Behavior, Learning and Health

The Dietary Connection

About Us

The Feingold® Association of the United States, Inc., founded in 1976, is a non-profit organization whose purposes are to generate public awareness of the potential role of foods and synthetic additives in behavior, learning, and health problems, and to support its members in the implementation of the Feingold Program.

Neither a diagnosis nor a prescription is required to use the Feingold Program as a healthy diet choice for children and adults.

The Feingold Association does not endorse, approve or assume responsibility for any product, brand, method or treatment. The presence (or absence) of a product on a *Feingold Foodlist*, or the discussion of a method or treatment does not constitute approval (or disapproval). The *Foodlists* are based primarily upon information supplied by manufacturers and are not based upon independent testing.

This booklet is for educational purposes only. This information is not intended to replace competent medical diagnosis and care.

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BEHAVIOR, LEARNING AND HEALTH

The Dietary Connection

Edited by: Shula Edelkind
Printed in Soy Ink by: Graphic Ventures, Atlanta, GA

We thank our supporters

Susan and Marty Berkoff
Betty Ruth and Milton Hollander
Kuriansky Foundation
B. L. Manger Foundation
Alice D. McDonald
Melissa and Greg Milbank
Annette and William Miller

and

the many members and friends
of the
Feingold Association
who have helped make the
printing of this book possible

a special thanks to
our Feingold staff, medical advisors
and volunteers

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Symptoms That May Be Helped by the Feingold Program

A person who may be helped by the Feingold Program displays more of the following symptoms more frequently and to more of an extreme than the average person.

Behavior

MARKED HYPERACTIVITY
- ☐ Constant motion
- ☐ Running instead of walking
- ☐ Inability to sit still
- ☐ Inappropriate wiggling of legs / hands

IMPULSIVE ACTIONS
- ☐ Disruptive behavior / disturbs others
- ☐ Unresponsiveness to discipline
- ☐ Poor self-control
- ☐ Destructive: throws, breaks things
- ☐ Little or no recognition of danger to self
- ☐ Unpredictable behavior
- ☐ Inappropriate noises
- ☐ Excessive and/or loud talking
- ☐ Interrupts often
- ☐ Abusive behavior to people or pets

COMPULSIVE ACTIONS
- ☐ Perseveration (repeating an activity)
- ☐ Touching things / people
- ☐ Aggression
- ☐ Workaholic habits
- ☐ Chewing on clothing, other objects
- ☐ Scratching, biting, picking at skin

EMOTIONAL CONCERNS
- ☐ Low frustration tolerance
- ☐ Sensitive to touch, pain, sound, lights
- ☐ Depression
- ☐ Frequent crying
- ☐ Demands immediate attention
- ☐ Irritability
- ☐ Panics easily
- ☐ Nervousness
- ☐ Low self-esteem
- ☐ Mood swings
- ☐ Suicidal thoughts

Learning / Developmental

SHORT ATTENTION SPAN
- ☐ Impatience
- ☐ Distraction
- ☐ Failure to complete projects
- ☐ Inability to listen to whole story
- ☐ Inability to follow directions

NEURO-MUSCULAR INVOLVEMENT
- ☐ Accident prone
- ☐ Poor muscle coordination
- ☐ Poor eye-hand coordination
- ☐ Difficulty writing
- ☐ Dyslexia / reading problems
- ☐ Speech difficulties / delays
- ☐ Difficulty with playground activities, sports
- ☐ Eye-muscle disorder (nystagmus, strabismus)
- ☐ Tics
- ☐ Seizures

COGNITIVE & PERCEPTUAL DISTURBANCES
- ☐ Auditory processing problems
- ☐ Visual processing problems
- ☐ Comprehension & short term memory difficulty
- ☐ Disturbed spatial orientation (up-down; left-right)
- ☐ Reasoning difficulty (math problems or word meaning)

Health / Physical Complaints

POOR SLEEP HABITS
- ☐ Resists bedtime
- ☐ Can't fall asleep
- ☐ Restless/erratic sleep
- ☐ Nightmares, bad dreams

FREQUENT PHYSICAL COMPLAINTS
- ☐ Ear infections
- ☐ Asthma
- ☐ Leg aches
- ☐ Bed wetting
- ☐ Stomachaches
- ☐ Constipation
- ☐ Day wetting
- ☐ Headaches
- ☐ Diarrhea
- ☐ Hives or rashes
- ☐ Congestion

The Feingold Program

The Feingold Program addresses additive and salicylate sensitivity. The Feingold Association of the United States (FAUS) provides its members with comprehensive information on brand name foods and nonfood products that are free of the indicated additives.

Stage One:

Stage One is the initial period during which the items listed below are eliminated from the diet.

- **Artificial (synthetic) colors**
  Food dye may be listed as "food coloring," "U.S. certified color," "certified color," or "color added." It may also be listed by its FDA number (*i.e.*, "FD&C Yellow #5"), by its "E" number in Europe (*i.e.*, E-102), or by its name (*i.e.*, "Tartrazine"). Sometimes the words "artificial color" or "color added" actually refer to a natural coloring such as carmine or titanium dioxide. You will not know this, however, without a Feingold Association's *Foodlist & Shopping Guide,* which is available in the U.S. and Canada. In other countries, you need to learn your E-numbers. *See page 6 for more information on colorings in the U.S.*

- **Artificial (synthetic) flavors**
  Artificial vanilla (vanillin) is a synthetic flavoring generally identified by name. Most of the thousands of artificial flavors are listed only as "flavoring," "artificial flavoring" or "natural & artificial flavoring."

- **Three preservatives**
  BHA (Butylated Hydroxyanisole)
  BHT (Butylated Hydroxytoluene)
  TBHQ (Tertiary Butylhydroquinone)

In the U.S., the Feingold Program materials simplify the process of finding suitable foods and other products.

- **Aspartame**
  Aspartame and similar sweeteners - Equal, Nutrasweet, Spoonful, Equal-Measure, Benevia, Misura, NatraTaste, E951, Neotame, Alitame – are now excluded from the Feingold Program.

  Sucralose (Splenda) and other synthetic sweeteners are not officially excluded, but products containing them are not added to the *Foodlist & Shopping Guide*. Products containing alcohol sugars (names end in *"-ol")* are allowed, but marked with a "(CS)" since they are related to corn syrup. Stevia and agave are sweeteners made from plants, and they are allowed. *See page 36 for more information.*

- **Salicylates**
  These are chemical compounds found in some foods, medicines, and personal care products. *See page 8 for more information.*

Stage Two:

After observing a favorable response to Stage One, salicylates may be reintroduced and tested for tolerance one at a time. While some people find they need to remain on Stage One, others are able to tolerate some salicylate-containing items occasionally, and still others can eat them freely. The artificial colors, flavors, preservatives, and sweeteners listed above are not reintroduced.

Some chemical additives are not routinely eliminated, but products containing them are marked in the *Foodlist & Shopping Guide*, so that they can be avoided at the start of the diet or later if necessary. They are: Calcium Propionate (CP), Corn Syrup (CS), Sulfite (SF), Sodium Benzoate (SB), Monosodium Glutamate (MSG/HVP), Nitrites/Nitrates (N), and Natural Smoke Flavor (SM).

What the Feingold Association Provides

New Member Package:

- **Getting Started** – a national food list immediately available on line to new members
- **The Feingold Program book** – *indispensable for beginners*
    - Getting Started Section
    - Handbook Section
    - Special Needs Section – introduction to dealing with SAS, Gluten, Casein, Benzoates, Sulfur
    - Recipes & Menu Plan Section
    - Resource Section
        - Information regarding other services and places to get help
        - "Dear Grandma" letter to help explain to relatives and friends what you are doing
    - Appendix
        - Diet Diary Form (to photocopy) – to help pinpoint reaction triggers
        - Shopping List (to photocopy)
- **Foodlist & Shopping Guide** – 150+ page book for your region of U.S. (Canadian book is smaller)
- **Pure Facts Newsletter** – 10 issues a year with *Foodlist* updates and other information
- **Fast Food Guide** – acceptable foods in fast food restaurants
- **Supplements Guide** – to help you find supplements that meet Feingold guidelines
- **Mail Order Guide** – for specialty items and hard-to-find products

Member Services:

- Telephone help-line
- E-Mail help-line
- Monthly e-newsletter and product alerts by e-mail as needed
- On-line support for subscribers to *Pure Facts* – message board, recipes board, chat room, product alerts list, product submission and reaction report forms

Also Available:

- **Book:** *Why Can't My Child Behave? (fourth ed., 2006)* – by Jane Hersey; editor of *Pure Facts.* Based on the experience of thousands of families for several decades, this book provides practical answers. Nearly 400 pages long, it is a valuable companion to the Program materials.
- **Information Packets** for teachers and physicians
- **School Year Calendar**
- **Reprints** of *Pure Facts* articles from previous years
- **Audio CD:** *What are all those funny things in food? . . . and should I eat them?*
- **Book:** *Behavior, Learning & Health* – (this book) commonly called *"The Bluebook"*
- **Book:** *Healthier Food for Busy People: 20 little rules to help you navigate the supermarket* – An entertaining introduction to better nutrition; 38 pages

How to Order Feingold Program Materials:

- **The Program materials** are provided to those who join the Feingold Association. Join on the website **feingold.org** (also called **ADDdiet.com**) or call **1-800-321-3287** (in the United States). In Canada, call 1-631-369-9340.
- **People outside the U.S.** may become an associate member (free) through the website.
- **The books and audio CD** are also available on the website or by calling the numbers above.
- **Financial aid** is available when required, subject to available funds. Contact the Membership Office at the number above if you need a reduced membership fee.

Frequently Asked Questions

1. Who was Dr. Feingold?

Ben F. Feingold, M.D. was both a pediatrician and allergist. He was Chief of Pediatrics at Cedars of Lebanon Hospital in Los Angeles, CA, until 1951, when he became Chief of Allergy at Kaiser-Permanente Medical Center in San Francisco. He was considered a pioneer in the fields of allergy and immunology. He continued his work with children and adults with hyperactivity and allergy long after his retirement, until his death at the age of 82, in 1982.

2. What is the Feingold Association?

Founded in 1976, the Feingold Association is a 501(C)3 non-profit organization made up of parents, professionals and volunteers. It is dedicated to helping children and adults apply the scientifically proven dietary techniques of the Feingold Program for better behavior, learning and health.

3. What is the Feingold Program?

This dietary program was developed at the Kaiser-Permanente Medical Center in San Francisco. Called the "K-P Diet," it was an outgrowth of the earlier diet for urticaria (hives) developed by Dr. Stephen D. Lockey, Sr. of the Mayo Clinic. The media renamed it the "Feingold Diet." It is a simple approach that eliminates artificial food colors, artificial flavors, three preservatives, and certain salicylates as individually necessary.

4. How can the Feingold Program help me?

This is a good place to start. It can help you determine if certain foods or food additives contribute to symptoms. If they do, then the diet itself is also the treatment, adjusted to your individual needs. It can be part of a multi-modal treatment protocol, and is compatible with any other form of treatment.

5. How soon can I expect to see results?

It varies with the individual. If the Feingold Program is followed carefully, you should know within one to six weeks if food additives or salicylates are responsible for the symptoms. As a rule, young children respond the most quickly, sometimes within a few days. If ADHD medication is being used, a response may take longer. If other sensitivities or allergies are involved, they must also be addressed. The *Foodlist* can also be used with a gluten-free/casein-free diet, or with any allergy diet.

6. Is it hard?

Changing your eating behavior is never easy, but soon becomes a way of life. Many well-known products are free of problem additives, and you will be able to enjoy most of your favorite foods just by changing some of the brands. Avoiding salicylates is a little harder, but it is an important part of the Program. This is also the only way available to find out whether salicylate-sensitivity is a problem.

7. Why can't I just read labels?

Regulations governing the labeling requirements of both food and non-food items are inconsistent; therefore labels frequently have information that is incomplete or misleading.

Clay Bennett, St. Petersburg Times
Reprinted with permission

Most people think that manufacturers list all the ingredients in a product, but it is not true. They do not have to list what has already been added to the ingredients by others, and some products are not required to list ingredients at all. Ingredients such as "flavoring" do not indicate whether they are natural or artificial, or whether they may contain salicylate.

8. How do I know which foods are O.K. to use?

As a member of the Feingold Association of the United States (FAUS), you will receive a book listing the thousands of acceptable brand-name products available in your region of the country.

FAUS began doing this work in 1976, producing a one-page *Foodlist & Shopping Guide*. Today, this unique book is over 150 pages long *(the Canadian Foodlist book is about 60 pages)* and is organized by category. You can easily take it to the supermarket. It is reprinted frequently and updated through the *Pure Facts* newsletter and e-mail alerts. For an item to be added to this list, the manufacturer must fill out and sign a detailed inquiry form verifying that the product is free of all the undesired additives – including additives in the ingredients they buy from others.

9. Will I have to cook from 'scratch?'

Not unless you want to. The *Foodlist & Shopping Guide* includes a wide selection of prepared foods available in your supermarket. Our product inquiry is ongoing, so new products become available continuously. Moreover, due to consumer demand, manufacturers are responding by providing more products that meet our ingredient guidelines. At the supermarket, you simply choose products from the thousands of acceptable items in your *Foodlist*, including snacks, cakes, ice cream, candy, and prepared foods. Once you are home from the supermarket, you prepare food as you normally would.

10. But what about sugar?

Many people think that sugar causes behavior problems. If you suspect such a problem, it's more likely that the additives are to blame. However, some people are sensitive to corn syrup (or the chemical residues in it), some are sensitive to beet sugar, and a few are unable to tolerate cane sugar.

While items containing corn syrup are marked with a (CS) in the *Foodlist,* sugar is <u>not</u> routinely eliminated on the Feingold Program.

11. Are all additives bad?

There are well over 12,000 food additives in our food supply today, nearly 2/3 of them flavorings, but few have been tested for their effect on the nervous system or the immune system. Furthermore, many of those tested and found to have unfavorable effects are still in use.[1]

It is, therefore, not surprising that scientists working with the food industry[2] have convinced the FDA to use the De Minimis principle ("a little bit can't hurt") so that new flavoring chemicals do not need to be tested for side effects before being accepted for use.

As for fragrances – the FDA does not supervise or mandate research on them or control their labeling; they say it is because they do not have any budget for that. *(See more on page 8.)*

The additives we eliminate appear to be the worst offenders for the majority of children and adults with ADHD and related problems. If improvement is erratic or less than desired, our materials help you consider other additives, such as corn syrup, monosodium glutamate, sodium benzoate, sulfites, etc.

12. Will I have to take my child off behavior modifying medication?

You can begin the diet while your child is still on behavior modifying medication, though it may take longer for the child to respond. Members frequently report that after using diet and medication together for a while, their doctor is able to reduce or discontinue the medication. Other members report that, for their child, medication appears to be more effective when used with diet. For best results, we recommend making the effort to acquire all needed medication in a color-free form. If needed, we can help you find a compounding pharmacist who may be able to make the medication you need.

When removing a child from behavior modifying medication, the child's symptoms may initially become worse. This is a medication "rebound" effect, and can last several days to several weeks. Do not stop your child's medication without medical guidance.

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1. **Aoshima** 1997, **Bamforth** 1993
2. **Kroes** 2000, 2002, 2004, 2005

Artificial Colors

Artificial color certified "FD&C" is permitted by the Food & Drug Administration (FDA) to be added to foods, drugs and cosmetics. "D&C" means the certified color may be used only in drugs and cosmetics. These colorings were originally manufactured from coal tar, but today they are made from petroleum. The FDA certification rules list the permissible amounts of contaminants and residues such as lead, mercury, arsenic, and certain carcinogens such as benzidine. It is interesting to note that the D&C colors permitted only in cosmetics and in medications (and given to sick children) are often allowed to have twice the amount of lead contaminant as colorings allowed in food.[1]

In commercially available FD&C Yellow #5 and #6, benzidine (which causes cancer) has been found in amounts up to 200 times the officially allowed level of only 1 part per *billion*.[2] FD&C colorings continue to be listed as "Generally Recognized As Safe" (GRAS) despite studies showing neurological effects,[3] DNA damage,[4] and elevated cholesterol.[5]

In 2006, almost *19 million pounds* of color additives were certified by FDA inspectors. The FDA receives a "user fee" from the manufacturer for each pound of food dye certified. Note, that means each pound *approved*, not each pound *examined*.[6]

Petroleum … Lead … Mercury … Arsenic …yuck. Whether or not you are sensitive to the additives we eliminate, you may wish to avoid them. Let us show you how to enjoy a "normal American diet" without them.

Artificial Flavors

Used as low-cost substitutes for natural flavorings, these chemicals are not usually listed individually. One that may be listed separately is vanillin *(imitation vanilla)*, widely used in chocolate as well as in vanilla-flavored items. Some people who believe they are allergic to chocolate may actually be reacting to this artificial flavoring. One source of imitation vanilla flavoring is the waste product of paper mills; another is petroleum. Therefore, while vanillin is technically identical to one of the chemicals in pure vanilla flavoring, the manufacturing methods result in high levels of sulfites and other contaminants.

A single artificial flavoring can be a combination of hundreds of individual chemicals, many of which are derived from petroleum. As an example of a (short) formula, here is a synthetic raspberry flavoring: *Vanillin, Ethylvanillin, Alphaionone, Maltol, 1-(p-hydroxy-phenyl)-3-Butanone, Dimethyl Sulphide, 2,5-Dimethyl-N-(2-pyrazinyl) Pyrrole.* Where's the fruit?

Some artificial flavorings may not be problematic, but since they are not identified, the Feingold Program eliminates all of them.

The FDA does not monitor these flavorings nor require that they be tested. Rather, a concept called "threshold of toxicological concern" has been implemented to set acceptable daily intake levels for chemicals *of unknown toxicity*, apparently on the theory that a little bit can't hurt. This is called the "de minimis principle" and was introduced to "save the time, cost, animal use and expertise" usually needed for extensive toxicity testing and safety evaluations.[7]

Even when testing is done, however, it may be ignored. Vanillin, for example, continues to be listed as GRAS despite its ability to inhibit the liver enzyme dopamine sulphotransferase by 50%.[8] Other flavorings affect RNA, thyroid, and enzymes (el-Saadany 1991). Most flavorings have never been studied for neurotoxicity. *See page 32 for more information about colorings and flavorings.*

1. **Food & Drugs**, Title 21
2. **Lancaster,** 1999
3. **Tanaka** 1993, 1996, 2001, 2005; **Vorhees** 1983
4. **Rosenkranz** 1990; **Sweeney** 1994; Tsuda 2001; **Sasaki** 2002
5. **Aboel-Zahab** 1997
6. **Food & Drug Administration –** Report on the Certification of Color Additives.
7. **Kroes** 2000, 2002, 2005
8. **Bamforth** 1993

Preservatives

BHA: *Butylated Hydroxyanisole* **BHT:** *Butylated Hydroxytoluene* **TBHQ:** *Tertiary Butylhydroquinone*

Preservatives are used primarily to prevent fats from becoming rancid, allowing foods to have a longer "shelf-life." Most are not believed to be a health hazard, but the above three petroleum-based preservatives have been found to trigger behavior and health problems.

Studies on these chemicals are disturbing. As early as 1974, a study by Stokes & Scudder[1] reported that when pregnant mice were fed BHA and BHT, it affected the brain chemistry of their offspring, reducing their cholinesterase and serotonin to half the normal levels. They reported, "The affected mice weighed less, slept less and fought more than normal controls."

Since BHA, BHT, and TBHQ are included in so many products containing other additives as well, it would be prudent to study their interactions with each other. One of the few such studies found that BHA can "facilitate the activation of BHT in the lung" and increase its toxicity.[2] Yet it is common to find both of them in the same meal.

> Most additives have ***never*** been studied in combination with each other or with environmental toxins, medications, or vaccines.

Recently, another study on additive interactions[3] showed that a coloring plus an excitotoxin (MSG or aspartame) is far more toxic to developing neurons than either one alone. When two chemicals used together do more damage than each alone added up, it is called "synergy." In real life, we are eating all these chemicals together and for the most part we have no idea what they can do to us in such mixtures.

These preservatives continue to enjoy GRAS (Generally Recognized As Safe) status despite evidence that they are **toxic** to various cells and organs,[4] they are **tumor** promoters,[5] they **weaken the immune system**,[6] they impact the **nervous system and behavior**,[7] they have a negative effect on **sperm and/or egg production**,[8] **reproduction and development**.[9]

Sasasaki (2002) says that many of the 39 common additives he studied, including BHT and BHA, produced DNA damage at low doses close to the ADI, *(the allowable daily intake)*.[10]

In 1999, the National Institutes of Health (NIH) Eighth Report on Carcinogens stated: "There is sufficient evidence for the carcinogenicity of butylated hydroxyanisole (BHA) in experimental animals … administration of butylated hydroxyanisole in the diet induced papillomas *(non-cancerous tumors)* and carcinomas *(cancers)* of the forestomach in mice."

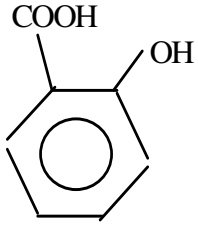
In the year 2000, the NIH Ninth Report on Carcinogens stated – and the Tenth Report and the Eleventh Report repeat – that BHA "is reasonably anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity in experimental animals."[11] When put in their diet, BHA caused papillomas and carcinomas in the forestomach of rats, mice, and hamsters. But each year the NIH concludes, **"No data were available to evaluate the carcinogenicity of butylated hydroxyanisole in humans."**

These preservatives are not always listed on product labels. If the product contains oil or other secondary ingredients, preservatives in those ingredients may not be listed. They can be avoided, however, by using the Feingold Association's *Foodlist & Shopping Guide.*

See page 34 for more about preservatives.

1. **Stokes** 1974
2. **Thompson** 1988, 1989
3. **Lau** 2006
4. **Zoccarato** 1987; **Thompson** 1988; **Kahl** 1983, 1993; **Siman** 1996; **Gudz** 1997; **Stolze** 1999; **Safer** 1999; **Yu** 2000; **Groten** 2000
5. **Kahl** 1984; **Parke** 1992; **Kahl** 1993; **Bauer** 2001; **Sasaki** 2002
6. **Tryphonas** 1999
7. **Stokes** 1974;**Tanaka** 1993
8. **Takami** 1999
9. **Meyer** 1980; **Vorhees** 1981; **McFarlane** 1997
10. **Sasaki** 2002
11. **NIH 11th Report on Carcinogens,** http://ntp.niehs.nih.gov/index.cfm?objectid=32BA9724-F1F6-975E-7FCE50709CB4C932

Salicylates



Salicylates [Sa-Lis'-uh-Lates] comprise a group of compounds made by plants as protection against insects and disease. Salicylates are chemically related to aspirin (acetylsalicylic acid). There are several types, such as sodium salicylate, methyl salicylate, ethyl salicylate, aluminum acetyl salicylate, ammonium salicylate, etc. The salicylates to be eliminated can be found in some fruits and a few vegetables, and are used for flavor, aroma, or preservatives in some foods, medications, cosmetics, and other non-food items. Anyone allergic to aspirin may feel better when also eliminating salicylate-containing foods and products.

Stage One of the Feingold Program eliminates those salicylates identified as the most troublesome. After a favorable response is seen, salicylate-containing products may be carefully reintroduced, one at a time, to determine if there is a problem with any or all of them.

Feingold Association members report wide variation in salicylate sensitivity, as well as a cumulative effect and a more dramatic reaction when combined with synthetic additives. Some can eat salicylates freely, while others can occasionally tolerate small amounts of a favorite salicylate food if they are otherwise stable on Stage One of the Program. For those who are more sensitive than usual, a comprehensive set of tables of known salicylate food sources is included in Program materials, based on a 1985 study of Australian foods.[1] This study considered quantity alone, with no thought of the relative toxicity of various kinds of salicylate. More study is urgently needed, but this is the best information that is currently available.

Environmental Chemicals

Artificially colored, flavored, scented, or preserved non-food items can also cause a reaction when inhaled or absorbed through the skin. The Feingold Program will help you find household and personal care items less likely to cause symptoms. Although the Program does not address the issue of pesticides directly, some members report symptom improvement when pesticides in food and the environment are avoided.

Pesticides

The National Academy of Science reports "neurotoxic and behavioral effects may result from low-level chronic exposure to some organophosphate and carbamate pesticides." As long ago as April 1991, the United States government report, *Neurotoxicity: Identifying and Controlling Poisons for the Nervous System* stated that everyone is at risk of being harmed by these chemicals, but the highest risk groups are fetuses, children, and the elderly.

Pesticides used outside the home are easily tracked inside and are readily inhaled and absorbed through the skin. Children are at high risk of exposure since they are more likely to crawl on the floor and play in the grass and on the school playground.

Nevertheless, a main route of chronic exposure is through the diet, and eating organic foods as often as possible makes a measurable difference.[2]

Perfumes

Today, fragrances are made primarily from petroleum, and can be just as harmful as petroleum-based food additives. When inhaled, they go directly to the brain, where they can trigger an immediate reaction. Fragrances applied to the skin are also absorbed systemically.

Various chemicals commonly used in perfumes, cleaning supplies – and even children's toys – have been shown to cause adverse effects in animals, including: inhibition of motor activity, respiratory tract irritation, narcotic effects when inhaled, hyperactivity, irritability, liver damage, spasms and death; and, in humans: marked eye, nose, or throat irritation, numbness of fingers and arms.[3] **Fragrances are not under FDA regulation and are not required to be tested for safety.** If not tested by the manufacturer, there is supposed to be a note put on the label to that effect. This requirement also is not monitored by anyone.[4]

1. **Swain** 1985
2. **Lu** 2006
3. **Spencer** 1984
4. **FDA** information via phone calls by this author in 2003, and verified in 2004 and 2007.

A different kind of school lunch

Students in one midwestern community are enjoying fresh, delicious food plus a big change in their learning environment.

Walk down the hallways of the Appleton, Wisconsin, Central Alternative High School and you will see students focused on their education, interacting successfully with each other and with their teachers. Notice the calmness and purposefulness that sets these teens apart from others. You will notice that the hallways are different in another respect. They aren't lined with soft drink and junk food machines. Then check out the cafeteria. Burgers, fries and burritos have been replaced by salads, meats prepared with old fashioned recipes, and whole grain breads. Fresh fruits and vegetables are offered, and the students drink water.

Grades are up, truancy is no longer a problem, arguments are rare, and teachers are able to spend their time teaching. What's going on in Appleton, Wisconsin?

In 1997 Natural Ovens of Manitowoc, WI, initiated a five-year project to bring healthy food into area schools. The goal was to show that fresh, nutritious food can make a real difference in the student's behavior, learning and health.

Just prior to the beginning of the program, Greg Bretthauer had been offered the job of dean of students at the school. What he saw were teens who were "rude, obnoxious, and ill mannered." Because of problems with discipline and weapons violations, a police officer had to be on staff. Appleton was a school for troubled teens that other schools had given up on, and it was a school out of control.

The story of the Appleton project has been documented on a DVD and videotape called *Impact of Fresh, Healthy Food on Learning and Behavior 2004.* It is also part of their *Roadmap to Healthy Foods in School,* and both are available from Natural Press, at **1-877-628-8398** or www.naturalpress.info.

Principal LuAnn Coenen is amazed at the change she has seen in her school. Each year Wisconsin principals are required to file a report on the number of students who have dropped out, been expelled, found using drugs, carrying weapons, or who have committed suicide. **Since the start of the program, she reported, the number in every category has been "zero."**

Today Greg is dean of students in an atmosphere vastly different from what he saw in 1997.

Mary Bruyette, a teacher at the high school, reports that the students are now calm and well behaved. "I don't have to deal with the daily discipline issues; that just isn't an issue here." Their biggest problems now are parking and tardiness. “I don't have the disruptions in class or the difficulties with student behavior that I experienced before we started the food program," she said.

Students who previously had been headed for trouble have turned their lives around, according to Dr. Thomas Scullen, Superintendent of the Appleton Area School District. He told the interviewer, "We have kids who have had a lot of problems and got through the whole last year without an expulsion. Drop-outs dropped to non-existent. Kids came to school. They have learned that with healthier foods it's going to make them a better person. It keeps them more focused and makes them happier." Dr. Scullen had expected that the healthy diet would improve behavior, but he was pleasantly surprised that it has had such an impact on academic performance.

Mary Bruyette says she can demand more, academically, from the students than she previously could. Now she can use all of her class period for instruction. The high school's counselor, Deb Larson, says, "I don't have the angry outbursts, so instead we get to deal with the real issues that are underlying and causing some of the problems in the kids’ lives."

Typically, while school dietitians want children to eat healthier food, they are convinced such efforts will be futile, and that if students cannot get their fast food in the cafeteria they will buy it off campus. This does not appear to be a problem in Appleton, where the food is not only natural, it is prepared with care. Natural Ovens made sure of this by supplying their own cooks to the school.

Like children on the Feingold Program, once these teens have made the connection between food, behavior and learning, they tend to prefer to enjoy the benefits. One student said, "I really like the food. It tastes good, it's hot, it's fresh." One girl commented, "Now that I concentrate, I think it is easier to get along with people." Another student said, "If you're going for a big test, you want to eat great."

The on-campus policeman, Dan Tauber, is able to be a role model now, instead of a disciplinarian. Students are interested in how he eats to keep in such good physical shape, and have noticed their athletic abilities have a lot to do with their diet.

"Returning students are now the advocates for the program. The kids encourage each other," according to Mary Bruyette. "They set the example for the new kids. It works great."

> "I've taught here almost 30 years. I see the kids this year as calmer, easier to talk to. They just seem more rational. I had thought about retiring this year and basically I've decided to teach another year -- I'm having too much fun!"
>
> *- Dennis Abrahm, Middle School Science Teacher*

Many of the changes are being phased in to Appleton's middle and elementary schools. Candy machines are gone and pop machines are being replaced with juice machines or water coolers. There is a district-wide commitment to healthier eating and lifestyle in general.

Even in schools where more modest changes have been made, there are some real differences. Gary Van Lankvelt, principal of the Einstein Middle School, has seen "more calmness and less bouncy activity. Students seem to be more alert and focused."

> "We've got to stop using our most precious commodity – our kids – to make extra money."
>
> *- LuAnn Coenen , Principal*

Madison Middle School's principal, Fred Ginnochio, says the students are buying the healthier a la carte items and more are using the salad bar. He has found when the kids are in the halls "we have not had one incident all year that I have had to get involved in with shoving, a fight, aggressive behavior."

Dr. Scullen sees an eventual switchover in all of Appleton's schools. "It can take several years to make the transition. The program will sell itself on its own merits, given the time. I think instead of looking at the food program as a "break-even" we have to take a look at what do we have to put in to make it really good for the kids."

What about increased cost?

> "One child arrested would cost the schools more."
>
> *- Dr. Barbara Reed Stitt, Natural Ovens President*

Natural Ovens underwrote the cost for their 5 year study that will eventually impact 200 Wisconsin schools. The price to turn the problem around was $20,000 a year. Natural Ovens President, Dr. Barbara Reed Stitt, noted that "one child arrested would cost the schools more."

Dr. Scullen believes, "If it results in a happier kid, improved learning, and ultimately a better community, then it's a cost we cannot avoid. It's something we must do." Says Dan Tauber, "Let's invest in the kids now, financially, with food versus invest in them later, financially, with 'how do we correct the problems we have because they are not eating healthy?'"

"Nutrition for students should be part of the general operating budget," according to Mary Bruyette. "We're concerned about everything else. We're concerned about new band uniforms. We're concerned about the football team. We're concerned about text books. Why not be concerned about nutrition? That seems to me the basis in many cases for creating a positive learning environment."

LuAnn Coenen says, "I can't buy the argument that it's too costly for schools to provide good nutrition for their students. I found that one cost will reduce another. I don't have the vandalism. I don't have the litter. I don't have the need for high security."

Let's Do Lunch!

Improving Your School's Food Program

www.school-lunch.org

New York City Public Schools:

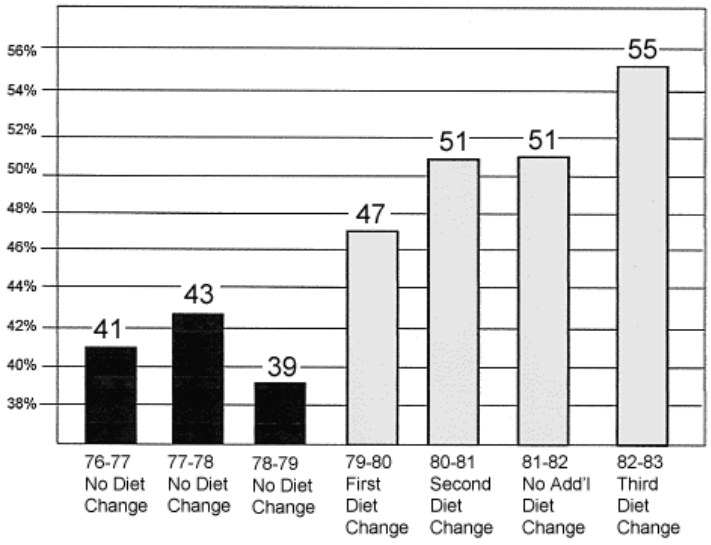
Four Years of Success

In the spring of 1979, New York City's public schools ranked in the 39th percentile on standardized California Achievement Test scores given nationwide. That means that 61 percent of the nation's public schools scored higher. They had been in the lower half of the country for years. However, for a few years in the 1980s, these same 803 schools ranked in the upper half of the nation's schools. They went from 11% below the national average to 5% above it. What happened?

In the fall of 1979, the city's Board of Education decided to make some changes in their lunch and breakfast program. They ordered a reduction in sugar (and this would reduce dependence on prepackaged foods) and they banned two artificial food colorings. In the next set of achievement tests, the schools averaged in the 47th percentile – an increase five times larger than any other documented increase. Dr. Elizabeth Cagan, Chief Administrator of the Office of School Food and Nutrition of the New York City Board of Education, and the researcher Dr. Stephen Schoenthaler, studied the changes occurring during these years.

National Rankings of 803 New York City Public Schools Before and After Diet Changes

Percentile Rankings based on CAT Scores



As they implemented changes bringing the school lunch and breakfast programs in line with "stage two" of the Feingold Diet – eliminating artificial flavoring and coloring, as well as the BHA, and BHT preservatives – school scores rose to the 55th percentile. This was a total rise of almost 16%, in a cohort of over a million children. Moreover, when the changes were analyzed, a dramatic difference was found in the ratio of change to amount of food eaten at school. Before these changes, the more school meals the children ate, the worse their scores. After the changes, this reversed: the more school meals the children ate, the better they did academically.

And that is not all – when Dr. Schoenthaler looked at which children had made such dramatic changes that the entire school system improved, he found that it was not uniform. Not *all* children made a 16% improvement. Rather, the lowest achievers improved the most. In 1979, before implementing the dietary changes, 12.4% of the one million students in New York City schools were performing two or more grades below the proper level. These were the "learning disabled" and "repeat failure" children. By the end of 1983, only 4.9% of children were in that category. In other words, 7.5% of a million children – 75,000 children – were no longer "learning disabled" low-achievers, but had become able to perform at the level normal for their age. These were the children that no other efforts had helped. No other hypothesis fits: all changes were related to the dietary changes.

What about the placebo effect – could that have explained it?

Dr. Schoenthaler analyzed this possibility, in detail, but came to the conclusion that it was not possible. A placebo effect would take place immediately and wear off. This did not happen. A placebo effect cannot explain the reversal in the correlation of children's scores with amount of food eaten at school. Several other

possible explanations were evaluated and rejected as not possible because they, too, simply do not fit the facts. The dietary change explanation, on the other hand, fits every fact observed.

A close look at the graph of student scores reveals two other interesting facts: Looking at the highest black bar, one could wonder if something had happened that year, too. Indeed it had – the school had attempted to reduce fat in the school food. Again, this would decrease their dependence on prepackaged foods (usually heavily laced with additives, as well as fat), and the effort brought a modest rise in scores. The next year that effort was abandoned – and the scores again dropped. What about 1981-82? Why does the level remain "stuck" at the 51%? That year, no further dietary changes had been introduced. The food available to the children remained the same, and their academic results also remained the same. The following year, when the food was improved by elimination of the petroleum-based preservatives BHA and BHT, average scores rose again -- to well above the national average.

> No other school district could be located which reported such a large gain above the rest of the nation so quickly in a large population.
>
> *- Dr. S. Schoenthaler*

See more about how other schools are helping their students by improving their lunch program – and how you can help your child's school do the same – at the website www.school-lunch.org

See more about recipes recommended for U.S. schools at teamnutrition.usda.gov/Resources/usda_recipes.html

See the American Academy of Pediatrics Policy Statement on Soft Drinks in Schools at portal.nysed.gov/portal/page/pref/CNKC/IntDocs/152.pdf

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1. **Schoenthaler**, SJ, Doraz WE, Wakefield JA. 1986 – The Impact of a Low Food Additive and Sucrose Diet on Academic Performance in 803 New York City Public Schools, *International Journal of Biosocial Research,* Vol. 8(2): 185-195
2. **Schoenthaler**, SJ, Doraz WE, Wakefield JA. 1986a – The Testing of Various Hypotheses as Explanations for the Gains in National Standardized Academic Test Scores in the 1978-1983 New York City Nutrition Policy Modification Project, *International Journal of Biosocial Research,* Vol. 8(2): 196-203

ADHD

According to the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV), Attention Deficit Hyperactivity Disorder (ADHD) or one of its subtypes can be diagnosed if the child shows certain characteristics for a period of six months or more, with at least some of the symptoms beginning before age 7. The symptoms are subjective, generally described by a parent, and require:

1) Six or more symptoms of <u>lack of attention</u>, as paraphrased below:

- Fails to pay attention, makes mistakes…
- Difficulty staying on tasks
- Does not seem to listen
- Fails to finish things
- Trouble organizing things
- Does not like homework or schoolwork
- Loses things
- Easily distracted
- Forgetful

- OR -

2) Six or more symptoms of <u>hyperactivity-impulsivity</u>, as paraphrased below:

- Fidgets
- Leaves seat in class
- Runs around, is restless
- Difficulty playing quietly
- Acts like "driven by a motor"
- Talks too much
- Blurts out answers
- Can't wait his turn
- Interrupts others

For people who don't fit neatly into the categories of ADHD-attentional, ADHD-hyperactive, or ADHD-combined, there is another diagnosis called "ADHD, not otherwise specified." Diagnoses such as ODD (Oppositional Defiant Disorder), Conduct Disorder and Explosive Disorder are descriptive of their major problem symptoms; medical treatment offered is often the same as for ADHD.

Many of the symptoms listed above overlap. For example, how would you separate the symptoms "losing things," "forgetful," and "having trouble organizing?" Are they really three separate symptoms?

While much attention is focused on the symptoms of ADHD, many of these children are not just problems for their parents and teachers – they are physically sick. It is generally recognized now that bedwetting and ADHD "go together," that ear infections and ADHD "go together," that asthma and ADHD "go together," that sleep disturbances and ADHD "go together," etc. These children have headaches, they have poor appetites, they can't sleep, they get ear infections, they have rings under their eyes, their skin seems dry, pale, or rough – they often simply appear to be unwell.

There is research that links each of these symptoms to diet,[1] and when the Feingold Program works for a child like this, most or all of the symptoms seem to improve. It has also been noted by a number of researchers that people with ADHD may have abnormal levels of zinc, copper, manganese, lead, cadmium, essential fatty acids, electrolytes, sulfate metabolism, etc.[2] These things also may need to be addressed before the child will really be well.

Zinc is interesting, in particular, because two studies by a chemist in England[3] showed that children with ADHD lose zinc when exposed to Yellow #5 and #6, but children without ADHD do not.

Zinc deficiency symptoms include behavioral effects as well as various physical effects. Perhaps this is one reason for the dramatic response many of these children make to a change in diet – not just in attention, but in a multitude of symptoms, both major and minor.

As this book goes to print, research on several hundred children in the UK has just been published[5] showing that 20 to 62.4 mg of food dyes and preservative pushes ordinary children about 10% closer to an ADHD diagnosis. As some of the researchers commented, even if additives are not the only cause of a child's ADHD, avoiding them certainly may help.

The Feingold Association believes that children with learning or behavior problems deserve careful evaluation; any underlying physical illnesses, vitamin deficiency, and allergy should all be ruled out or addressed during diagnosis. A brief trial of the inexpensive Feingold elimination diet can rule out or identify sensitivity to additives and/or salicylates.

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1. www.diet-studies.com/research.html
2. **Brenner** 1979; **Alberti** 1999; **Carrie** 2002; **Gomez** 2006; **Hamazak** 2002; **McFadden** 1996; **Oades** 1998
3. **Ward** 1990, 1997
4. **Litonjua** 2006, **Devereux** 2006b
5. **McCann** 2007

Asthma

By using the Feingold Foodlist and Program information, you will learn how to eliminate the bronchoconstricting food additives, salicylates, sulfites, and many of the environmental chemicals likely to cause problems. Our Product Information Center and our more than 30 years of experience will make this process much easier. If you are a health care provider, we can be a resource for your asthmatic patients. Patients with both ADHD and asthma will have a double benefit, as both symptoms may improve.

then ... In the mid-twentieth century, asthma was less common, and was considered psychosomatic, caused by emotional conflict. Often, parents seeking help for their children's asthma problems found themselves blamed for it. Dr. M. Murray Peshkin,[1] medical director of the Children's Asthma Research Institute and Hospital in Denver from 1940 to 1959, coined the term "parentectomy," claiming that children developed asthma in response to an overbearing, rejecting mother. Seriously ill children sent to his clinic high in Colorado's clean mountain air did indeed improve quickly, often with no medication. Called "rapid responders," they lived there while their parents received psychotherapy back home. By 1958, however, the Institute's 98% of rapid responders dwindled down to 28%, and from there to zero.[2] Rather than looking to see what had changed in the Colorado environment (pollution? diet?) the experts decided the early "rapid responders" never really had asthma to begin with.[3]

and now ... Today, according to WebMD, 17.3 million Americans have asthma, making it the leading chronic disease in this country. Among potential triggers for asthma attacks, the American Academy of Pediatrics[4,5] and *Harrison's Principles of Internal Medicine*[6] acknowledge a variety of environmental allergens and irritants, including Tartrazine (Yellow #5) and other FD&C food colorings, as well as sulfiting agents such as potassium metabisulfite, potassium and sodium bisulfite, sodium sulfite, and sulfur dioxide. The Food and Drug Administration requires that Yellow No. 5 be listed by name on ingredient labels, due, in part, to their recognition of the danger this dye can pose for asthmatics. And yet – even today – in spite of this knowledge, parents are rarely advised to avoid foods containing these additives, and even asthma medications frequently contain both colorings and sulfites.

In recent studies,[7] almost 2000 children were studied from before birth to 2 years and 5 years. It was shown that when vitamin E and zinc are low in a mother's diet during pregnancy, her children are more likely to suffer wheezing and asthma. What about the children of a woman with ADHD, eating food containing Yellow #5 & #6 (and losing zinc) during her pregnancy?

We may not have much control over some asthma triggers, such as the recent increase in small-particulate pollution in the outside air, but we can choose to filter our inside air. We can pay attention to those substances over which we do have control: food additives, scented toys, children's vitamins, toothpaste, classroom disinfectants, markers, and other controllable sources of environmental toxins.

Although brochures about asthma written by pharmaceutical companies do not provide information about the role of diet in asthma, you can find relevant studies on the Feingold web site and in this book on page 28.

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1. **National Library of Science Breath of Life**. www.nlm.nih.gov/hmd/breath/breath_exhibit/FourPersp/emotions/IVCs1.html
2. **Childhood Asthma**: Pathophysiology and Treatment by David G. Tinkelman, MD, publ.1993 by Marcel Dekker, pp.556-558
3. *Ibid.*
4. **AAP Policy Statement**, January 1997. www.aap.org/policy/re9706.html
5. **AAP: Inactive Ingredients in Pharmaceutical Products**, *Pediatrics,* Vol. 99 No. 2 February 1997, pp. 268-278 http://aappolicy.aappublications.org/cgi/content/full/pediatrics;99/2/268
6. **Harrison's Principles of Internal Medicine**, 12th ed., McGraw- Hill, Inc., pp. 1048
7. **Litonjua** 2006, **Devereux** 2006b

Aggression and Disruptive Behavior

We all know that violence has increased dramatically. Efforts at gun control, more prisons and severe punishments – all have failed to reduce our standing as the most violence-prone of all industrialized nations.[1]

Experts have been calling for research on the causes, and the National Research Council recommends identifying genetic and biological factors of "violence-prone" children.[2] However, genetic factors do not change in one generation, and cannot explain the whole story. It is time to begin paying attention to research being done in another direction. As long ago as the 1980's, studies in both schools and jails dramatically showed that a diet that removes additives and enhances nutrition brings significant improvement in behavior and academic performance.

In 1985 Dr. Stephen Schoenthaler published a series of studies on 12 juvenile correctional facilities, housing 8,076 young offenders.[3] Just as he showed in the school studies (*page 11*), not *all* the children improved, but 20% of them made such a dramatic recovery that the total of "deviant behaviors" for all the children fell by 47%.

> We may not be able to provide every child with two loving parents, but we really can improve nutrition, reduce toxins, and even test for metabolic abnormalities through our schools and medical services.

At a Tidewater, VA detention facility, behavior problems fell 48% following dietary changes: Violence declined 33%, theft dropped 77%, etc.[4]

A controlled study of 1,382 youths at three Los Angeles County probation detention centers found a 44% reduction in bad behavior,[5] and a northern California probation department facility making similar dietary changes[6] found that violence fell 25% and "horseplay" declined 42%. In both these California institutions, suicide attempts fell 44%.

Animal studies[7] on the petroleum-based antioxidant preservative BHA, BHT, and TBHQ have long shown them to cause decreased learning and grooming, and increased activity, developmental delays and aggression. Other studies[8] have shown these preservatives to be carcinogenic as well.

Isn't it time to simply replace these three preservatives with others equally available but less harmful? Instead, in efforts to reduce transfats, we have greatly *increased* the use of these chemicals in food oil. We will all have to pay the piper in the form of increased cancers, increased violence, increased school problems, and decreased academic performance.

Again, studies[9] have shown that violence-prone males have abnormal copper-to-zinc ratios, and that 75% of young criminals have allergy and nutritional problems. In 1997 and 1998, Bennett showed that when treated appropriately by diet and nutritional intervention, most young offenders improve and never re-offend. Even earlier, a chemist in the UK had found that children with ADHD lost zinc through their urine when exposed to Yellow #5 and #6, resulting in a variety of symptoms, including aggresssion and violence.[10]

Monkeys fed soy formula[11] (which has much more manganese than breast milk) develop neurological and behavior problems. Some violent adolescents have been found to have high levels of manganese in their hair.

In 1989, the Kellogg Report[12] said, "Nutrition, lifestyle choices and the state of our environment hold solutions to many of the crises which beset society." They go on to say, "Many who readily accept the link between diet and heart disease or other chronic physical conditions, find it hard to imagine that nutrition could have a direct and determining effect on human behavior and personality dysfunctions."

A more recent review of the literature on violence discusses cholesterol and hormone levels, nutritional deficits, prenatal/postnatal exposure to metals, smoking and other toxins, iron, zinc, neurotoxins, brain injury, and the family enviroment. [13]

Organizations and families dealing with violent children (and adults) must begin to consider the role of foods, additives, heavy metal exposure, essential fatty acid levels, vitamins, and other dietary factors.

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1. **N,Y.Times**, Nov.13, 1992, "Study Cites Role of Biological and Genetic Factors in Violence"
2. Ibid.
3. **Schoenthaler** 1985
4. **Schoenthaler** 1983, 1983a
5. **Schoenthaler** 1986, 1991; See the experience of several schools at www.school-lunch.org
6. **Schoenthaler** 1983b
7. **Meyer** 1980; **Stokes** 1974; **Tanaka** 1993; **Zoccarato** 1987
8. **Bauer** 2001, 2005; **Kahl** 1984, 1993; **NIH** 11th Report on Carcinogens 1005; **Sarafian** 2002; **Sasaki** 2002; **Thompson** 1988, 1989
9. **Walsh** 1997; **Bennett** 1997, 1998
10. **Ward** 1990, 1997
11. **Cockell** 2004; **Golub** 2005
12. **The Kellogg Report** 1989
13. **Liu** 2005

Enuresis (Bedwetting)

As if the child with learning and behavior problems doesn't have enough to deal with, bedwetting (*nocturnal enuresis*) and daytime wetting (*diurnal enuresis*) may be another part of their daily struggle. ADHD children at age 6 are **2.7 times more likely** than controls to have nocturnal enuresis and **4.5 times more likely** to have diurnal enuresis.[1] It has been known since at least 1976 that an improvement in diet can cure enuresis in many children.[2] In 1992, Egger et al reported on 21 children with enuresis who had been successfully treated by diet for either hyperactive behavior or migraines. For 12 of them, the enuresis stopped, and for another 4 it improved. They confirmed this by a double blind follow-up study.[3]

Although the Feingold Program has never been promoted as a bedwetting "cure," over the years parents have frequently reported that one of the benefits they have seen with the Feingold Program is the disappearance of bedwetting.

Seizures, Headaches, other Physical Problems

Other symptoms also often improve on the Feingold Program. When implementing the diet for behavior problems, parents are more often than not surprised that the child's (or their own) headaches, sleep difficulties, GI problems, skin problems, etc. are suddenly gone, as well.

There are many symptoms that "travel with" the symptoms of ADHD but are often either treated as separate illnesses or ignored altogether. Besides the asthma and bed-wetting already discussed, some people suffer from chronic headaches or migraine, frequent earaches, stomach aches, trouble sleeping, chronic dehydration, dry or "allergic" skin conditions, seizures, etc. Not all people have all these symptoms, of course, but all the people who respond to dietary intervention "fit" somewhere in the profile of symptoms on page 1, represented here by three interlocking circles. It is astonishing how many parents report that their children have "all" the symptoms listed – and yet by simply changing their diet, all or most of their problems improve or disappear.

In research, this has been shown repeatedly by studies on migraine, seizures and enuresis. Egger found that in 45 children with epilepsy as well as various physical or behavioral problems listed in "our" symptoms list, 80% of them improved on his elimination diet. However, of the 18 children with epilepsy alone and no other symptoms, none improved.[4]

In other studies,[5] Egger found that 93% of 88 children with frequent migraine, and 81.6% of 76 overactive children, recovered on an additive-free diet. Again, other symptoms these children had, and which also improved, included abdominal pain, behavior disorder, seizures, asthma, and eczema.

Ward,[6] a British chemist, found that ADHD children (but not normal children) lost zinc in response to exposure to Yellow #5 and #6. They exhibited a variety of symptoms including asthma, speech problems, behavioral deterioration, eczema, and aggression. And in 1998, Oades found that children with ADHD drank four times as much water as "normal" children, yet tended to remain dehydrated, had twice the normal level of neuropeptide Y, and excreted more norepinephrine and a serotonin metabolite, but less sodium, phosphate and calcium than normal children.[7]

Could these findings indicate a genetic difference? Possibly. Or could it indicate damage to the sulfation system by vaccination or other chemical exposure, as suggested in a Congressional Committee hearing?[8] Also possible. Or perhaps the implicated additives are akin to drugs and what we see as symptoms are actually "side effects?" Again possible. What is clear to us, at least, is that the difference in these children is at a level basic to many bodily functions. Treating it at the specific receptor level, as is done with stimulant medication, may ameliorate some symptoms, but is never a cure. A better choice, often with better results and no side effects, is appropriate dietary change. Certainly, diet is worth trying first – and worth continuing even if some medications must be added in individual cases for maximum relief.

1. **Robson** 1997
2. **Salzman** 1976
3. **Egger** 1992
4. **Egger** 1989
5. **Egger** 1983, 1985
6. **Ward** 1990, 1997
7. **Oades** 1998
8. **Megson** 2000: www.diet-studies.com/megson.html

Autism Spectrum Disorders

Autism, High Functioning Autism,
Pervasive Developmental Delay (PDD), Asperger's Syndrome

Not so many years ago, autism was a rare disorder, affecting **3 in 10,000** children. In 1997, the Autism Society of America reported that autism occurred in approximately **1 of every 500** births, the symptoms usually becoming apparent during the first three years of life. This was already, at that time, considered an epidemic.

In 2006, however – less than 10 years later – the Centers for Disease Control acknowledged that **1 in 150** children in the U.S. is autistic. In July, 2007, British researchers confirmed that the rate of autism in Great Britain has risen to **1 in 58**. Autism is the fastest-growing developmental disability today.

Much of the ongoing research is devoted to discovering a genetic predisposition for autism. It is worth keeping in mind, however, that it is simply impossible to have an epidemic – and this IS an epidemic – of a genetic disorder unless gene variations that were harmless for centuries have now suddenly been impacted by some change in the environment.[1, 2]

A growing body of evidence suggests that observable symptoms of autism are linked to biochemical intolerances, allergies, or metabolic errors. It is believed that foods and environmental factors play a major role. One of the environmental changes causing much controversy is the increase in vaccine exposure. According to the National Vaccine Information Center,[3] safety research on these vaccines is deficient, and the vaccines themselves certainly contain enough chemical toxins to pose a problem for any babies who may (genetically) have difficulty dealing with them.

Web sites worth visiting:

- www.autismNDI.com - *Autism Network for Dietary Intervention*
- www.autismwebsite.com/ari - *Autism Research Institute*
- www.autismwebsite.com/ari/treatment/form34q.htm - *Parent Ratings of Biomedical Interventions*
- www.gfcfdiet.com - *Gluten-Free, Casein-Free Diet*
- www.diet-studies.com/megson.html - *Mary Megson, MD, at Congressional Committee, April 2000*
- www.nvic.org - *National Vaccine Information Center*

Research studies underway in England, Norway, and the United States are investigating biochemical processes and genetic errors in patients with autism. These include gluten and casein intolerance, phenol-sulfotransferase (PST) deficiency, and others. Hopefully, research will soon reveal methods to detect those children at risk, to protect them before they become autistic.

Many families have reported that symptoms of autism improve by using the Feingold Program alone or in combination with a gluten-free, casein-free (GFCF) diet. Some Feingold members find their ADHD children also benefit from the GFCF Diet, and some medical professionals now put ADHD at the "mild end" of what they are calling Autism Spectrum Disorders (ASD).

One very impressive nonprofit organization is the Autism Research Institute (ARI) headed by the late Dr. Bernard Rimland, who first recognized autism as a biological disorder rather than a mental illness.

Since 1967, the ARI has collected data from more than 18,500 parents of autistic children. They ask parents to rate the interventions they have used for their children. More than 40 drugs have been rated, from Adderall to Zoloft, as well as 26 supplements and 9 dietary variations.

Overall, the supplements and diets show higher success rates than the medications. The rate of negative responses (getting worse), moreover, is much higher for medications than for the other treatments.

The most successful diet is the GFCF Diet (65%), followed by the Candida Diet (54%) and the Feingold Diet (53%); the best rated non-drug treatment is Chelation (76%); the best rated supplements are Vitamin B12 (63%) and Melatonin (61%); and the best rated drugs are Diflucan (55%), Nystatin (49%), Risperidal (54%), and Secretin IV (48%).

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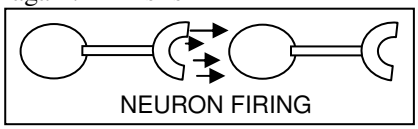
1. This is clearly illustrated by hunter-gatherer tribes who rarely suffered from diabetes until they adopted the Western diet and culture which they were not genetically able to tolerate. Almost immediately, they developed an "epidemic" of diabetes afflicting up to 50% of their population.
2. Pima Indians, Genetic Research www.diabetes.niddk.nih.gov/dm/pubs/pima/genetic/genetic.htm
3. National Vaccine Center - www.NVIC.org

The PST Connection

Some people have too little of an important enzyme called phenol sulfotransferase (PST).[1] It is made in the intestines, which need PST to metabolize (detoxify) the phenolic compounds in many foods, including salicylates and the high-phenolic petroleum-based additives. However, the brain also requires PST for "housekeeping" duties involving neurotransmitters – those chemicals which jump the tiny space (synapse) between brain cells (neurons). Each time a neuron "fires" and the neurotransmitter "jumps" that space, PST must prepare the space to "fire" again. This is measured in *nanoseconds*, occurs millions of times a second all over the brain and must be perfectly synchronized.



If a person is marginal or low in PST, and eats lots of high-phenolic foods and additives, there may not be enough PST left to do the "clean up" work in the brain, thus preventing neurons from firing effectively.[2] Moreover, it seems that salicylates (which are also phenolic compounds) not only need PST but actually suppress its production,[3] making PST levels even lower. This explanation is over-simplified and the evidence is indirect, but it may help explain why the avoidance of salicylates at the start of the Feingold Program is important. Once suppression is stopped, there may be some recovery, leading to the later tolerance of salicylates usually seen. Surely, this is only part of a larger and complex picture, but in this area the circumstantial evidence is mounting. *See more at pages 8 and 38.*

In practice, the Feingold Program guides parents in choosing a low-phenolic diet, taking stress off a fragile sulfation system.[4] This may be especially important for people with autism, who have been shown to have extremely low PST levels. Other interventions that may help include avoiding sources of sulfite (SO_3), while increasing sources of the sulfate (SO_4) which is needed for PST production. Some people increase sulfate through the skin (epson salt baths) or by drinking Evian water.

The Gluten/Casein Connection

A baby nurses, and usually falls asleep when full. This is due partly to endorphins made by the baby when tasting milk, and partly to the milk protein itself which enters the baby's blood in a morphine-like form.[5] This "leaky" gut is normal in babies, and is one reason that babies may develop allergies if given solid foods too early – because when other partially digested proteins get through the gut wall and into the blood, where they don't belong, they may be treated as invaders by the infant's developing immune system. Toward the end of his first year, the baby's intestinal wall becomes less permeable, allowing tolerance for new foods. However, if anything has happened to prevent this, damaging the delicate intestinal system, the growing child may experience symptoms of digestive distress, allergies, or cognitive problems. It has long been known that incompletely digested proteins can cause allergies. Less well known is that the incompletely digested casein protein (*casomorphin*) and gluten protein (*gluteomorphin or gliadorphin*) both act as morphines, possibly causing symptoms of autism, ADHD, or even schizophrenia.

Unfortunately, many children with autism crave the casein and gluten that hurts them – like little drug addicts, they need their "fix." Parents of such children report that their child's whole diet consists of macaroni & cheese, cereal & milk, bread & butter, pizza, cheese puffs, cheese sandwiches, puddings, etc. Moreover, these children may have sensory problems related to diet – some tolerate only soft foods, while others cannot stand the feel of soft foods and require crunchiness. Removing casein and gluten quickly from such a child's diet may be a Mission Impossible task. We recommend a slower approach, beginning with the much easier "regular" Feingold Diet – which alone may decrease some symptoms and improve appetite. Meanwhile, several tests provided by the Great Plains Laboratory[6] can help determine whether the child actually needs a gluten/casein free diet, whether he may be deficient in zinc or other minerals, etc. If necessary, casein and gluten items can be replaced very slowly, a tablespoon per day, for example. Remember that this is an addiction condition, and the child may have serious withdrawal symptoms, including behavioral deterioration, if changes are made too quickly.

1. **Alberti** 1999; **Scadding** 1988; **Sinaiko** 1996
2. **Bamforth** 1993; **Harris** 1996; **Sinaiko** 1996
3. **Harris** 1998
4. **McFadden** 1996
5. **Blass** 1996
6. **Great Plains Lab:** 1-913-341-8949, GPL4U@aol.com

A Call for Better Research

Scientists who study the effects of additives on behavior have traditionally studied only the handful of allowed synthetic food colorings, **ignoring the other 12,000 food additives now in use but never tested for behavioral or neurological effects.** Safety studies usually test each additive alone, although we eat lots of them together, often combined in a single product. A landmark study (Lau 2006), recently found that two additives commonly used together inhibited developing neurons many times more than they were expected to do, based on the damage each caused alone. More studies on such common combinations are urgently needed.

Animal studies on food dyes traditionally focus on whether they cause cancer, damage reproduction, or distort physical development. They have only rarely concerned themselves with cognitive function in either animals or people – and when they do, they use concentrations of the dyes at levels far below the known average daily intake. Long ago, a group of food additive and chemical companies calling themselves The Nutrition Foundation recommended using **27 mg per day** of artificial food colors in human studies on food additives and behavior. Meanwhile, a National Academy of Sciences study on 12,000 people showed that 99% of them ate up to an average of **327.6 mg of dye per day** (in 1977). With today's blue oatmeal and red applesauce, it may be much higher.

Food Coloring	Average Mg / Day We Ate in 1977 per National Academy of Science Survey	Mg / Day the Nutrition Foundation Recommends for Research on ADHD & Diet
Red No. 3	24.0	1.6
Yellow No. 5 + No. 5 Lake	65.0	7.3
Green No. 3	04.3	0.1
Blue No. 1 + No. 1 Lake	22.6	0.8
Yellow No. 6 + No. 6 Lake	51.0	6.1
Blue No. 2 + No. 2 Lake	10.9	0.5
Red No. 40 + No. 40 Lake	127.0	10.5
Orange B (not used since 1978)	NOT LISTED	0.1
TOTAL	**327.6**	**27.0**

27 mg of coloring is about how much is in a single glass of a red drink made from a powdered mix. It is about how much is in a half-teaspoon of bright red frosting or a half-teaspoon of green ketchup.

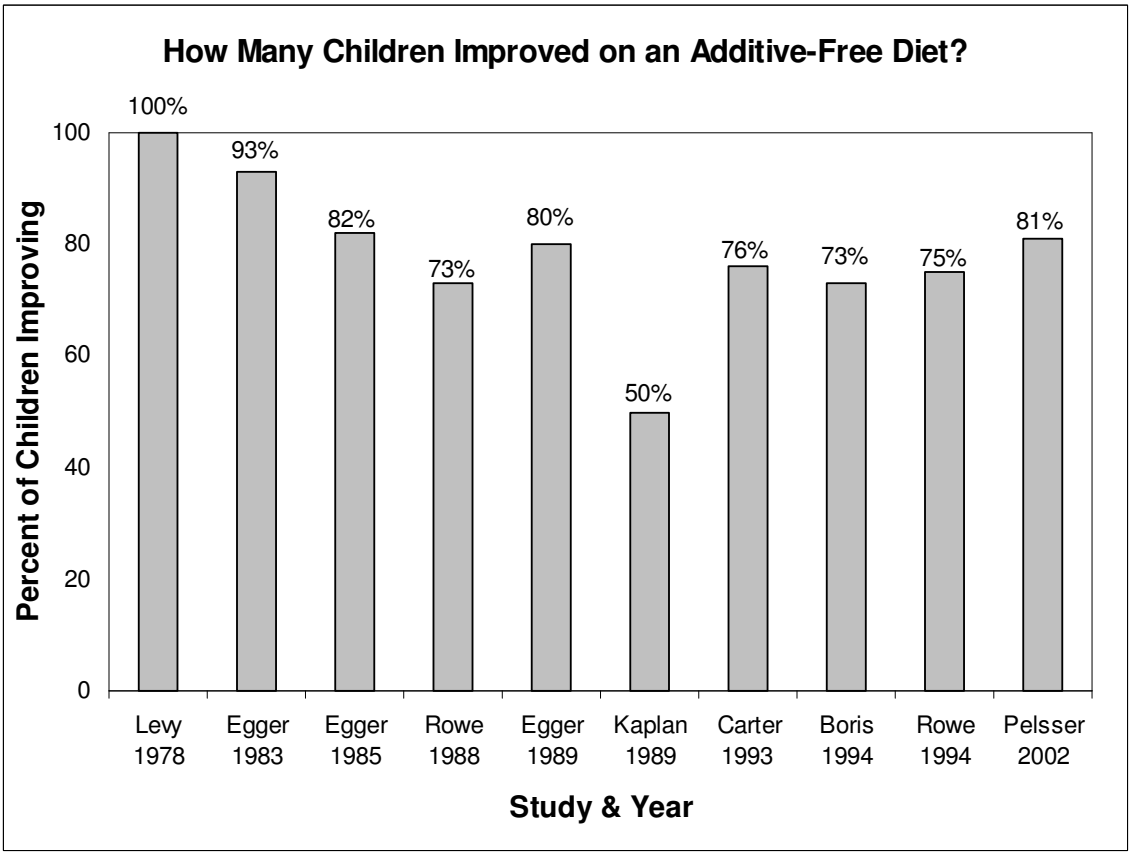
Although companies decline to tell us how much coloring is actually in their products, an analytical balance and an artist's eye brings you the following estimates:

- Red frosting = **155 mg** of Red #40 per Tb
- Green ketchup = **150 mg** of pre-mixed Yellow #5 and Blue #1 per Tb
- 6 oz red cherry drink from a mix = **18 mg** of Red #40

The Feingold Association would like to see research that:

1. Studies the Feingold Program as it is really used in the real world – with Feingold Association Program materials;
2. Uses realistic amounts of mixed additives, for a reasonable time period, for challenges;
3. Studies prevalence and relative toxicities of the different natural salicylate compounds;
4. Studies the combination of various salicylate compounds with synthetic additives;
5. Studies neurological effects of synthetic flavorings alone and in combination with other additives and salicylates.

Look around your local supermarket at the blue sports drinks, colored ketchup, garish cereals and "fruit" roll-ups, and you will wonder just how much of these chemicals you really eat in a day. Even the fat-free mayonnaise and sour cream contains coloring to keep its rich white appearance. What about that healthy-looking yellow bread? Is it egg yolk? Or Yellow #5? Are those really blueberries in the blueberry muffin? Or lumps of colored, flavored gel? Did the color of that strawberry popsicle come from a strawberry … or a test tube?



In these studies, the researchers put the children on an additive-free diet similar to the Feingold Diet. As you can see above, they found that a high percentage of children improved. Later, each researcher gave the children an additive or group of additives in a double-blind test. The results varied, depending upon the type and amount of challenge material.

- **The amount of food dyes recommended** by the Nutrition Foundation for researchers to use in their studies *per person per day* ..... **27** mg
- **Average amount of food dyes actually consumed,** according to the National Academy of Sciences in 1977 *per person per day*..... **327** mg

This 327 mg does not take into account today's blue soda, colored applesauce, fluorescent cereals, striped toothpaste, and other such questionable inventions. One must assume today's rate is higher, especially for children, to whom many of these "fun foods" are marketed. **No studies have been done proving that 300 mg or more of food coloring are neurologically safe for children.**

Who was the Nutrition Foundation? It was a trade industry organization, now called the International Life Sciences Institute (ILSI). In 1977, the Nutrition Foundation members included representatives from:

- Hoffmann-LaRoche, Inc. – *pharmaceuticals*
- Fritzsche-D & O, Inc. – *artificial flavors*
- Stange Company – *artificial colors & flavors*
- Florasynth, Inc. – *artificial flavors*
- Kohnstamm & Co. – *artificial colors & flavors*
- PFW, Inc. – *artificial flavors*
- Monell Chemical Senses Ctr – *artificial flavors*
- ICI Americas, Inc. – *dyes, pesticides, petrochemicals*
- Ajinomoto Company, Inc. – *MSG*
- Griffith Laboratories – *nitrites*
- The Coca-Cola Company
- CPC North America – *corn syrup*
- Amstar Corporation – *sugar*
- Revere Sugar Corporation – *sugar*

Relevant Research

Table of Contents:

Studies are listed alphabetically in each section by last name of primary author.

★ = Double Blind Placebo Controlled Study

The Role of Diet in Behaviour
Ben F. Feingold, MD
written just before his death & published posthumously in Ecology of Disease. 1982. 1(2-3) pp.153-65.

"The increase in behavioural disorders accompanied by a persistent drop in scholastic performance coupled with the continuing rise in the prevalence of delinquency is undoubtedly one of the most important expressions of the disruption of nature by the rising concentration of pollutants in the ecosystem … Public recognition and participation in the problem are mandatory to correct the insidious downgrading of the human race, which is already evident."

Concerns About the Research on Coloring

- **Double-blind "challenge" studies:** Usually colorings alone are used as challenges, often only a small amount of a single color. The other thousands of additives eliminated by the Feingold Program are ignored.

- **The increasing use of synthetic colorings without adequate testing:** A recent study of children (Husain 2006) revealed that the children are eating **2 to 8 times more than the acceptable daily intake (ADI)** of food coloring. The authors are concerned about the possible health effects on the children. This study took place in Kuwait. How much food coloring are American children eating?

- Since companies refuse to reveal how much coloring is in their products, how do you know how much you are actually eating? To give you an idea, two of our students at a university in Atlanta measured the following:

  - 1 TB red frosting (or other opaque item) = 150 mg of Red #40 (3 TB to frost a cupcake **= 450 mg**)
  - 1 TB green ketchup = 150 mg of Yellow #5 + Blue #1 mixed (2 TB for fries and a burger **= 300 mg**)
  - Small cup (6 oz) red powder-mix drink (Red #40) = **18 to 20 mg**

NO STUDY of 400-800 mg food dyes has ever been done on any children – normal or ADHD!

Medication for ADHD

Stimulant medications work - often dramatically. Unfortunately, one of the worst side effects of these drugs – small vessel disease – can only be diagnosed by viewing the heart at autopsy. People using both the Feingold Program and stimulant medication report needing much less medication. As far as we know, no research has yet been done to explain this.

Bailly D, 2006 – Since the introduction of Selective Serotonin Reuptake Inhibitors *(SSRIs, e.g. Prozac)* in the 1990s, reported side effects include excitation, restlessness, disinhibition *(acting out)*, and self-injurious thinking and behavior. Authors warn that side effects must be monitored frequently.

Brown 1989 ★ 11 black male children with ADHD were given placebo and Ritalin for two weeks each. They had a significant increase in blood pressure on Ritalin, and should be monitored carefully.

Castner 2003 – Primates given amphetamine develop monoamine dysregulation and hallucinations. Symptoms include looking at and reaching for things not there, and hypervigilance.

El-Zein 2005 – 12 children were tested before and 3 months after starting on Ritalin. In all of them, chromosome abnormalities were tripled. The relationship between chromosome abnormalities and cancer is well-documented.

Food & Drug Administration 2005 – Manufacturers were ordered to add a **"Black Box" warning** to the labeling of all antidepressant medications because they can cause suicidal thoughts and behavior.

Henderson 1995 – Small lesions *(damaged areas)* were found in the myocardium *(heart wall muscle)* of a patient treated with Ritalin. Rats and mice were injected with various doses of Ritalin, and their hearts were examined. Heart damage was found in all cases, even with the smallest doses given for the shortest time.

Kelly 1988 ★ In 47 children with ADHD, doses of Ritalin were linearly related to increasing heart rate depending upon both the initial rate and the length of time on medication.

Markowitz 1999 – Ethylphenidate was found in the blood and liver of people who died after taking Ritalin *(methylphenidate)* and alcohol *(ethyl alcohol)*. Authors do not know what this chemical does or if it is toxic. ***Note:*** *Taking Ritalin to drink more alcohol without passing out is a new "party" activity.*

Olfson 2006 – In this case-matched study, antidepressant drug treatment in children under 19 was significantly associated with suicide attempts and deaths. Antidepressants are sometimes used with ADHD treatment.

Public Citizen 2007 – In their newsletter, *Best Pills Worst Pills*, they report that all stimulant medications for ADHD, and also Adderall, must carry "**Black Box warnings**" about the risk of these medications to cause increased blood pressure, stroke, heart attack, new or worse behavior, bipolar illness, increased aggression, psychotic or manic symptoms, as well as sudden death in patients with heart defects.

Wang 1994 – Ritalin decreased blood flow in all regions of the brain in 5 healthy men, up to 30% in some regions. The authors recommend that this effect on blood vessels be considered when prescribing.

ADHD and Autism Research

Bateman 2004 ★ In a large group of normal toddlers, a small (20 mg) amount of coloring with benzoate preservative caused adverse effects detectable by parents. Bateman suggests removing these additives from the diet of all children.

Bennett 1997 – A survey determined that **75%** of young criminals, but only **18%** of non-offenders, are physically ill with allergy and nutritional problems.

Bennett 1998 – When treated for food intolerance, allergy, and mineral imbalance, 9 child criminals improved physically and psychologically. 7 of them continued the diet and continued to improve. After 2 years, 5 of them had never re-offended. The authors recommend this approach for criminal justice, education, and health agencies.

Boris 1994 ★ **73%** of 26 children with ADHD responded well to an elimination diet. 16 of them were given a double-blind test with 100 mg of color and suspected foods. **ALL** reacted to it. Boris concludes, "Dietary factors may play a significant role in the etiology of the majority of children with ADHD."

Brenner 1977 – Intending to prove Dr. Feingold wrong, Brenner offered the diet to 32 families whose children had **not** improved on medication. On the diet, 11 (**34%**) "were markedly improved … the startling changes seen in patients who had been followed for years with other forms of therapy suggest strongly that this improvement was genuine."

Brenner 1979 – Lab tests – 20 children who responded to the Feingold Diet, and 14 who did not, were tested for zinc and copper levels in their blood. Children who responded to the diet had high copper levels in their blood. *(See the Ward studies, page 27.)*

Cade 2000 – High IgG antibodies to gluten were found in **87%** of autistic and **86%** of schizophrenic patients. IgG antibodies to casein were found in **90%** of autistic and **93%** of schizophrenics. A gluten-casein free diet was accompanied by improvement in **81%** of autistic children. This supports the proposal that both disorders are due to absorption of morphine-like chemicals formed in the intestine from digestion of gluten and casein.

Risk-Benefit Analysis

*By Philip Handler, Pres.**
National Academy of Sciences

"A sensible guide would surely be to reduce exposure to hazard whenever possible, to accept substantial hazard only for great benefit, minor hazard for modest benefit, and no hazard at all when the benefit seems relatively trivial."

The manufacturer benefits from the use of inexpensive synthetic coloring; the consumer bears all the risk, with no benefit whatsoever.

**2 terms, 1969-81. He also received the National Medal of Science.*

Carter 1993 ★ **75.6%** of 78 children diagnosed with "hyperactive behavior**"** improved on an open trial of an elimination diet. This was verified in a placebo-controlled double-blind challenge protocol.

Conners 1976 ★ Using a Feingold Diet and a control diet on 15 hyperactive children, both parents and teachers reported improvement on the K-P *(Feingold)* Diet.

Dengate 2002 ★ Calcium propionate *(a preservative used in bread)* caused irritability, restlessness, inattention and sleep disturbance in children who had improved on a diet without synthetic additives. ***Note:*** *The study was done in Australia where much more calcium propionate is used in bread than in U.S. Products containing this preservative are marked in the Feingold Foodlist and Shopping Guides .*

Some researchers prefer the "oligoantigenic *(few foods)* diet" which eliminates all additives and allows only a very few foods. It is useful for a short trial for diagnosis, but not for satisfactory long-term use.

Dumbrell 1978 – This was a study on the nutritional quality of the Feingold Diet. Dumbrell concluded that the Feingold Diet was superior to the normal diet in nutritional quality.

Egger 1983 ★ **93%** of 88 children with frequent migraine recovered on a "few foods" additive-free diet. Other symptoms which improved: abdominal pain, behavior disorder, seizures, asthma, and eczema.

Egger 1985 – **81.6%** of 76 overactive children improved on a "few-foods" additive-free diet. Other symptoms such as headaches, abdominal pain, and seizures also improved.

Egger 1989 ★ **80% o**f 45 children with epilepsy, and also physical or behavioral problems, recovered or improved on a "few foods" diet. Headaches, abdominal pain, and hyperactive behavior stopped in all those whose seizures stopped, and in some of those whose seizures did not. In double-blind, placebo-controlled provocation studies, symptoms returned in **94%** of the children when challenged with the foods and additives.

Egger 1992 ★ On a diet avoiding additives, **76%** of 21 children whose migraine or hyperactive behavior had improved also stopped bed wetting.

Fitzsimon 1978 ★ Children 6-14 years old who had improved on the Feingold Diet were given 40 mg of acetylsalicylic acid or placebo. Significance was reached in tests of general cognitive capacity, line walking and the "finger-to-nose" tests, as well as increased disturbance in sleep patterns in these children.

Note: 40 mg is only half of a baby aspirin.

Goyette 1978 ★ Performance on a visual-motor tracking task was impaired after a challenge of artificial colors. Goyette said, "Artificial food dyes do indeed impair and disrupt the behavior of the children."

Gross 1987 – 36 children at a summer camp were put on a Feingold-type diet for **one week**, and then one week on an additive-containing diet. Gross concluded that the Feingold Diet has no merit, although he conceded that the camp director and teachers all felt the children were noisier during the additive-rich week.

Note: *All but one of the hyperactive children remained on their (colored) behavior-modifying medication during the study. Most children need more than one week to respond to a diet change. Two children were sent home during the "additive rich" week: One was the only ADHD child not on medication, and the other child's ADHD medication was suddenly "not strong enough" when additives were present. See more about this study at www.diet-studies.com/adhd.html#Gross.*

Harding 2003 ★ Food supplement treatment of ADHD was of equal efficacy to Ritalin treatment. The author suggests 8 risk factors for ADHD: food and additive allergies, heavy metal toxicity and other environmental toxins, low-protein/high-carbohydrate diets, mineral imbalances, essential fatty acid and phospholipid deficiencies, amino acid deficiencies, thyroid disorders, and B-vitamin deficiencies.

Hamazak 2002 ★ DHA *(in fish oil)* controls aggression in young people under stress, and this study was designed to see if it is useful for elderly people. The ordinary food intake of 150 mg per day was not enough, but getting an extra 1.5 g of DHA a day significantly decreased aggressiveness in older university employees, while the placebo did not. ***Note:*** *Fish oil is not part of the basic Feingold Program, but much research has shown it to be a helpful addition to everyone's diet. 1.5 g of DHA is 1500 mg – 10 to 15 capsules of fish oil, depending on the brand.*

Harley 1978 ★ 10 hyperactive preschool children were tested with two diets, not knowing which was the Feingold Diet. **100%** of them improved on the Feingold Diet. Harley admits he was "not in a position to refute his [Feingold's] claims regarding the possible causative effect played by artificial food colors in preschool children."

100% of preschoolers improved on the Feingold Diet in this early double blind study.

Harley 1978 ★ 36 school-age boys were tested with 2 diets after stopping their medication. Only 22 of them were neurologically normal and had normal EEGs, while 14 had various neurological problems besides ADHD. 13 children improved on the Feingold Diet. 12 of them (92%) were in the group having the control (additive-containing) diet first. This fits with Dr. Feingold's findings that it takes longer for a child who was on stimulants to respond to the diet. In this study, Harley trusted product ingredient lists, not Feingold materials, and did not eliminate preservatives.

The "control" diet also had few additives (less than 27 mg/day). Since children who are recently off stimulant meds may take longer to respond to diet change, it is not surprising that 92% of the responding children were in the group trying the Feingold Diet *after* the control diet.

Harper 1978 – Both during baseline and while following the "hyperkinesis diet," nutrient intakes of 54 hyperactive children "compared favorably with the Recommended Dietary Allowances."

Husain 2006 – A dietary record of 3,141 children in Kuwait indicated that they exceeded the ADI *(acceptable daily intake)* of 4 of the 9 permitted colors by factors of 2-8. Authors call for studies into potential adverse health effects associated with the high intake of these artificial colors.

Kaplan 1989 – Children with ADHD do not eat differently; therefore, their nutrition-behavior interactions are more likely to be a function of idiosyncratic sensitivities.

Kaplan 1989a ★ In a 10-week diet study, more than half the children improved in behavior, with negligible placebo effects. Other symptoms improved: halitosis, night awakenings, and inability to sleep.

Levy 1978 ★ Mothers of some of these children reported more symptoms during the challenge period, but objective tests did not show a significant deterioration. Tests were given the DAY AFTER a challenge with cookies containing only ONE mg Yellow #5.

A "challenge" of only 1 mg of food dye is absurdly small, and if any reaction had occurred, it would surely be gone in 24 hours.

Lien 2006 – In a survey of 5,498 children in Norway, 4 or more glasses of sugar-containing soft drinks per day were associated with mental health problems and hyperactivity. ***Note:*** *Soda usually contains corn syrup (not ordinary sugar) as well as synthetic coloring, flavoring, and preservative chemicals. This study shows a correlation between soda and mental health, but does not prove causation.*

Mattes 1981 ★ Calling it a "high dose," Mattes gave cookies with only 13 mg of food dye to children well established on the Feingold Diet. He concluded there was "no evidence of a food coloring effect." ***Note:*** *After being on the diet for some time, most children can handle an occasional exposure to food additives without obvious effects.*

McCann 2007 ★ "Artificial colours or a sodium benzoate preservative (or both) in the diet result in increased hyperactivity in 3-year-old and 8/9-year-old children in the general population."

Niederhofer 2006 – 132 patients with Celiac Disease (CD) were assessed for ADHD symptoms before and 6 months after starting a gluten-free diet. Their Connors scores and most of their ADHD symptoms improved significantly on the diet. ***Note:*** *Processed food products often contain gluten. Whether the improvement was from elimination of gluten or reduction of synthetic additives was not determined.*

Pelsser 2002 – **80.6%** of 31 children with ADHD who completed a 2-week trial on the "few foods" diet improved by at least 50% on both the Conners Scale and the ADHD Rating Scale. "In young children with ADHD an elimination diet can lead to a statistically significant decrease in symptoms."

Pollock 1990 ★ Artificial food colors had "an adverse effect" on the Conners behavior rating of 19 children.

Rowe 1988 ★ **72.7% o**f 55 children on a 6-week trial of the Feingold Diet demonstrated improved behavior.

Rowe 1994 – **75%** of 200 children put on the Feingold Diet measurably improved.

Rowe 1994 ★ Following the previous study, other children were put on an additive-free diet and then challenged with 6 different doses of Yellow #5. **82.6%** of 23 "suspected reactors" and even 10% of the 20 "control children" reacted. Reactions and length of time the children were affected depended on the dose. Investigators used their own more sensitive questionnaire, not the Connors questionnaire.

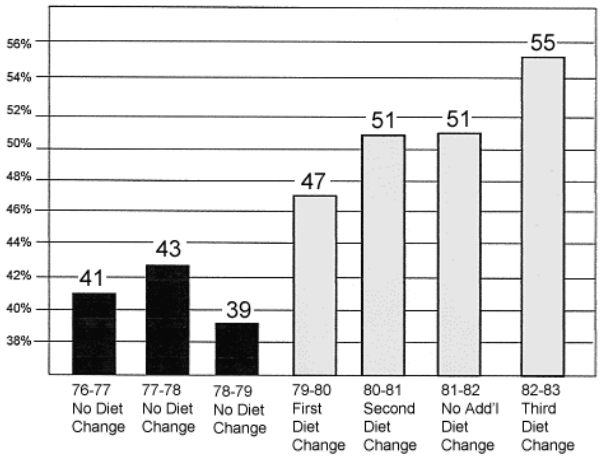
Salamy 1982 ★ When given drinks with food additives, all the children showed changes in EEG and heart rate. Hyperactive children were more affected than normal children.

Salzman 1976 – **93%** of 15 children given the Australian version of the Feingold Diet improved in the areas of overactivity, distractibility, impulsiveness and excitability. Sleep and enuresis *(bed-wetting)* problems were resolved partially or completely.

Schmidt 1997 ★ The children with conduct disorder who responded to dietary treatment did just as well as those who responded to medication.

Schoenthaler 1986 – Over 4 years, a school breakfast and lunch program with less sucrose and fewer additives was implemented in 803 NYC public schools. Each improvement came closer to the Feingold Diet, and was accompanied by an improvement in test score averages on national tests. From start to finish, there was a **15.7% increase** in mean academic percentile rating.

Moreover, 12.4% of the one million children were more than 2 years below grade level before the change. Afterwards, only 4.9% of them were more than 2 years below grade level.



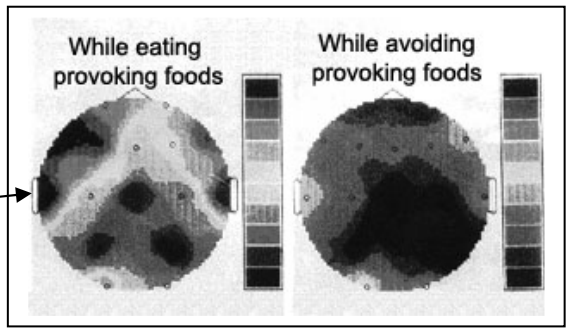
Schoenthaler 1991 – Improving the diet in 813 state facilities *(jails)* resulted in "significantly improved conduct, intelligence, and/or academic performance…"

Swanson 1980 ★ After a few days on an additive-free diet, 40 children were given 100-150 mg of mixed food dyes, or placebo. Half the children were hyperactive and half were normal controls. A learning test showed that the learning ability of the hyperactive children (but NOT the controls) was worse after the food dyes.

Note: *Swanson was criticized for using "too much" dye. Critics said it was a "toxic reaction." However, 100 mg of dye is easily reached by anybody eating two or thee pieces of colored candy, one cupcake with bright colored frosting, or a few cups of Kool-Aid. If 100 mg is to be considered "toxic," then why is it so freely allowed in the supermarket, while its use by researchers is restricted?*

Uhlig 1997 ★ This study is the first to show an association between brain electrical activity and the intake of provoking foods in children with food-induced ADHD.

Beta-1 activity in the fronto-temporal areas of the brain was increased (in the one on the left).



Ward 1990 ★ Yellow #5 caused a reduction in serum and saliva zinc and an increase in urinary zinc with a corresponding deterioration in behavior and emotional responses in ADHD children but not in the normal children.

Ward 1997 ★ In hyperactive children, Yellow #5 and #6 caused a reduction in zinc, resulting in one or more of the following symptoms: Overactivity, aggression, violence, poor speech, poor coordination, asthma, eczema. Compared to controls, hyperactive children were low in zinc and iron, but high in aluminum, cadmium and lead.

Weiss 1980 ★ Using 35.26 mg dye on children who were *not* hyperactive, he concluded: "Modest doses of synthetic colors, and perhaps other agents excluded by elimination diets, can provoke disturbed behavior in children."

Williams 1978 ★ Although both placebo and medication pills contained coloring, and his "modified" diet did not exclude salicylates, Williams nevertheless showed that drugs-plus-diet works better than drugs alone, by both parent and teacher ratings. In fact, 7 of the 26 children were diagnosed as "no longer hyperactive."

Bio-Markers - Biochemical Differences in ADHD

It has often been said that ADHD is a disease with no biological marker; i.e., there is no blood or urine or other physical test to identify it. Some even claim it does not exist because it cannot be measured. This is like saying that a headache cannot exist – after all, a headache, too, is subjective.

*However, research has revealed there **ARE** biochemical differences in children with ADHD. We wonder why these differences continue to be ignored, and why followup studies have difficulty being funded (Ward and Swanson, personal communication). To develop accurate medical testing, and to better understand the condition, we need more studies like these:*

Alberti 1999 ★ Autistic children showed a low level of sulfation, indicating difficulty in detoxifying or metabolizing certain compounds.

Brenner 1979 ★ 20 children who responded to the Feingold Diet, and 14 who did not, were tested for zinc and copper levels in their blood. Responders had a higher level of copper. ***Note:*** *High copper would indicate low zinc.* *See the Ward studies, page 28.*

Oades 1998 ★ Over 2 days, children with ADHD drank four times as much water and showed twice the levels of neuropeptide Y (NPY) as healthy children. Urinary excretion of norepinephrine and a serotonin metabolite were markedly increased in children with ADHD, while excretion rates for sodium, phosphate and calcium were decreased. In spite of drinking more water, children in the ADHD group produced less urine. Oades writes, "Increases of drinking and circulating NPY in ADHD children and decreased electrolyte excretion may reflect a common disturbance in metabolic homeostasis."

Walsh 1997 – An independent laboratory compared the blood copper/zinc ratio of assaultive males with other male patients with no history of violence, showing clearly a statistically abnormal zinc/copper ratio in violence-prone individuals. ***Note:*** *This is not necessarily a biochemical marker, but – more important – it is something that can be tested … and fixed.*

Ward 1990 ★ Yellow #5 reduced zinc in blood and saliva, and increased it in urine of the ADHD children but not the controls. The zinc loss corresponded to deterioration in behavior and emotional responses.

Ward 1997 ★ In hyperactive children, Yellows #5 and #6 significantly reduced zinc levels, causing one or more of the following symptoms: Overactivity, aggression, violence, poor speech, poor coordination, asthma, eczema. Compared to controls, hyperactive children were low in zinc and iron, but high in aluminum, cadmium and lead.

Warrington 1986 – In patients with chronic additive-induced urticaria, or aspirin-sensitive asthma, Yellow #5 caused significant LIF *(T cell-derived lymphokine leucocyte inhibitory factor)* release from mononuclear cells. These results "suggest a potential diagnostic test for this condition." ***Note:*** *Asthma and skin problems frequently plague children with ADHD. When diet helps the ADHD, it usually helps the other conditions as well. It would be interesting to measure LIF release in ADHD.*

Allergy: Asthma, Eczema / Urticaria

Arai 1998 – **60%** of 20 adult asthmatics reacted to metabisulfite with airway obstruction, urticaria, skin problems and nasal congestion. ***Note:*** *Products containing sulfite are noted in the Feingold Foodlist and Shopping Guide.*

Barnes 1998 – Even high dose corticosteroids do not control 5% of patients with asthma. The author recommends looking for unrecognized allergens, occupational sensitizers, dietary additives, etc.

Cant 1986 – Changing the mother's diet helped 37 breast fed infants with eczema.

Ceserani 1978 – Yellow #5 induces bronchoconstriction similar to that caused by aspirin and other nonsteroidal anti-inflammatory drugs in some aspirin-sensitive people.

Devereux 2006 – Since 1960, the prevalence of asthma and allergic disease has increased sufficiently to become a major public-health concern. Concurrently, there have been marked changes in the Western diet, and it has been proposed that these changes have contributed to the increase in the prevalence of asthma and allergy, with the most recent evidence indicating that maternal diet during pregnancy might be particularly important in the development of childhood asthma.

Devereux 2006 – In a longitudinal study, 1,861 children were followed from conception to 5 years old. The mother's intake of foods containing vitamin E and zinc during pregnancy is strongly associated with the child's risk of experiencing wheeze and asthma at age 5.

Egger 1983 ★ **93%** of 88 children with frequent migraine recovered on the "few foods" additive-free diet. Other symptoms which improved included abdominal pain, behavior disorder, seizure, asthma, and eczema.

Genton 1985 – In 20 of 34 patients with asthma or urticaria, a diet without additives or aspirin resulted in a "marked improvement of symptoms" within 5 days.

Gomez 2006 – Zinc deficiency affects enzymes, causing major changes in the lipid *(fats such as cholesterol)* composition of the lung. Therefore, zinc supplementation must be included in public health interventions and therapies for high-risk subjects or those with certain diseases, such as **asthma.** "

Note: *Brenner found that zinc deficiency is a problem in ADHD, Ward determined that exposure to synthetic colorings cause children with ADHD to lose zinc, and Arnold found that children given zinc respond better to stimulant medications, while fatty acid supplements seem to improve symptoms of ADHD in cases of borderline zinc deficiency. It is known that many children with ADHD also have asthma. Will artificial coloring-induced zinc loss worsen their asthma? Do children with asthma alone also lose zinc upon exposure to colorings? These studies have not been done.*

Hong 1989 ★ In **42.7%** of 36 patients on medication given blind provocation tests, aspirin and food additives overcame their medications, causing bronchoconstriction, angioedema, or urticaria.

Jimenez-Aranda 1996 – Yellow #5 was the most reactive additive in a study of 40 patients with chronic urticaria.

Juhlin 1981 ★ In 330 patients with recurrent urticaria, a questionnaire revealed a common history of allergy, asthma, and abdominal problems. Provocation tests with various food additives revealed one or more positive reactions in one-third of the patients.

Juhlin 1987 – In patients with chronic urticaria *(hives)*, author suggests looking for adverse reactions to food additives.

Kalinke 1999 ★ A 58 year old patient had progressive pigmented purpura *(called PPP, it is brown pigmentation of the skin spreading from the legs upward).* Controlled oral provocation testing revealed that food containing Yellow #5 triggered flares of the PPP. This case was followed for over 20 years.

Litonjua 2006 – Dietary and supplement intakes of 1290 pregnant women were studied. Higher intake of vitamin E and zinc by the mother was related to less wheezing in the child at 2 years. Authors conclude that consuming more antioxidants during pregnancy may decrease the risk of wheezing for the baby.

Lockey 1977 – Lockey developed tests for diagnosis of sensitivity, and created a diet at the Mayo Clinic for urticaria and asthma patients. ***Note:*** *This diet later was used and further refined by Dr. Feingold, who called it the K-P Diet. It was later commonly called the Feingold Diet.*

Longo 1987 – In **87.8%** of 82 patients with asthma who were put on an additive-free "oligoantigenic" diet, their eosinophil count went down, and improvement of symptoms followed.

Pachor 1989 – An adult with Melkersson-Rosenthal syndrome experienced intolerance to the food additives sodium benzoate and Yellow #5, with swelling of the face, hypertrophy of the gums, etc. All symptoms went into remission once the food additives were excluded from the diet.

Ring 2001 – "Pseudo-allergic" reactions can be caused by low-molecular-mass chemicals (i.e., preservatives, colorings, etc.). Allergic contact eczema can be caused by artificial flavorings such as vanillin.

Sakakibara 1995 – Aspirin-induced asthma (AIA) is important because: 1) It is caused by inhibition of an enzyme; 2) It affects 9.8% of asthmatic adults; 3) AIA patients also have chronic sinusitis, nasal polyps, and inability to smell; 4) Some medications make AIA worse; 5) Some patient are sensitive to Yellow #5, sodium benzoate, parabens etc; 6) It can be fatal; 7) AIA will be less severe if correctly diagnosed and given appropriate medical treatment. ***Note:*** *Some asthma drugs contain these additives.*

Sloper 1991 ★ **74%** of 66 patients with eczema improved on a diet eliminating colors, preservatives, milk, eggs, and tomatoes. The longer a food had been avoided, the less likely was the chance of a positive food reaction. Authors say, "This diet may be considered in all children with moderate or severe eczema."

Van Bever 1989 ★ After testing 25 children with severe atopic dermatitis, it was found that some foods, food additives, tyramine, and acetylsalicylic acid can cause skin, intestinal, and respiratory reactions.

Veien 1991 ★ A severe eruption of leukocytoclastic vasculitis *(blood vessel inflammation)* occurred after eating 50 mg of Red #4 *(E124 in Europe).* It faded after 2 months on a diet without food additives.

Ward 1997 ★ In hyperactive children, Yellows #5 and #6 significantly lower zinc levels, causing one or more of the following symptoms: Overactivity, aggression, violence, poor speech, poor coordination, asthma, eczema.

Warrington 1986 – In patients with chronic additive-induced urticaria or aspirin-sensitive asthma, Yellow #5 causes the release of a chemical from certain cells which suggests a potential diagnostic test.

Worm 2001 – In people with atopic dermatitis and food intolerance, additives *(Yellow #5, benzoate, nitrite, etc.)* cause white blood cells to make more leukotriene, contributing to allergic reactions and asthma.

Wuthrich 1981 ★ Adverse reaction to aspirin or food additives is called intolerance or pseudoallergy, and related to prostaglandin imbalance. In oral tests using aspirin and additives, **26.6%** of 620 patients with urticaria, asthma, or chronic rhinitis were intolerant, and **2/3** of them improved on an elimination diet. Wuthrich said that drugs must no longer be synthetically colored. ***Note:*** *Now, more than 25 years later, they still are.*

Yoneyama 2000 – On a Japanese island, researchers were able to study an entire population of children under 4 years old, of which only half had been vaccinated with the DPT vaccine. Vaccinated children had **10 times** more asthma than those who were not vaccinated. Very few studies compare vaccinated with unvaccinated children.

	Vaccinated Children	Unvaccinated Children
Asthma	25.6%	2.3%
Atopic Dermatitis	18.0%	2.3%
Asthma, Rhinitis, or Dermatitis	56.4%	9.3%

Note: *Since children who become more prone to allergic, autoimmune, or behavioral disorders after vaccination often benefit from the low-phenolic Feingold Diet, we suspect that the damage may be somewhere in the sulfation system. Research along these lines, and research into identifying those children at risk, is needed. To our knowledge, no such research is being done.*

Physical Problems: Migraine, Seizures, Earache, Etc.

Antico 1989 – IBS: Comparing diet and other therapies, the authors conclude that food additive intolerance may be a major factor in the pathogenesis of Irritable Bowel Syndrome.

Egger 1983 ★ MIGRAINE, G.I. PAIN, SEIZURES: **93%** of 88 children with frequent migraine recovered on the "few foods" diet without additives. Other symptoms which improved included abdominal pain, behavior disorder, fits, asthma, and eczema.

Egger 1985 – HEADACHE, G.I. PAIN, SEIZURES: **81.6%** of 76 overactive children improved on a few-foods diet without additives. Other symptoms such as headaches, abdominal pain, and seizures also improved.

Egger 1989 ★ HEADACHE, G.I. PAIN, SEIZURES etc: **80% o**f 45 children with epilepsy plus headaches, abdominal symptoms, or hyperactivity improved on an elimination diet. Symptoms improved in all those whose seizures stopped, and in some whose seizures did not stop. In double-blind challenge, symptoms returned in 15 of 16 children **(94%)**"

Egger 1992 ★ MIGRAINE, ENURESIS: On a diet without additives, **76%** of 21 children whose migraine or hyperactive behavior had improved also stopped bed wetting.

Faulkner-Hogg 1999 – CELIAC DISEASE: 39 adults who continued to have symptoms on a gluten-free diet were studied. Of 22 patients who switched from an almost-gluten-free to a no-detectable-gluten diet, 5 became well and 10 improved. Diarrhea, headache, nausea, and flatulence were provoked by amine, salicylate and soy, as well as gluten. ***Note:*** *Salicylate is addressed by the Feingold Diet, while both salicylate and amines are addressed by the Failsafe Diet. See www.fedupwithfoodadditives.info*

Feingold 1979 – EYE PROBLEMS: Eye muscle disorders may respond well to the Feingold Diet. In addition, benzoates – both naturally occuring and those used as preservatives – should be eliminated. Dr. Feingold proposed that a variety of neurologic and neuromuscular disturbances "may be induced by identical chemicals, depending upon the individual's genetic profile and the interaction with other environmental factors." He said nystagmus and strabismus should not be ignored. Unfortunately, no further research on this has been found.

Murphy 2006 ★ SEIZURES: The Ketogenic Diet used for epilepsy improves symptoms of ADHD in people with both disorders. Hyperactive rats put on the Ketogenic Diet showed a reversible decrease in activity within 24 hours. Murphy says, "The Ketogenic Diet may be of use in the treatment of ADHD." ***Note:*** *Any diet removing most "processed" foods approaches the Feingold Diet by eliminating the many additives used in processed foods. Research on whether the nerve-protecting effect of the high-fat Ketogenic Diet counteracts the neuron-damaging effect of additives would be interesting. See Lau 2006, page 33.*

Neuman 1978 ★ ALLERGY: This was a randomized, controlled, clinical trial. 122 patients with allergies ate 50 mg Yellow #5 or placebo. They suffered the following reactions from the coloring: General weakness, heatwaves, heart palpitations, blurred vision, rhinorrhoea *(runny nose)*, feeling of suffocation, pruritus *(itching),* and urticaria *(hives)*. There was activation of the fibrinolytic pathway. ***Note:*** *50 mg is not a high dose of Yellow #5.*

Nsouli 1994 ★ EARACHE: An additive-free diet prevented recurrence of earache in 70 **(86%)** of 81 patients. A challenge diet with the suspected food(s) produced earache in 66 of the 70 patients **(94%)**. Nsouli said, "Food allergy should be considered in all pediatric patients with recurrent serous otitis media …"

Petitpierre 1985 ★ IBS: 14 patients with irritable bowel syndrome got better on an elimination diet. Then they were challenged "blindly" (they did not know when they received challenge and when it was a placebo). The challenges with foods or additives caused the typical symptoms of Irritable Bowel Syndrome. Elevated yeasts (Candida *albicans,* Geotrichum *candidum*) were also important, favoring the development of allergic and pseudo-allergic reactions.

Robson 1997 ★ ENURESIS: Children with ADHD were 2.7 times more likely to wet their bed, and 4.5 times more likely to wet their pants than children without ADHD.

Salzman 1976 – SLEEP & ENURESIS: **93%** of 15 children given the Feingold Diet improved in overactivity, distractibility, impulsiveness and excitability. Sleep and enuresis *(bed-wetting)* problems were resolved partially or completely

Colorings and Flavorings

Abdel-Aziz 1997 – In mice, Red #3 reduced sperm count by 50%, reduced the number of moving sperms by 57%, and increased the number of sperm abnormalities.

Aboel-Zahab 1997 – A combination of food colorings were fed to healthy adult rats. Results included:

- Decreased body weight, hemoglobin, and red blood cells
- Increased thyroid hormone, cholesterol, triglycerides
- Increased liver enzymes
- Brown pigment deposit in liver and kidney tubular cells
- Areas of hemorrhage in both liver and kidneys
- The balance between types of white blood cells was abnormal

In summary, certified food dyes can:

- Make you hyperactive
- Give you cancer
- Damage your sperm
- Damage your liver
- Lower your immunity
- Raise your cholesterol
- Decrease your brain size
- Trigger an asthma attack
- Give you hives
- Damage your nerves

Allen 1984 – For most people with food intolerance, symptoms are caused by small molecules in the food or additives. These reactions are pharmacological *(like drug side effects)* and do not show up on IgE allergy testing.

Aoshima 1997 – The effects of certain chemicals and additives on GABA *(inhibitory neuron)* receptors were measured. Results indicated that food additives can measurably modulate the neural transmission in the brain, which "changes the frame of the human mind, as alcohol or tobacco does."

Ashida 2000 – Artificial food colors may impair hepatic *(liver)* function.

Augustine 1980 – In frog nerves, Red #3 produced a dose-dependent increase in neurotransmitter release.

Bamforth 1993 – Yellow #5 and the artificial flavoring *vanillin* inhibit the enzyme dopamine sulfotransferase. Vanillin also inhibits by 50% the metabolism of a birth control medication which is sulfated in the liver.

Ceserani 1978 – Yellow #5 causes bronchoconstriction in some aspirin-sensitive people, just like aspirin.

D'Souza 1987 – Aspirin, Indomethacin and Yellow #5 (0.1-2.0 mg/kg) induced dose-dependent increases in carotid-sinus nerve (CSN) activity, accompanied by increases in mean arterial blood pressure.

el-Saadany 1991 – Synthetic colorings and flavoring were given to adult rats. Serum protein, RNA and T4 *(thyroid)* hormone were increased. Nucleic acid enzymes were stimulated in all the organs studied. G-6-PD and 6-PGD activity increased. Coloring and flavoring together resulted in the highest increases.

Food & Drug Administration (U.S.) – "The color certification program is self-supporting because the law requires manufacturers to pay FDA a user fee for each pound of color the agency certifies." ***Note:*** *They get paid per pound* ***PASSED****, not per pound* ***EXAMINED*** *- certainly a conflict of interest. In 2006 FDA certified almost* ***19 million pounds*** *of color additives.*

Food & Drug Administration (U.S.) – The colorings are not certified to be *safe*. FD&C colors are certified to have no more than the following amounts of contaminants such as the following:

- Benzidine, not more than 1 part per billion. *(See Lancaster study, page 33.)*
- Lead, not more than 10 parts per million.
- Arsenic, not more than 3 parts per million.
- Mercury, not more than 1 part per million.

Food & Drug Administration Public Health Advisory 2003 – Letter warning physicians of blue discoloration of the skin, urine, and feces, of metabolic acidosis and death when Blue #1 is used to color enteral *(tube feeding)* solutions. FDA says that since Blue #1 is a mitochondrial toxin, it is "plausible but not proven" as the cause. FDA says Blue #1 has been used for tube feeding for 30 years but never evaluated for safety.

Groten 2000 – Combining unrelated additives is not a health concern because of the low doses involved. Authors claim no actual research is necessary. ***Note:*** *This report was copyrighted by the International Life Sciences Institute, formerly known as the Nutrition Foundation, and composed of the major food, chemical, and pharmaceutical companies, listed in part on page 20.*

Hedman 1981 – Tiny amounts of Yellow #5 cause contractions in the trachea smooth muscle tissue of guinea pigs.

Koutsogeorgopoulou 1998 – Results showed clear immuno-suppressive effects of Red #2 and Yellow #5.

Kroes 2000 – Describes the Threshold of Toxicological Concern and **de minimis** concepts *("a little bit can't hurt")* used to evaluate additives. Thus, the cost and time needed to actually test additives for safety can be avoided.

Kroes 2002 – Using the Threshold of Toxicological Concern, a de minimis value can be set for chemicals of unknown toxicity. This method is now used by the US FDA and the WHO for evaluations of flavoring substances. ILSI *(International Life Sciences Institute, composed of companies that make food additives, pesticides, snack foods, etc.)* is heavily promoting this new method of "safety evaluation."

Lancaster 1999 – FDA allows only 1 part per billion (1 ng/g = ONE nanogram per gram) of benzidine in food dyes because it is so highly carcinogenic. Testing commercially available food colors, Lancaster found levels up to **270 ng/g –** MUCH higher than the amount allowed by FDA's own regulations.

Lau 2006 – Inhibition of neuron growth indicates neurotoxicity during development. Testing the amount of additives often found in snack foods, Lau combined Blue #1 + MSG, and Yellow #10 + Aspartame. The combinations were synergistic, far more toxic than expected by adding up the effect of each one tested alone. Blue #1 + MSG was *4 times as toxic*, and Yellow #10 + Aspartame was *7 times as toxic*. ***Note:*** *Although Yellow #10 is not used in snacks in the U.S., it is commonly used in medications, cosmetics, etc.*

National Academy of Sciences 1979 – From 2 weeks of data on 12,000 people, the NAS determined that 99% of people eat up to an average of **327 mg** food dye per person per day. For reasons unknown, they divided this number by 5, to set the average daily intake of food dyes at 65 mg per day.

Reyes 1996 – All food dyes tested inhibit mitochondrial respiration. The percentage of inhibition varied per color, and was dose related. ***Note:*** *Mitochondria control the energy in your cells. Inhibition is not good.*

Rosenkranz 1990 – In chemical studies, one of the aromatic amines obtained upon reduction *(a part of digestion)* of Red #40 was unexpectedly mutagenic *(making mutations or changes in DNA).*

Sasaki 2002 ★ Low levels of each of the food dyes caused DNA damage in the mouse stomach, colon and bladder.

Sweeney 1994 – Intestinal bacteria "reduce" the azo bond in azo dyes, producing superoxide free radicals, thus confirming that azo dyes are a source of genotoxic agents *(resulting in mutations or cancer).*

Tanaka 1993 ★ 2 generations of mice were fed low doses of Red #2. The pups weighed more, had trouble turning over and finding a source of smell. Movement was affected, and more pups died.

Tanaka 1996 ★ Yellow #6 was fed to 2 generations of mice. There were some (unspecified) adverse effects on litter size, weight, and sex ratio. The pups had trouble with surface righting *(turning over),* negative geotaxis *(crawling upwards),* swimming direction, and swimming head angle. Their difficulty was dose-related.

Tanaka 2001 ★ Red #3 was fed to 2 generations of mice. Movement and other changes were dose-related.

Tanaka 2006 ★ When mice ate Yellow #5, activity and body weight increased, and some developmental milestones changed. **"**Nevertheless," says Tanaka, "the actual dietary intake of tartrazine *(Yellow #5)* is presumed to be much lower**.**" ***Note:*** *This conclusion of safety is based on nothing but conjecture.*

Tsuda 2001 ★ Very low doses of 3 azo food dyes caused DNA damage in the colon, lung, bladder, etc., when fed to mice. Damage was observable as early as three hours after they ate it. Tsuda says, "more extensive assessment of azo additives is warranted."

Vorhees 1983 ★ When rats ate Red #40, it reduced reproductive success, parent and pup weight, brain weight, survival, and female vaginal development. Running wheel activity decreased, and open-field rearing activity increased. Red #40 produced physical and behavioral toxicity in pups at high doses (10%).

Ward 1990 ★ Yellow #5 reduced zinc in blood and saliva, and increased urinary zinc of the ADHD children but not the controls. The zinc loss corresponded to deterioration in behavior and emotional responses.

Ward 1997 ★ In hyperactive children, Yellows #5 and #6 significantly lowered zinc levels, causing one or more of the following symptoms: Overactivity, aggression, violence, poor speech, poor coordination, asthma, eczema. Hyperactive children were low in zinc and iron, but high in aluminum, cadmium and lead.

Worm 2001 – In people with atopic dermatitis and food intolerance, additives *(Yellow #5, benzoate, nitrite, etc.)* cause white blood cells to make more leukotriene, a chemical contributing to allergic reactions and asthma.

The Three Preservatives

Bauer 2001 – Butylated hydroxytoluene (BHT) increases lung tumors in certain kinds of mice. Thus, BHT is used with other tumor and inflammation promoters to increase tumor production for research.

Bauer 2005 – In a study of chronic pulmonary disease and how it causes lung cancers, the researchers used BHT together with other promoters to maximize the available mouse tumors to study.

Dengate 2002 ★ Calcium propionate (a bread preservative) caused irritability, restlessness, inattention and sleep disturbance in children who had responded well to a diet removing synthetic additives and tyramine. ***Note:*** *This study was done in Australia, where much more calcium propionate is used in bread than in the U.S. While not eliminated by the Feingold Program, products containing this preservative are marked with a (CP) symbol in the Foodlist books.*

Fisherman 1973 ★ 250 mg BHT in food caused an asthma attack within 75 minutes in some asthmatic patients.

Kahl 1983 – Feeding rats BHT increases some chemicals but decreases others in hepatic *(liver)* microsomes.

Kahl 1984 – Studying the action of BHA and BHT on cells and organs, Kahl was hoping they may protect against cancer. Although they do protect against radiation and have anti-tumor actions, their use in the prevention of human cancer was judged "unlikely" in light of their ability to promote tumors themselves.

Kahl 1993 – The toxicology of BHA, BHT, and vitamin E *(alpha-tocopherol)* is described. At high doses all antagonize vitamin K and interfere with blood clotting. BHT is toxic to the lungs and causes liver tumors. BHA causes tumors of the forestomach. Kahl says all published findings agree that BHA and BHT are tumor promoters, but vitamin E is not carcinogenic and is safe to use in higher doses.

McFarlane 1997 ★ Pregnant rats fed a "nominal" dose of BHT (500 mg/kg) had liver enlargement and abnormality. Pups were born at normal weight, but lost weight while nursing and did not gain it back.

Meyer 1980 ★ When pregnant rats received 500 mg/kg BHT, there was a significant negative effect on body weight in both generations, and developmental problems in the pups, starting during the lactation period.

NIH Eleventh Report on Carcinogens 2005 – BHA is "reasonably anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity in experimental animals … No data were available to evaluate the carcinogenicity of BHA in humans." ***Note:*** *They have been saying this every year since 1986.*

Safer 1999 – Rats fed BHT had increased liver weight. Under an electron microscope, the liver cells showed gradual vacuolization *(holes)* and disintegration, a "moth-eaten" appearance, withered mitochondria *(mitochondria control cell energy)*, and necrosis *(death)*. These findings were described in clinical and gruesome detail.

Sarafian 2002 – Exposure to marijuana smoke and BHA is far more harmful to the lungs than either one alone.

Sasaki 2002 – Both BHA and BHT cause DNA damage in the stomach, colon and bladder.

Siman 1996 – BHT has adverse effects on the liver of rats. Like tobacco and many drugs, it is metabolized by *cytochrome P450* in the liver, where it becomes a harmful pro-oxidative compound instead of the anti-oxidant it is supposed to be.

Stokes 1974 ★ 0.5% BHA or BHT was fed to pregnant mice and their offspring. Compared to controls, BHA-treated pups explored more, and slept, groomed, and learned less. BHT-treated pups slept less, learned less, and were more aggressive.

Stolze 1999 – The combination of BHA and TBHQ was shown to cause harmful effects on erythrocyte *(red blood cell)* membrane structures.

Takami 1999 – BHA, BHT and 3 other preservatives were shown to damage oocyte *(egg)* maturation in female rats. Antioxidants with no harm to oocyte maturation included ascorbic acid and vitamin E.

Tanaka 1993 ★ BHT was fed to mice for 3 generations. At the lowest (0.015%) level, body weight of the pups was increased at birth and during lactation for each generation. A few neurobehavioral parameters (e.g., turning over and crawling uphill) were affected at all levels.

Thompson 1988 – BHA interacts with BHT in the lungs of mice by stimulating formation of hydrogen peroxide which increases the ability of BHT to bind to protein. Both of these things directly injure the lung tissues.

Thompson 1988 – BHT produces an increase in mouse lung weight by the necrosis *(death)* of cells in the lung walls. BHA alone has no effect on lung weight up to a dose of 500 mg/kg. However, when added to small amounts of BHT, the BHA significantly increased the lung weight in a dose-dependent manner.

Thompson 1988 – In rat liver mitochondria, BHA and BHT inhibited respiratory control of cells by stimulating state 4 respiration. They also affected the mitochondrial membrane, causing calcium release and mitochondrial swelling. There was a rapid decrease in ATP *(energy source)* levels and then cell death.

Thompson 1989 – Like BHA, phenolic compounds in medicine and foods stimulate BHT to become the more toxic BHT-quinone methide. ***Note:*** *Salicylates, food dyes – even neurotransmitters – are phenolic.*

Thompson 1989 – BHA enhanced the covalent binding of BHT by 400%, increased the formation of the polar and aqueous metabolites of BHT, and created two additional metabolites of BHT.

Tryphonas 1999 – 0.5% BHT treatment resulted in a significant reduction in natural killer (NK) cell activity of splenocytes *(cells in spleen that kill invaders).* ***Note:*** *This means BHT affects the immune system.*

Yu 2000 – The proposed use of BHA as a cancer prevention is challenged by the observation that BHA has a toxic effect in animals, causing apoptosis *(cell death)* in freshly isolated rat hepatocytes *(liver cells).*

Zoccarato 1987 – In guinea pig cerebral cortex neurons, it was seen that BHA and BHT strongly inhibit certain processes important to calcium ion depolarization of GABA and glutamate neuron transmission.

Sweeteners

CORN SYRUP

Corn syrup and high fructose corn syrup are not eliminated on the Feingold Program. However, products containing them are marked in the Feingold Foodlist and Shopping Guide for those who wish to avoid them. Our experience has been that about 20% of our members are intolerant of corn syrup, although most of them can tolerate cane sugar with no problem.

Children who eat a lot of "sugar" are probably eating a lot of corn syrup. 20% of Feingold members report a sensitivity to corn syrup.

Some other names for corn syrup are: Dextrose, Glucose, Corn Sweetener, High Fructose Corn Syrup, Maltodextrin, and Corn Syrup Solids.

Gaby 2005 – Consumption of high-fructose corn syrup (HFCS) may now exceed that of sucrose. Although it does not hurt blood-sugar regulation in the short-term, HFCS has other effects on metabolism. It promotes the formation of toxic chemicals involved in aging, in diabetes complications, and in hardening of the arteries. In some patients, it causes chronic diarrhea or other bowel problems. It may be partly responsible for the increase in obesity, diabetes mellitus, and non-alcoholic fatty liver disease. The authors say that the evidence suggests it is more harmful than generally recognized.

Hallfrisch 1990 – When HFCS was intoduced in 1967, it was recommended as a replacement for "regular" sugar for diabetic and obese people. Although HFCS causes a smaller increase in blood glucose and insulin than sugar does, there are a number of undesirable changes that don't show up immediately. It is absorbed from the small intestine and metabolized in the liver. When eating more fructose than glucose, it may be malabsorbed. It turns into fat more easily, and raises triglycerides and cholesterol more than ordinary sugar or other carbohydrates. It increases blood pressure, uric acid, and lactic acid.

SUGAR *Sugar is allowed on the Feingold Program. Sugar not labeled "cane sugar" is usually made from beets. Some people who appear to be sugar-intolerant may be reacting to chemicals used in the manufacture of beet sugar. They may do better with cane sugar. Honey can sometimes be a salicylate, depending on the type of blossom the bees visited, but is usually well tolerated.*

Inam 2006 ★ Serotonin is a neurotransmitter important in mood, stress, and attention. One group of rats was fed a standard rat diet, while another group was fed a standard diet with 25% table sugar for 5 weeks. Both groups were then tested with a medication that would indicate serotonin response. The study showed that sugar induced a change in the serotonin receptor's ability to receive messages both before and after the synapse *(space between neurons).*

Note: *Keep this study in mind for the child with continuing behavior problems even on the Feingold Program. Too many children do get over 25% of their calories from sugar or – even worse – from corn syrup.*

Wolraich 1994 ★ Children whose parents said they were "sugar-sensitive" were tested with a series of 3 diets: One with sugar, one with aspartame, and one with saccharin. None of these sweeteners had an adverse effect on the children's behavior. Wolraich concluded that the three sweeteners could not all be "equally bad" because the children had improved continuously during the nine weeks of the study.

Note: *Since all 3 diets were without artificial food colorings, flavorings, and preservatives, this improvement is not surprising.*

Note: *Most candy and soda contains CORN SYRUP – not table sugar – but this study did not test corn syrup.*

This study is often quoted to "prove" that parents are poor judges, and that sugar is not harmful to behavior.

However, this study did not test the synthetic dyes, artificial flavorings or preservatives found in foods like candies and soda. It did not even use the same kind of sweetener found in most of these foods, so the results are of little value.

ASPARTAME *Aspartame (Equal, NutraSweet, etc.) and the related chemicals Neotame and Alitame were specifically excluded from the Feingold Program in 2004.*

Butchko 2002 – "It is clear that aspartame is safe, and there are no unresolved questions regarding its safety under conditions of intended use." ***Note:*** *This study was done by the NutraSweet Company.*

Lau 2006 – Food coloring + aspartame was found to be synergistic, i.e., far more toxic to developing neurons than expected by just adding up the effect of each additive given alone.

Maher 1987 – Some people suffer neurological or behavioral reactions to aspartame. If mice are given enough aspartame to elevate plasma phenylalanine levels more than tyrosine levels (which happens in humans), seizures are more easily induced.

A senior FDA toxicologist, the late Dr. Adrian Gross, tried to prevent the approval of aspartame. He told Congress that they were violating the Delaney Amendment since it was known that aspartame can trigger brain tumors. He said, **"If the FDA violates its own laws, who is left to protect the public?"**

Nakao 2003 – Formaldehyde is a breakdown product of aspartame. In rat cells, 100 *microM* of it significantly increased the number of shrunken cells and cells with damaged DNA. More than 6 times that concentration has been measured in humans given large doses of aspartame.

Roberts 2001– Aspartame-induced disorders in children include headache, confusion, convulsions, irritability, depression, intellectual deterioration, antisocial behavior, rashes, asthma and unstable diabetes, as well as actual addiction to aspartame-containing products.

OTHER ARTIFICIAL SWEETENERS

Coming under the heading of "artificial flavorings," artificial sweeteners are not acceptable on the Feingold Program. Specifically, no products containing sucralose (Splenda) or saccharine (Sweet 'N Low) are listed in the Feingold Foodlist and Shopping Guide books.

Sucralose (Splenda) pretends to be natural. It is made from sugar by replacing certain parts of the sugar molecule with chlorine. It thus becomes a chlorocarbon whose chemical structure is closer to a pesticide than a sugar. In order to be measured by the spoonful like sugar, Splenda is bulked up with corn syrup solids, and contains *almost* 5 calories per teaspoon (legally but not truthfully called "zero").

Feingold members who had used Splenda were asked for input, and reported that Splenda had caused the following symptoms: Racing heart, stomach ache, head banging and crying (in an autistic child), asthma attack, depression, inceased yeast infection problems, and memory loss (in an adult). It is not known whether these effects were caused by the sucralose or the corn syrup component.

Other sweeteners include Tagatose (from milk), Trehalose (from starch), Acesulfame potassium, Neohesperidine DC (from oranges). "Natural" artificial sweeteners from plant proteins are being developed. So far, The Feingold Association has no opinion on whether any of these sweeteners are safe to use for people on the Feingold Program. At this time, no products containing them are listed in the *Foodlist and Shopping Guides*

AGAVE

Agave syrup is made from the agave plant and is a natural sweetener. It is acceptable on the Feingold Program.

STEVIA

Stevia is allowed on the Feingold Program.

Stevia is an herb that has been used as a no-calorie sweetener in Japan and Brazil for over 20 years. Studies show it can also lower blood pressure, improve blood sugar control, and increase insulin sensitivity. (Chang 2005, Hsieh 2003)

ALCOHOL SUGARS

Alcohol sugars are allowed on the Feingold Program. Care should be taken not to overdo them, since too much has a laxative effect.

When a sugar name ends in *"ol"* that means it is an alcohol sugar. Commonly used alcohol sugars: Sorbitol, Mannitol, Xylitol, Polyols (from hydrogenated starch hydrolysates)

PST / Sulfation Pathways

Alberti 1999 ★ Autistic children showed a low level of sulfation, indicating difficulty in detoxifying or metabolizing certain compounds.

Bamforth 1993 ★ Yellow #5 and artificial *vanillin* flavoring inhibit the enzyme dopamine sulfotransferase. Vanillin also inhibits by 50% the metabolism of a birth control medication which is sulfated in the liver.

Harris 1996 – Dietary factors play an important part in the sulfation detoxification pathway.

Harris 1998 – Low doses of salicylic acid *(aspirin)* consistently and selectively inhibited the P form of the enzyme phenol sulfotransferase (PST) by **50%. *Note:*** *Thus, if a child is already low in this enzyme, salicylate would make it worse.*

McFadden 1996 – People with environmental intolerance or chronic disease may have impaired sulfation, related to intolerance of phenol and tyramine containing foods. "It may be a factor in the success of the Feingold Diet." ***Note:*** *The Feingold Diet does not eliminate tyramine, but the Australian Failsafe Diet does.*

Scadding 1988 – **78%** of 74 people with food sensitivity were "poor sulfoxidisers," having trouble with sulfur and carbon oxidation reactions. A metabolic defect is suspected.

Animal Research – Additives, Behavior and Neurology

Carrie 2002 ★ An omega-3 supplement improved learning ability and vision in old mice whether fed a balanced diet or an omega-3 deficient diet. ***Note:*** *This is not part of the basic Feingold Program, but research has shown this essential fatty acid to be a helpful addition to everyone's diet.*

Meyer 1980 ★ When BHT was given to pregnant rats, it had a negative effect on body weight in both generations, and pups had developmental problems.

Ruppert 1985 ★ A single exposure to the metals cadmium or tin produced hyperactivity in the rat pups. Authors conclude these metals are neurotoxic to the developing nervous system.

Stokes 1974 ★ BHA and BHT were fed to pregnant mice and their pups. BHA-fed pups explored more, but slept, groomed, and learned less. BHT-fed pups slept less, were more aggressive, with learning difficulties.

Tanaka 1993 ★ Red #2 was fed to mice. The pups weighed more, had trouble turning over, finding a source of smell, and more died. Movement activity of male pups was affected.

Exposing mice and rats to some toxins damages their GABA neurons (the "brakes" of the nervous system), resulting in HYPERACTIVITY.

Can some food additives also damage GABA neurons? Shall we rev up these neurons with stimulant medication, or try to stop the damage by avoiding the food additives?

NOTE: Ruling out toxic metal exposure should be part of the diagnostic workup for children with behavior problems. See hriptc.org for more information.

Tanaka 1993 ★ BHT was fed to mice for 3 generations. In the group that got the least (0.015%), body weight of the pups increased. Turning over and crawling uphill were abnormal in all the treatment groups**,** but Tanaka nevertheless concluded that these doses had "little effect" on the mice.

Tanaka 1996 ★ When 2 generations of mice ate Yellow #6, the pups weighed more and had dose-related difficulty with surface righting *(turning over),* negative geotaxis *(crawling upwards),* and swimming.

Tanaka 2001 ★ 2 generations of mice ate Red #3. Movement and other changes were dose-related.

Tanaka 2005 ★ When Yellow #5 was fed to mice, activity and body weight increased, and the timing of some developmental milestones changed. **"**Nevertheless," says Tanaka, "the actual dietary intake of tartrazine *(Yellow #5)* is presumed to be much lower**.** It would therefore appear that the level of actual dietary intake of tartrazine is unlikely to produce any adverse effects in humans**.**" ***Note:*** *He provides no supporting facts for this conclusion.*

Vorhees 1983 ★ Red #40 was fed to rats for 2 generations. It reduced reproductive success, brain weight, survival, and female vaginal development. Running wheel activity decreased, and rearing activity *(standing up)* increased. Authors say that "Red #40 produced physical and behavioral toxicity in developing rats."

Reviews of Research

Anthony 1999 – An elimination diet is effective in most cases, and medication should be reserved for those who fail.

Arnold 1999 – In a report under contract for the 1998 NIH Conference on ADHD, Arnold identified 23 non-stimulant treatments. He said only dietary treatment has convincing double-blind evidence of efficacy.

Baumgaertel 1999 – Scientific evidence suggests that individualized dietary management and trace element supplementation is effective in some children.

Berdonces 2001 – Psychiatric medications have major risks. Additives, preservatives, dyes, etc. can make ADHD worse. He also discusses omega-3 oils, vitamins, minerals, and herbs.

Breakey 1997 – After reviewing the reseach literature, she concludes that "diet definitely affects some children."

Jacobson 1999 – After reviewing 25 years of research, the *Center for Science in the Public Interest* (CSPI) recommends NIH-sponsored research on additives, FDA testing of additives for behavioral effects, and an FDA ban on use of synthetic dye in products for children. Also, CSPI says the FDA must stop denying that food additives contribute to ADHD, and advise the public that methylphenidate (Ritalin etc) causes cancer and is a poor first choice for treating ADHD. The CSPI also says that fast food chains, hospitals, summer camps and schools should make their meals without food dyes.

Kavale 1983 – In a meta analysis of early studies in the 1970's on artificial colorings only, they concluded that the diet has no significant benefit. Unfortunately, this old analysis continues to be quoted by ADHD experts.

Kellogg Report 1989 – This 735 page report funded by the Kellogg and Ford foundations looks at health in the United States. The authors say the brain abnormalities associated with learning and behavioral problems appear related to neurotransmitter precursor imbalances, vitamin and mineral deficiencies, and "the consumption of refined carbohydrates, toxic elements, additives, colorings, caffeine, and allergens." They conclude that "what Americans need most of all is an instinctive preference for whole foods and a healthy sense of suspicion about processed foods."

Kidd 2000 – Major contributors to ADHD include adverse responses to food additives and foods, sensitivity to environmental chemicals, molds, and fungi, and exposure to neurodevelopmental toxins such as heavy metals and organohalide pollutants.

Liu 2005 – This paper reviews early biological risk factors for violence, including pregnancy/birth complications, fetal exposure to nicotine, alcohol, and drugs, low cholesterol, malnutrition, lead and manganese exposure, head injuries and brain dysfunction, low arousal, low serotonin, low cortisol, and high testosterone.

Rimland 1983 – Invited by publishers to comment on the Mattes, Kavale & Forness reviews of the early studies, Rimland concludes "GIGO = garbage in / garbage out." He makes the following points:

1) Most of the studies were nearly irrelevant because they studied only 10 dyes but the diet excluded over 3,000 other compounds used at that time *(over 12,000 of these compounds are in use today).*
2) The dosage levels of the colorings tested were ridiculously small.
3) They failed to consider the role of the subject's nutritional status.
4) They failed to recognize and control relevant variables (e.g., copper levels or fluorescent lights)
5) They came to arbitrary negative conclusions not supported by the actual data (e.g. Harley study)
6) They paid inadequate attention to animal and *in vitro* studies.

Schab 2004 – The increase in ADHD raises the possibility of a widespread risk factor. In a new meta-analysis of all appropriate double-blind placebo-controlled trials evaluating the effects of AFCs *(artificial food colors)*, Schab found they were consistent with accumulating evidence that "neurobehavioral toxicity may characterize a variety of widely distributed chemicals." ***Note:*** *AFCs are only part of what is eliminated by the Feingold Program.*

Schnoll 2003 – Schnoll concluded that food additives, refined sugars, food sensitivities/allergies, and fatty acid deficiencies are all linked to ADHD, and that diet modification should be part of the treatment protocol.

Schnyder 1999 – Adverse reactions to foods may be caused by toxic, enzymatic, pharmacological, "pseudo-allergic" or allergic mechanisms. Diagnosis can usually be based on the history and results of a diet.

Weiss 1982 – As a toxicologist, Dr. Weiss re-analyzed several of the early "negative" studies, and concluded, "The Feingold hypothesis, in principle, is supported by experiments that meet scientific criteria of validity..." ***Note:*** *In other words, even the early studies funded by the additive industry did actually support the Feingold Diet when analyzed properly.*

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