Potential Associations

ADHD	Allergies (Asthma, Rhinitis, Contact Dermatitis etc.)	Alzheimer's	Anemia/Immune Suppression	Autism	Autoimmune diseases (RA, Lupus, MS, psoriasis)	Blood Pressure and Kidney Disease	Cancer
Bisphenol A	Antimony	Aluminum	Benzene	Mercury	Arsenic	Arsenic	Aluminum (breast?)
Lead	Bisphenol A	Lead	Cadmium		Lead	Lead	Arsenic (skin, bladder, lung, liver, kidney, prostate)
Mercury	Cadmium	Mercury	Lead		Mercury	Mercury	Benzene (leukemia)
Phthalates	Formaldehyde		Polycyclic aromatic hydrocarbons (PAHs)		Mold (and other biotoxins)		Bisphenol A (prostate, uterine, breast)
Polychlorinated biphenyls (PCBs)	Mold (and other biotoxins)						Cadmium (lung, prostate, kidney, bladder)
	Nickel						Electromagnetic Fields (leukemia)
	Phthalates						Formaldehyde (nose, throat)
							Heterocyclic amines (stomach, colorectal, pancreatic, breast)
							Lead (lung, stomach, bladder)
							Nickel (lung, nose, larynx, prostate)
							Perchloroethylene (leukemia, skin, colon, lung, larynx, bladder, urogenital tract)
							Phthalates (prostate, uterine, breast)
							Solvents (acetonitrile, benzene, carbon tetrachloride, chloroform, perchloroethylene, and trichloroethylene) (liver, biliary tract and non-Hodgkin's lymphomas)
							Vinyl Chloride, PVC and Dioxin (Persistent Organic Pollutants-POPs) (breast)

Potential Associations

Chronic Fatigue, Fibromyalgia	Diabetes/Insulin Resistance	Fertility Issues, Endometriosis, Menstrual Disorders (Endocrine Disruption)	Multiple Chemical Sensitivities, (Migraines, Headaches)	Neurobehavioral Issues (Memory Problems, Mental Illness, Depression, Fatigue, Anxiety, Confusion)
Arsenic	Arsenic	Arsenic	Benzene	Aluminum
Benzene	Bisphenol A	Bisphenol A	Formaldehyde	Arsenic
Cadmium	Electromagnetic Fields	Cadmium	Mold (and other biotoxins)	Electromagnetic Fields
Electromagnetic Radiation	Pesticides (Persistent Organic Pollutants-POPs)	Electromagnetic Fields	Perchloroethylene	Lead
Formaldehyde	Polychlorinated Biphenyls (PCB) (Persistent Organic Pollutants-POPs)	Formaldehyde (menstrual disorders)	Pesticides (Persistent Organic Pollutants-POPs)	Mercury
Lead	Vinyl Chloride, PVC and Dioxin (Persistent Organic Pollutants-POPs)	Lead	Polychlorinated biphenyls (PCBs)	Mold (and other biotoxins)
Mercury		Mercury	Solvents	Phthalates
Mold (and other biotoxins)		Phthalates	Vinyl Chloride, PVC and Dioxin	Polychlorinated biphenyls (PCBs)
Nickel		Polychlorinated biphenyls (PCBs)		Solvents (acetonitrile, benzene, carbon tetrachloride, chloroform, perchloroethylene, and trichloroethylene).
Perchloroethylene		Polycyclic aromatic hydrocarbons (PAHs)		
Pesticides (Persistent Organic Pollutants-POPs)		Solvents (acetonitrile, benzene, carbon tetrachloride, chloroform, perchloroethylene, and trichloroethylene)		
Polychlorinated biphenyls (PCBs)		Vinyl Chloride, PVC and Dioxin (Persistent Organic Pollutants-POPs) (endometriosis)		
Solvents (acetonitrile, benzene, carbon tetrachloride, chloroform, perchloroethylene, and trichloroethylene)				
Vinyl Chloride, PVC and Dioxin (Persistent Organic Pollutants-POPs)				

Potential Associations

Neurodevelopmental Issues (in the womb)	Osteoporosis	Parkinson's Disease	Peripheral Neuropathy
Arsenic	Cadmium	Manganese	Arsenic
Lead	Lead	Pesticides (Persistent Organic Pollutants-POPs)	Lead
Mercury			Mercury
Polychlorinated biphenyls (PCBs)			Polychlorinated biphenyls (PCBs)
Solvents (acetonitrile, benzene, carbon tetrachloride, chloroform, perchloroethylene, and trichloroethylene)			

Toxin	Definition and Sources
Aluminum	Aluminum is a chemical element and as the pure metal or as alloys (magnalium, aluminum bronze, etc.) is used for aircraft, utensils, apparatus, electrical conductors, and instead of copper in dental alloys. The coarse powder is used in aluminothermics (thermite process); the fine powder as flashlight in photography, in explosives, fireworks, and in aluminum paints; and for absorbing occluded gases in manufacture of steel. Aluminum has been exempted from testing for safety by the FDA under a convoluted logic wherein it is classified as GRAS (Generally Regarded As Safe). It has never been tested for safety by the FDA and there are no restrictions whatsoever on the amount or use of aluminum.
Antimony	Antimony is a chemical element and is used in electronics and flame-proofing, in paints, rubber, ceramics, enamels, batteries, ammunition, cable sheathing, matches, plumbing, some solders, drugs to treat Leishmaniasis, pewter, and as a hardening agent in a wide variety of alloys.
Arsenic	Arsenic is a notoriously poisonous metalloid with many allotropic forms, including a yellow (molecular non-metallic) and several black and grey forms (metalloids). Three metalloidal forms of arsenic, each with a different crystal structure, are found free in nature. However, it is more commonly found as arsenide and in arsenate compounds, several hundred of which are known. Arsenic is widely used as a treatment for wood and Arsenic and its compounds are also used as pesticides, herbicides, insecticides (like MSMA and DSMA), in animal feed as a method of disease prevention and growth stimulation, as a semiconductor material, in integrated circuits, in laser diodes and LEDs, in lead shots and bullets, in small quantities as an additive to brass used to make plumbing fittings, and for taxonomic sample preservation.
Benzene	Benzene is an organic solvent that is one of the 20 most widely used chemicals in the United States. It is used to make other chemicals that are then used to make plastics, resins, nylon, and other synthetic fibers. It is used to make explosives, photographic chemicals, rubber, lubricants, dyes, adhesives, coatings, paint, detergents, drugs, and pesticides. It is used in printing, lithography, and food processing. It has been used as a gasoline additive in the past, but that use has been greatly reduced in the United States since the 1990s. Benzene is formed from both natural processes and human activities. It is produced from volcanoes and forest fires, and is a natural part of crude oil, gasoline, and cigarette smoke.
Bisphenol A (BPA)	Bisphenol A (BPA) is a chemical used to make a strong plastic called polycarbonate that is used in many things like drinking bottles. BPA is also used as a lining on the inside of many metal food cans to keep the cans from rusting.
Cadmium	Cadmium is a metal element and occurs as a minor component in most zinc ores and therefore is a by-product of zinc production. Cadmium was for a long time used as pigment and for corrosion-resistant plating on steel. Cadmium compounds were also used to stabilize plastic. With the exception of its use in nickel-cadmium batteries, the use of cadmium is generally decreasing in all other applications. This decrease is due to the high toxicity and carcinogenicity of cadmium and the associated health and environmental concerns. Although cadmium is toxic, one enzyme, a carbonic anhydrase with a cadmium as reactive center, has been discovered.
Electromagnetic Fields	An electromagnetic field is a physical field produced by electrically charged objects. It affects the behavior of charged objects in the vicinity of the field. Light is the electromagnetic field in a certain frequency range. At lower frequencies the electromagnetic field may be radio waves or infrared light, while at higher frequencies it may be UV light or x-rays, among others. The use of electromagnetic radiation is seen in various disciplines. For example, X-rays are high frequency electromagnetic radiation and are used in radio astronomy, radiography in medicine, and radiometry in telecommunications. Common applications of EMFs include lasers in barcode readers and in CD and DVD players, radio waves from cellular phones, terrestrial radio signals, televisions, cordless phones, and many others. In fact, anything that uses electricity puts off an EMF, from simple home appliances to high voltage power lines.
Formaldehyde	Formaldehyde is a chemical compound with the formula CH2O. Aqueous solutions of formaldehyde are referred to as formalin. Annual world production of formaldehyde in 2005 was 46 billion pounds. In view of its widespread use, toxicity, and volatility, exposure to formaldehyde is a significant consideration for human health. Formaldehyde is an intermediate in the oxidation of methane as well as other carbon compounds, and thus is produced in forest fires, automobile exhaust, and in tobacco smoke and can even be produced in the atmosphere as part of smog. Formaldehyde is an ingredient in permanent adhesives such as those used in plywood or carpeting; in sanitary paper products such as facial tissue, table napkins, and paper towels; in paints and explosives; and it is used in the textile industry to make fabrics crease-resistant. Formaldehyde has been found as a contaminant in several bath products, at levels from 54–610 ppm.
HCAs	Heterocyclic amines (HCAs) are the carcinogenic chemicals formed from the cooking of muscle meats such as beef, pork, fowl, and fish at high temperatures. HCAs form when amino acids and creatine react at high cooking temperatures. Researchers have identified 17 different HCAs resulting from the cooking of muscle meats that may pose human cancer risk. Four factors influence HCA formation: type of food, cooking method, temperature, and time. HCAs are almost exclusively produced by cooking muscle meats; other sources of protein such as milk, eggs, tofu, and organ meats such as liver have very little or no HCA content naturally or when cooked. Temperature is the most important factor in the formation of HCAs. Frying, broiling, and barbecuing produce the largest amounts of HCAs because the meats are cooked at very high temperatures.
Lead	Lead is a soft heavy metal element used in building construction, lead-acid batteries, bullets and shot, weights, and as part of solder, pewter, fusible alloys and radiation shields (e.g., in X-ray rooms). Other uses for lead include ceramic glazes, stained glass, polyvinyl chloride (PVC) production, fishing sinkers, some candle wicks, in leaded glass, and in solder for electronics. Until the 1990s, lead was used in paint and gasoline. Like mercury, another heavy metal, lead is a potent neurotoxin that accumulates in soft tissues and bone over time.
Manganese	Manganese is found as a free element in nature and in many minerals. As a free element, manganese is a metal with important industrial metal alloy uses, particularly in stainless steels as a treatment for rust and corrosion prevention and in industrial pigments. Manganese dioxide is used as the cathode in standard and alkaline disposable dry cells and batteries. It is also used as an alloy in most beverage cans, an additive in unleaded gasoline, and in recently minted U.S. dollar coins. Manganese is a required trace mineral for all known living organisms and its ions function as cofactors for a number of enzymes in higher organisms, where they are essential in detoxification of superoxide free radicals. Manganese can cause a poisoning syndrome with neurological damage which is sometimes irreversible.

Mercury	Mercury is a heavy, silvery metal element and is liquid at or near room temperature. It occurs in deposits throughout the world mostly as cinnabar, which is the source of the red pigment vermilion. Mercury is used in thermometers, barometers, and other scientific apparatus (though its use for these applications is decreasing), in amalgam material for dental restoration, in fluorescent bulbs (including compact fluorescents or CFLs), and batteries. Environmental sources of mercury are both natural and man-made. Natural sources such as volcanoes are responsible for approximately half of atmospheric mercury emissions. The other half comes mainly from coal-fired power plants, gold production, smelters, cement plants, and waste disposal.
Mold	Molds include all species of microscopic fungi that grow in the form of multicellular filaments. In contrast, microscopic fungi that grow as single cells are called yeasts. Molds are ubiquitous in nature, and mold spores are a common component of household and workplace dust and some people may have allergic reactions to them. Some molds also produce mycotoxins that can pose serious health risks to humans and animals. Exposure to high levels of mycotoxins can lead to neurological problems and in some cases death. Prolonged exposure, e.g. daily workplace exposure, can be particularly harmful. The term toxic mold refers to molds that produce mycotoxins, such as *Stachybotrys chartarum* , and not to all molds in general.
Nickel	Nickel is a chemical element that is corrosion-resistant, and is used in alloys; as a plating; in the manufacture of coins, magnets, and common household utensils; in stainless steel, rechargeable batteries, and electric guitar strings; as a catalyst for hydrogenation; and in a variety of other applications. It is listed as an essential trace mineral but its role in the body is unknown.
Perchloroethylene (PCE)	Perchloroethylene is a manufactured chemical that is primarily used for dry cleaning fabrics and degreasing metals. It is also used to make other chemicals, including chlorofluorocarbons, and rubber coatings; as an insulating fluid and cooling gas in electrical transformers; and as a scouring, sizing, and desizing agent in textiles. It is an ingredient in aerosol products, solvent soaps, printing inks, adhesives, sealants, paint removers, paper coatings, leather treatments, automotive cleaners, polishes, lubricants, and silicones. It is also an ingredient in some consumer products, including typewriter correction fluid, adhesives, spot removers, wood cleaners, and shoe polish.
Persistent Organic Pollutants (POPs)	Persistent Organic Pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes. Because of this, they have been observed to persist in the environment, to be capable of long-range transport, to bioaccumulate in human and animal tissue, to biomagnify in food chains, and to have potential significant impacts on human health and the environment. Many POPs are currently or were in the past used as pesticides. Others are used in industrial processes and in the production of a range of goods such as solvents, polyvinyl chloride (PVC), and pharmaceuticals. Although many different chemicals may be defined as POPs, 12 POPs, all chlorine-containing organic compounds, have been chosen as priority pollutants by the United Nations Environment Program (UNEP) for their impact on human health and environment. The twelve POPs include many of the first generation organochlorine insecticides, e.g. DDT and aldrin, industrial chemical products, e.g. PCBs (polychlorinated biphenyls), or unwanted by-products such as dioxins and furans.
Pesticides (some of which are a class of POPs)	A pesticide is any substance or mixture of substance intended for preventing, destroying, repelling or mitigating any pest. A pesticide may be a chemical substance, biological agent, antimicrobial, disinfectant or device used against any pest. Pests include insects, plant pathogens, weeds, mollusks, birds, mammals, fish, nematodes (roundworms) and microbes.
Phthalates	Phthalates are man-made chemicals used in many different products. They are mainly used as plasticizers (substances added to plastics to increase their flexibility, transparency, durability, and longevity), with their primary use being for the softening of polyvinyl chloride (PVC). These chemicals are found in some toys and bottles. They are also used in cosmetics and other personal care products like some lotions and shampoos. Phthalates are being phased out of many products in the United States and European Union over health concerns.
Polychlorinated Biphenyls (PCBs) (A class of Persistent Organic Pollutants-POPs)	Before 1977, PCBs were used as insulation, coolants, and lubricants in transformers, capacitors, vacuum pumps, gas-transmission turbines, hydraulic fluids, and other electrical equipment; as fillers in casting waxes; as plasticizers in paints, plastics, and rubber products; and in surface coatings, sealants, caulking compounds, fire retardants, dedusting agents, glues, inks, pesticides, and carbonless copy paper. Products made before 1977 that may still contain PCBs include old fluorescent lights, electrical devices, and microscope hydraulic oils. U.S. production of PCBs stopped in 1977 because of suspected harmful health and environmental effects; exports and imports of PCBs stopped in 1979.
Polycyclic aromatic hydrocarbons (PAHs)	Polycyclic aromatic hydrocarbons (PAHs) are chemical compounds that consist of fused aromatic rings. PAHs occur in oil, coal, and tar deposits, and are produced as byproducts of fuel burning (whether fossil fuel or biomass). PAHs are also found in foods. Studies have shown that most food intake of PAHs comes from cereals, oils, and fats. Smaller intakes come from vegetables and cooked meats.
Solvents (A class of Persistent Organic Pollutants-POPs) (acetonitrile, benzene, carbon tetrachloride,	Solvents are liquids or gases that can dissolve or extract other substances. They are used to dissolve grease, oil, and paint; to thin or mix pigments, paint, glue, pesticides, and epoxy resins; to clean electronics, automotive parts, tools, and engines; and to make other chemicals. Products that contain solvents include paint, ink, coatings, household cleaners, dry cleaning fluid, spot removers, adhesives, pharmaceuticals, personal care products, nail polish remover, microelectronics, automotive products, metal and vapor degreasers, paint strippers and thinners, refrigerants, foam-blowing agents, and coolants. Industries that use solvents include dry cleaning, painting, printing, soap manufacturing, paint removing, textile manufacturing, asphalt paving, manufacturing of printed circuit boards and semiconductors, cleaning of printed circuit boards, agriculture and food production, pesticide application, hospitals, oil painting, and art restoration.
Vinyl Chloride, PVC and Dioxin (A class of Persistent Organic Pollutants-POPs)	Vinyl chloride is an organochloride (an organic compound containing at least one covalently bonded Chlorine atom). It is also called vinyl chloride monomer, or VCM. This colorless compound is an important industrial chemical chiefly used to produce the polymer polyvinyl chloride (PVC). Vinyl chloride liquid is fed to polymerization reactors where it is converted from a monomer to a polymer PVC which is heated and molded into end products such as PVC pipe and bottles. Dioxins occur as by-products in the manufacture of organochlorides, in the incineration of chlorine-containing substances such as PVC (polyvinyl chloride), in the bleaching of paper, and from natural sources such as volcanoes and forest fires.
Volatile Organic Compounds (VOC)	Volatile Organic Compounds (VOCs) are chemicals that contain carbon and are ubiquitous in nature. VOCs are organic compounds that easily become vapors or gases. Along with carbon, they contain elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur, or nitrogen. VOCs are released from burning fuel, such as gasoline, wood, coal, or natural gas. They are also released from solvents, paints, glues, and other products that are used and stored at home and at work. Many VOCs are also hazardous air pollutants. VOCs, when combined with nitrogen oxides, react to form ground-level ozone, or smog. Examples of VOCs are gasoline, benzene, formaldehyde, solvents such as toluene and xylene, and perchloroethylene (or tetrachloroethylene), the main solvent used in dry cleaning. Many VOCs are commonly used in paint thinners, lacquer thinners, moth repellents, air fresheners, hobby supplies, wood preservatives, aerosol sprays, degreasers, automotive products, and dry cleaning fluids.

Resources

Agency for Toxic Substances and Disease Registry	http://www.atsdr.cdc.gov/
National Library of Medicine Environmental Health And Toxicology Specialized Information Services	http://sis.nlm.nih.gov/enviro.html
National Pesticide Information Center	http://npic.orst.edu/rmpp.htm
TOXNET	http://toxnet.nlm.nih.gov/
CDC's Third national Report on Human Exposure to Environmental Chemicals	http://www.cdc.gov/exposurereport/pdf/thirdreport.pdf