GMO-related Dangers

Dick Atlee, 3/10/14

1. **Health dangers**
    a. From the GMO technology itself
        1. Damaged DNA
            1. Reproductive damage in both the GMO plant and the consuming animal
            2. Damaged DNA product: proteins
            3. Cancers
        2. Altered proteins (shown in proteomic studies)
            a. Significance: proteins are the basis for biochemical activity in both the plant and the consuming animal, mostly in the form of enzymes
            b. Types of alteration
                1. Totally new proteins
                2. Truncated proteins
                3. Different protein folding arrangements, creating different bio-activity
            c. Role of damaged proteins (potentially deadly)
                1. Toxins
                2. Allergens
        3. Altered levels of expression of non-targeted genes, caused by GM promoter gene
        4. Altered nutritional characteristics of plant
        5. GM gene transfer to gut bacteria has occurred, raising the possibility of:
            a. Antibiotic-resistance (due to the always-present antibiotic marker gene)
            b. Bt insecticide production in the gut
    b. From chemicals used in conjunction with GMOs
        1. Direct -- farm workers and farm neighbors
            a. Allergies
            b. Cancers
        2. Indirect
            a. Source
                1. Air and water (Midwest, up to 90% of samples contaminated)
                2. Consumed food
                    a. On plant surface -- washable
                    b. Incorporated into plant -- can't wash out
                    c. Examples: Roundup-Ready in European city dwellers, Bt in Canadian blood
            b. Roundup/glyphosate
                1. Used in sharply increasing quantities, as increased GMO use creates superweeds
                2. Contaminates not only GMO's but other crops through pre-harvest "desiccation"
                3. Biological effects
                    a. Kills beneficial gut bacteria, favors pathogens
                    b. Interferes with shikamate metabolic pathway and P450 cytochrome enzymes
                    c. Alters cholesterol and sulfate metabolism
                    d. Chelates (renders unavailable) minerals vital to enzyme function
                    e. Damages gut cellular lining -> leaky gut
                4. These effects are at such a fundamentally basic level that a large range of diseases are functionally related or correlated -- allergies, Alzheimer's, autism, cancer, diabetes, gastrointestinal (Crohn's, colitis, irritable bowel), heart disease, obesity, nervous/neurological (aggression, anxiety, depression, MS, Parkinson's), reproductive (low fertility, birth defects, low birth weight), thyroid problems
    c. Anecdotal evidence -- thousands of sick people have had a large variety of illnesses vanish (immediately to several months) when their doctors ordered non-GMO diet.

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2. **Farming losses and damage**
    a. Economic losses/intimidation
        1. Loss of world markets that don't accept GMOs -> plummeting prices
        2. Decreased yields because GMOs not well adapted to local conditions

3. Developing debt dependency due to increasing chemical-input requirements (e.g., 250,000 Indian farmer suicides in last ten years due to Bt cotton)
4. Inability to save seeds for following year
5. Monsanto lawsuits for accidental contamination or seed-saving

b. Cultural loss -- Monsanto's hotline and bounty for neighbors reporting neighbors
c. Agricultural damage
   1. Soil damage -- soil bacteria killed, wrecking soil loft and absorbability
   2. Promotion of serious pervasive monoculture
   3. Development of superweeds and superbugs
   4. Displacement of often-more-successful agricultural varieties/approaches
d. Animal damage
   1. Domestic and wild animals of all kinds will refuse/avoid GMOs if possible.
   2. Widespread internal/external disease and reproductive damage in GMO-fed farm animals, reversed in every case by stopping GMO food.
   3. Example: New Zealand hogs now used for sausage casings -- US hog guts too fragile.

5. Organic farming threatened
   1. GM contamination of organic farms kills their organic certification
   2. GM corn genes found thousands of miles away in central Mexico (birthplace of corn)
   3. GM-induced insect Bt adaptation is eliminating organic agriculture's main insect controller

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3. Environment loss/damage

a. Biological
   1. "Pollution with legs"
      a. Self-reproducing -- can't call it back
      b. Chemical pollution dilutes, while genetic pollution multiplies and spreads
   2. Loss of biodiversity
      a. Farmer selection of a narrower range of varieties
      b. Chemical poisoning of all other plant life
b. Chemical
   1. Roundup not as biodegradable as first claimed
   2. Superweeds prompting an herbicide arms race of increasing-toxicity: approval now requested for GMOs resistant to 2,4-D (Agent Orange) and worse.

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4. World food supply threat

a. Increasing concentration in fewer and fewer companies
b. Increasing prevalence -- 90% of US soy, 95% of US corn, 95% of Canadian canola
c. Single-year seed technology -- impossible to save for next year: must buy every year
   1. Terminator technology -- second-year seeds won't germinate
   2. Activator technology -- seeds won't germinate without proprietary chemical
d. History of food control -- Progression since WWII
   1. 50s-60s: Green Revolution
      a. Destroyed native varieties
      b. Requiring unsustainable chemical inputs
      c. Forced out smaller farmers -> large-holding consolidation
   2. 70's: Food as a weapon of controlling population behavior (Henry Kissinger)
   3. 80's-00's: Genetic Revolution (continuing effects of Green Revolution, w/a-b-c above)
   4. 10's: Trade agreements to supersede national limits on GMOs
   5. Common factor in all: Rockefeller financing and influence
e. Hope (tempered by 4.d.4, above)
   1. Market-based solution has been working: consumer rejection -> producer rejection
   2. Education about GMOs has prompted
      a. World-wide rejection (except North America and UK)
      b. Increasing awareness in U.S. (through GMO-labeling efforts)
   3. Monsanto's 1999 5-year plan to control 100% of seeds never succeeded