirect.com/science/article/pii/S1471490614001690>
5. These microbes also influence how vaccines work (or not) in our systems. <http://www.sciencedirect.com/science/article/pii/S1471490614001148>
6. Amazon book – mind/gut connection [https://www.amazon.com/Mind-Gut-Connection-Conversation-Impacts-Choices/dp/0062376551/ref=redir\\_mobile\\_desktop?encoding=UTF8&psc=1&refRID=3QMBPZSSYESN8PS2JAV1&ref\\_=pd\\_aw\\_fbt\\_14\\_img\\_2#productDescription\\_secondary\\_view\\_div\\_1499277887428](https://www.amazon.com/Mind-Gut-Connection-Conversation-Impacts-Choices/dp/0062376551/ref=redir_mobile_desktop?encoding=UTF8&psc=1&refRID=3QMBPZSSYESN8PS2JAV1&ref_=pd_aw_fbt_14_img_2#productDescription_secondary_view_div_1499277887428)
7. Microbial Communities and Transgenic Crops: Understanding the Role Transgenic Crops May Play in the Rise of Antibiotic Resistance. Dissertation. 2017. **Microbes can take up the foreign genes and express them.** [https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/14394/Gardner\\_duke\\_0066D\\_13841.pdf?sequence=1](https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/14394/Gardner_duke_0066D_13841.pdf?sequence=1)

## I. Germ Theory (1) versus Immune System (2&3)

1. Germ Theory --- when exposed to “germs” we become sick.
  - a) Proposed by Louis Pasteur
  - b) “Pasteurization” kills unwanted microorganisms in dairy, for example.
2. Not everyone becomes sick from exposure to germs – the Immune system mediates health
  - a) A healthy immune system is very effective at preventing sickness.
  - b) A compromised immune system is very ineffective at preventing sickness
3. Environmental chemicals challenge the immune system
  - GMOs -- found in many foods <http://beyondpesticides.org/dailynewsblog/2017/07/labeling-genetically-engineered-food-look-like-usda-seeks-input/>
  - a) Glyphosate
    - Dr Stephanie Seneff – glyphosate implicated in nerve damage, celiac disease, and other disease <https://people.csail.mit.edu/seneff/>
    - (Seneff) Acetobacter bacteria found in unpasteurized apple cider vinegar and fermented veggies like sour kraut juice, are able to break down glyphosate.

- b) Every day Chemicals (read the labels)—do a little research here
    - Parabens (methyl-, ethyl-, poly-, etc.) “endocrine disruptors”
    - Carrageenen (damages the “gut” – it is in many, many things, read the label.
    - Fluoride (review Nuremberg trials and how the Nazis used Fluoride)
    - NaCl Sodium Chloride, table salt, may also contain dextrose (sugar), aluminum, and baking soda. Sea Salt is grey and “chunky”, never white and chunky (white means minerals are removed). Use Celtic sea salt or Himalayan pink salt.
    - Sugar – one of the most toxic things we consume. Limit it as much as possible.
    - Aspartame – artificial sweetener – look up information about this chemical.
    - Junk food (check labels for genetic engineered materials)
  - c) Vaccines
    - Flu shots <http://www.research.news/2017-10-17-bombshell-flu-shots-scientificallly-proven-to-weaken-immune-response-in-subsequent-years-researchers-stunned.html>
    - A few chemicals and “other” found in Vaccines Thimerosal (mercury), aluminum, cells, DNA, RNA, aborted fetal cells.
4. Foods for a healthy immune system
- a) Angelina Jolie’s breast cancer surgeon <https://www.naturalnews.com/2017-10-06-angelina-jolies-breast-cancer-surgeon-dubbed-dangerous-for-urging-women-to-buy-organic-and-eat-fresh-berries-to-help-prevent-cancer.html>
  - b) (Jolie’s surgeon) <http://abcnews.go.com/Health/angelina-jolies-doctor-shares-top-10-breast-cancer/story?id=50240558>
  - c) Traditional herbalism has been officially regarded as a method of alternative medicine in the United States since the [Flexner Report](#) of **1910** led to the closing of the [eclectic medical schools](#) where botanical medicine was exclusively practiced.
  - d) Herbal Medicine as an alternative medicine faqs <http://www.americanherbalistsguild.com/legal-and-regulatory-faqs>
  - e) Find the American Botanical Council – in Austin, TX, also on the web.
5. A few other resources (free online)
- a) **Health Ranger (Mike Adams)** —Analytical Chemist, former military, tests food items for heavy metals, pesticides, and other foreign materials. Publishes a blog with free subscription by email, and sells tested items. Dr Russell Blaylock has appeared on Health Ranger’s Natural News blog (look up Dr Russell Blaylock).
  - b) **Dr Mercola** —publishes a blog with free subscription by email, sells health-related items.
  - c) **Dr Berg (YouTube)** – short videos, informative and in common language.

*“To render (through ignorance) if not fatal, at all events incurable, the vast majority (99/100) of all diseases, namely, those of a chronic character, by continually weakening and tormenting the debilitated patient, already suffering without that from his disease and by adding new destructive drug diseases, this clearly seems to be the unhallowed main business of the old school of medicine (allopathy) and a very easy it is when once one has become adept in this pernicious practice, and is sufficiently insensible to the stings of conscience!”*

<http://www.awaken.com/2013/07/quotes-by-samuel-hahnemann/>

## J. What is Geoengineering?

1. David Keith, MIT. Recommends loading sulfuric acid into the atmosphere. (<https://keith.seas.harvard.edu/>)

2. "Frankenskies" video

a) Trailer <https://www.youtube.com/watch?v=N9X7tqx9fNQ&feature=youtu.be>

b) Full length video <https://www.youtube.com/watch?v=zNeOTOytEeA>

