Environmental Circumstances that can Damage the Developing Brain

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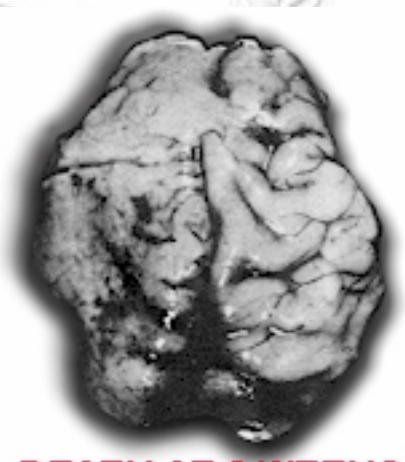
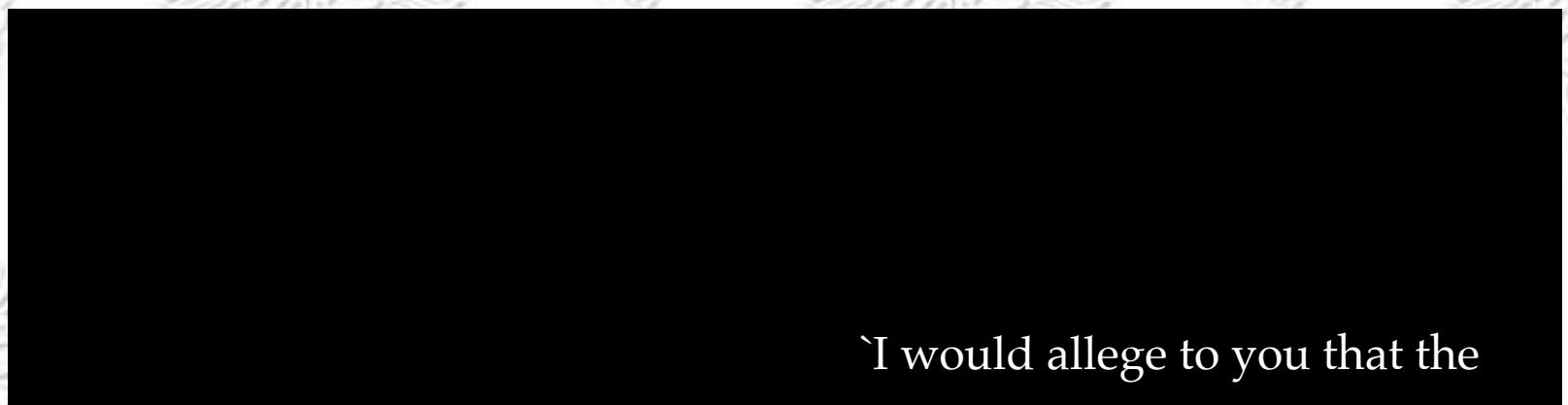
This report is the result of a 1997 Graduate Student Research Project conducted through the Special Education Department at the University of South Florida. The project involved extensive research of published peer reviewed medical journal articles which have shown environmental and chemical exposure factors can cause damage to the delicate brain growth processes in the unborn child during pregnancy, thereby demonstrating potential to cause Learning Disabilities, Attention Deficit Disorder, Hyperactivity and other child behavior anomalies. This report generates serious concern as public exposure to identified chemical sources continues to grow due to increased use in homes, jobs and consumer products.
The impact of the resulting decreased quality of offspring upon the families, schools and society is discussed.

The human brain begins growing in the 4th week of pregnancy at a rate of over 4,000 cells per second. Unlike an adult, the fetus does not have a functional blood brain barrier to protect itself from toxic insult. This lack of natural defense allows chemicals into the fetal brain with potential to cause serious harm and disruption in this delicate brain growth process.



The photograph above shows the brain of an infant girl who died at 6 weeks after birth. The mother was categorized as a chronic alcoholic. Along with greatly reduced head circumference and abnormally smooth left hemisphere, scientists located what they called "*bizarre arrangements*" of brain cells in many areas.
Journal of Pediatrics, 92(1):64-67

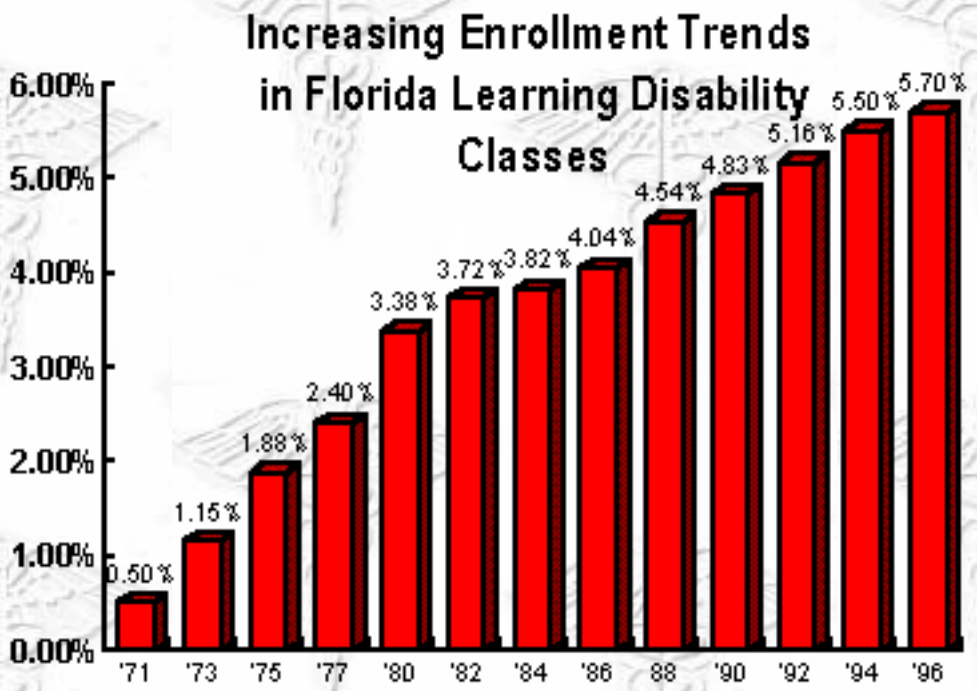


ultimate pollution is pollution that affects the cognitive ability of future generations.´

- Dr. David Carpenter

(Above photo and quote appeared in the Hudson River PCB story)

click - Environmental Causes Index -
to bypass Learning Disability Crisis Introduction



The Learning Disability Crisis

As can be seen in the above graph, the percentage of Florida students diagnosed with learning disabilities has risen from **.50%** in 1971 - to **2.40%** in 1977 - to **3.38%** in 1980 to **4.04%** in 1986 to **5.16%** in 1996 and will be over **6%** in 1998.

Whereas, the initial increase in these numbers can be explained by increased identification of children as the new L.D. program began, the continuing increases seen after 1985 cannot be attributed to this fact. However, there is mounting evidence showing how even low levels of common environmental chemicals from cosmetics to home pesticides can cause subtle neurological damage in both laboratory and real life settings.

Types of Neurological Damage found in Learning Disabilities and Attention Deficit Disorder

Scientists and researchers have now confirmed in a number of research studies that children with learning disabilities and attention deficit disorder exhibit at least one of several types of damage to the brain structure. This can appear as either one or more of

the following:

- **Fewer numbers of brain cells in important areas of the brain**
- **Smaller size of brain cells**
- **Brain cells that migrated to the wrong part of the brain (called dysplasia)**
- **Lower than normal blood flow to specific areas of the brain**
- **Brain cells that metabolize glucose (the brain's primary fuel) at lower than normal levels**

The above provides a neurological explanation for "**WHAT**" has actually happened inside the brains of these children, however, it does not address the question as to "**WHY**" it has happened. The question of "WHY" is the focus of this research project.

The Evidence

Some of what you are about to read regarding the causes of learning disabilities and attention deficit disorder may at first appear surprising, however, all research included in this web site has been conducted by major medical universities and research agencies and should therefore, be given careful assessment. It is human nature to avoid acknowledgment of practices that may have been conducted innocently for years, but now appear responsible for contributing to neurological harm to our children. However, continued avoidance of the evidence will only allow the problem to continue, with obvious negative consequences upon our children, school systems and society as a whole.

As an explanation for the continued rise in child brain cancers over the past 20-30 years throughout the U.S., the United States EPA has only recently begun initiatives to form a research council to investigate the "combined effects" of modern chemicals as an explanation for the rising rates of brain and neurological cancers among U.S. children.

Problems in EPA's Testing Guidelines

Current chemical testing guidelines set by the E.P.A. requires a chemical company to test a chemical for health effects upon test animals only **one chemical at a time.** This, unfortunately, is what many scientists state is a serious flaw in judging the safety of a chemical because this **is not** what our children are exposed to in the real world. In fact, a child is subjected to hundreds of chemicals simultaneously from chemical flavors and preservatives in food - to chemicals in cleaning compounds - cosmetics - plastic vapors in carpeting, paints and upholstery - vehicle exhaust - fabric softeners and chlorine products on bedding while they sleep and pesticides used in schools and the home. Because of this wide range of exposure, to determine the potential for true "real-life" effects - it would be necessary to test all these compounds simultaneously at low level exposures - and this just isn't being done.

Also, recent information has shown the unborn child is far more vulnerable to developing neurological damage during pregnancy than previously thought - the human brain is growing at over 4,000 cells per second beginning in the fourth week of pregnancy. An increasing number of neurotoxic compounds are being identified in today's modern society (not present 30-50 years ago) which can weaken or damage this brain development process. The effects of these chemical exposures can then become evident in later years as learning disabilities, attention deficit disorders, mental retardation or personality and behavior difficulties such as shyness, hyperactivity, aggression or even violent tendencies and lack of conscience.

Also receiving increased documentation is research showing exposure of the father to various chemical compounds during the 65 days prior to conception (*the time required to complete sperm development in the testicles*) can increase the risk for various birth defects and symptoms common in learning disability students. The names given to the science which studies this phenomena are *Pregnancy Neurotoxicology*, *Developmental Neurotoxicology and Behavioral Toxicology* and will be addressed below.

`The fetus that receives [PCBs] becomes something other than it might have been.

Too much of the testing of chemicals takes place ... in our children´s bodies.´

- Dr. J. P. Myers

(Above photo and quote appeared in the Hudson River PCB story)

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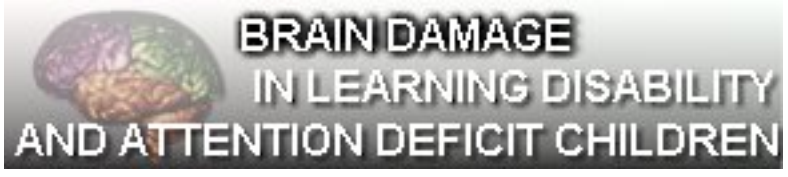
Environmental Causes of Learning Disabilities

Topic headings below detail the primary exposure sources which medical research has found can damage the delicate brain cell growth process occurring during pregnancy. This research provides strong evidence to support an environmental explanation for the large increases being observed nationally in children with attention deficit disorders (A.D.D.), learning disabilities and other behavior disorders such as hyperactivity, aggressive disorders and emotional handicaps (EH). The majority of research was compiled from the University of Florida and University of South Florida Medical Libraries by extensive investigation through the bound editions of the "Index Medicus" world-wide journal listings.


MARIJUANA


ASPIRIN


DAMAGED
SPERM


BRAIN DAMAGE
IN LEARNING DISABILITY
AND ATTENTION DEFICIT CHILDREN


PRESCRIPTION
DRUGS