Sick of chemicals:
a review of the evidence

Chemicals have brought enormous benefits to society but research, such as the findings described in this booklet, are linking many of them to cancers, allergies and fertility problems. The European Union's draft legislation to regulate chemicals, called REACH, aims to protect health and the environment. But many scientific experts and NGOs feel the proposed legislation will not provide adequate protection from the health effects of harmful chemicals, or provide future generations with a planet that is not polluted with hazardous chemicals. European countries must reduce dependency on chemicals that are harmful and replace them with safer substitutes.

This booklet shows only the tip of the iceberg in terms of evidence of the links between chemicals and health. It sets out some of the illnesses and conditions where there is «strong» or «good» evidence that chemicals contribute to ill health.

More research is emerging all the time and much of it shows that it is high time for legislators to act.

The chemicals and diseases mentioned in this booklet are taken from a database entitled, "**Chemical Contaminants and Human Disease: A Summary of Evidence**", created by three leading scientists and medical doctors: Sarah Janssen; Gina Solomon; Ted Schettler.

The database links 200 human health conditions to different chemical contaminants by strength of evidence. Thirty-two examples of diseases where «strong» or «good» evidence exists have been selected for inclusion here. The full database is available at:
http://www.protectingourhealth.org/corethemes/links/2004-0203spreadsheet.htm

Chemical Reaction and the European Public Health Alliance Environment Network acknowledge with thanks the permission given by the authors to use the data.

European Parliamentarians have a historic opportunity to respond to people's concerns about the health effects of chemicals by voting for an improved REACH.

Representing millions of Europeans, non-governmental organisations, such as Chemical Reaction, European Public Health Alliance Environment Network, European Environmental Bureau, Friends of the Earth Europe and Greenpeace, have come together to define a clear and unified message.

The key demands of non-governmental groups to the European Parliament are:

- **Phase out the use of hazardous chemicals**

Continued use should only be allowed if no safer alternatives are available or if their use is essential to society.

- **Strengthen registration procedures**

The aim should be to close the gap that currently exists in terms of safety information about chemicals

produced in quantities of between one and 10 tonnes per annum.

• Ensure independent quality audit

Ensure that industry information is independently audited for quality.

• Subject all articles to the same information requirements

Require chemicals used in imported articles to undergo the same information requirements as those in EU-made articles, so as to protect consumers and avoid distortion of competition.

• Make sufficient information publicly available

Full information on the chemicals contained in different products must be made available so that both retailers and consumers have the right to know and the right to choose what they purchase.

The light-hearted illustrations in the booklet show chemicals accumulating in our bodies, with sometimes irreversible effects. The booklet was produced by Chemical Reaction and the European Public Health Alliance Environment Network.

Chemical Reaction is a joint project on EU chemicals policy reform of the European Environmental Bureau, Friends of the Earth Europe and Greenpeace. Its aim is to provide a forum in which NGOs and citizens can become more involved in the relevant democratic decision making processes in the EU.
Website: www.chemicalreaction.org

The European Public Health Alliance Environmental Network advocates protection of the environment as a means to improving the health and well being of European citizens, and brings together groups that want to ensure that health is at the centre of environment issues. These include NGOs specialising in public health, environment-related health conditions and associations representing health care professionals.
Website: www.env-health.org

This publication has been made possible with the support of the Sigrid Rausing Trust.

Disease

Abnormal Sperm (morphology, motility, and sperm count)

«Strong» or «good» evidence links these chemicals

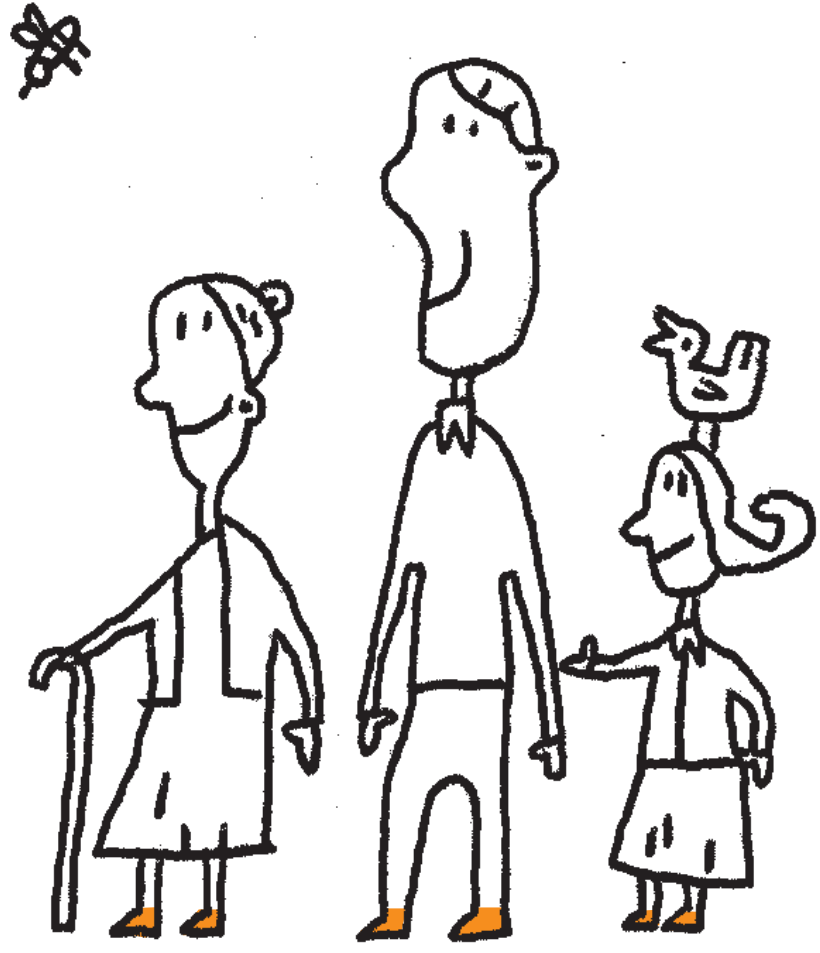
chlordecone, dibromochloropropane (DBCP), excessive heat, ethylene dibromide (EDB), ionizing radiation, lead, ethylene glycol ethers/acetates, DES/estrogens, PCBs; pesticides (alachlor, atrazine, 2,4-D, benomyl, diazinon, gossypol), 2-bromopropane, carbon disulfide

Disease

Acute Hepatocellular Injury (Hepatitis)

«Strong» or «good» evidence links these chemicals

ethanol, halothane, ionizing radiation; solvents: carbon tetrachloride, carbon tetrabromide, chloroform, dimethylformamide, tetrachloroethane, trichloroethylene (TCE); TNT; aflatoxins, mushroom toxins, bromobenzene, chlorinated naphthalenes, hexachlorobenzene, 2-nitropropane, paraquat, PCBs, phosphorus (yellow), phosphine, TCDD, trichloroethane



Disease

Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

«Strong» or «good» evidence links these chemicals

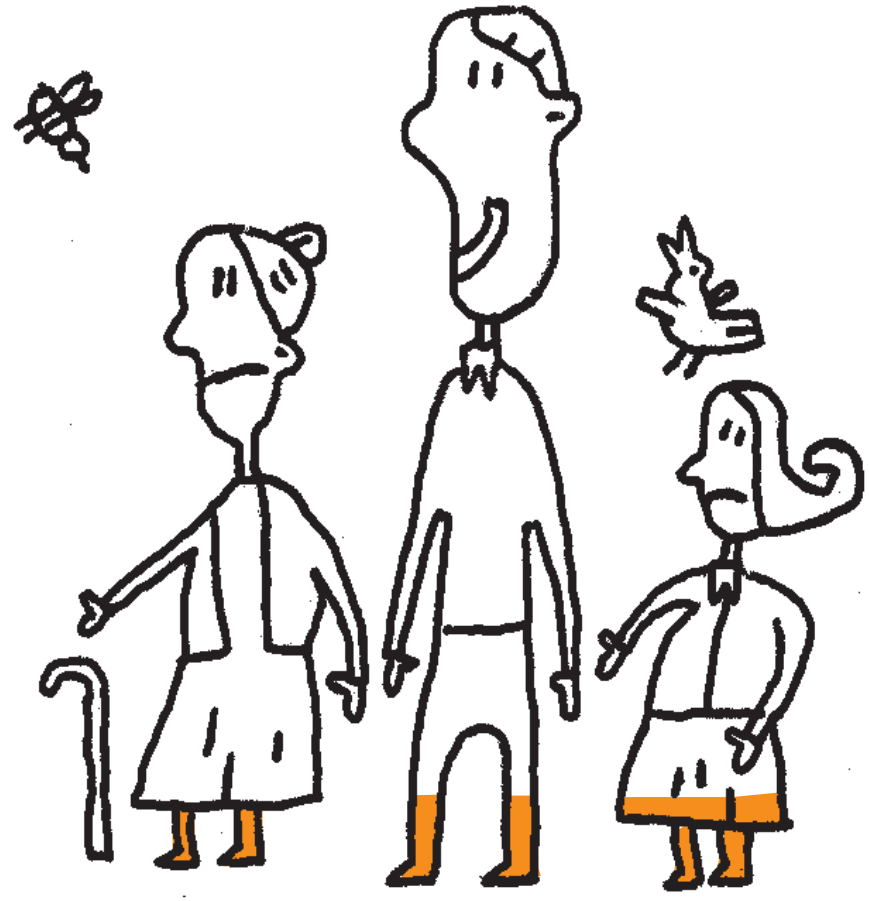
ethanol, PCBs, lead, tobacco smoke, manganese, organic solvents

Disease

Arrhythmias

«Strong» or «good» evidence links these chemicals

carbon monoxide, chlorofluorocarbons (CFCs), pesticides: carbamates and organophosphates, cyanide, dihalomethanes, methylene chloride, organic nitrates, antimony, arsenic, arsine gas, ethyl bromide, isopropyl chloride, lead, methyl bromide; organic solvents (including acetone, benzene, carbon tetrachloride, carbon disulfide, chloroform, dichloroethylene, ethyl chloride, ketones, methyl chloride, methylene chloride, tetrachloroethylene (PCE), trichloroethane, trichloroethylene (TCE), toluene and xylene)



Disease

Asthma (allergic)

«Strong» or «good» evidence links these chemicals

acid anhydrides, acrylates and methacrylates, amines (ethanolamines, ethylenediamine, paraphenylenediamine), animal antigens, captafol, chlorothalonil, colophony, enzymes (amylase, papain, subtilase, egg lysosyme, pepsin, trypsin), epoxy resins, fungal antigens, insect antigens, isocyanates, latex, metal fumes and salts (chromium, cobalt, nickel, platinum, tungsten carbide, vanadium, zinc carbide),plant pollens, plastic fumes and dusts (PVC, polyethylene, polypropylene), organic dusts (wood, grain, beans and fibers), aldehydes (acetaldehyde, acrolein, diesel engine exhaust, ozone, formaldehyde and propionaldehyde), aluminum, coal dust, diazonium salts, ethylene oxide, hexachlorophene, persulfate salts, phenol, pyrethins/pyrethoids, reactive dyes, sulfathiozole, tannic acid

Disease

Autoimmune Antibodies, positive antinuclear antibody (ANA)

«Strong» or «good» evidence links these chemicals

silica, asbestos, mercury, solvents (including benzene, carbon tetrachloride, formaldehyde, trichloroethane, trichloroethylene)

Disease

Bladder Cancer

«Strong» or «good» evidence links these chemicals

aromatic amines (4-aminobiphenyl, auramine, B-naphthalamine, benzidine, MOCA), benzidine-derived dyes, chlordimeform (and its metabolite 4-COT), coal tar, nitrobiphenyl, tobacco smoke, trihalomethanes (disinfection byproducts), arsenic, benzo(a)pyrene (PAH's), chlornaphazine, chlorphenol, ionizing radiation, methylene dianiline, organic solvents, o-toluidines

Disease

Breast Cancer

«Strong» or «good» evidence links these chemicals

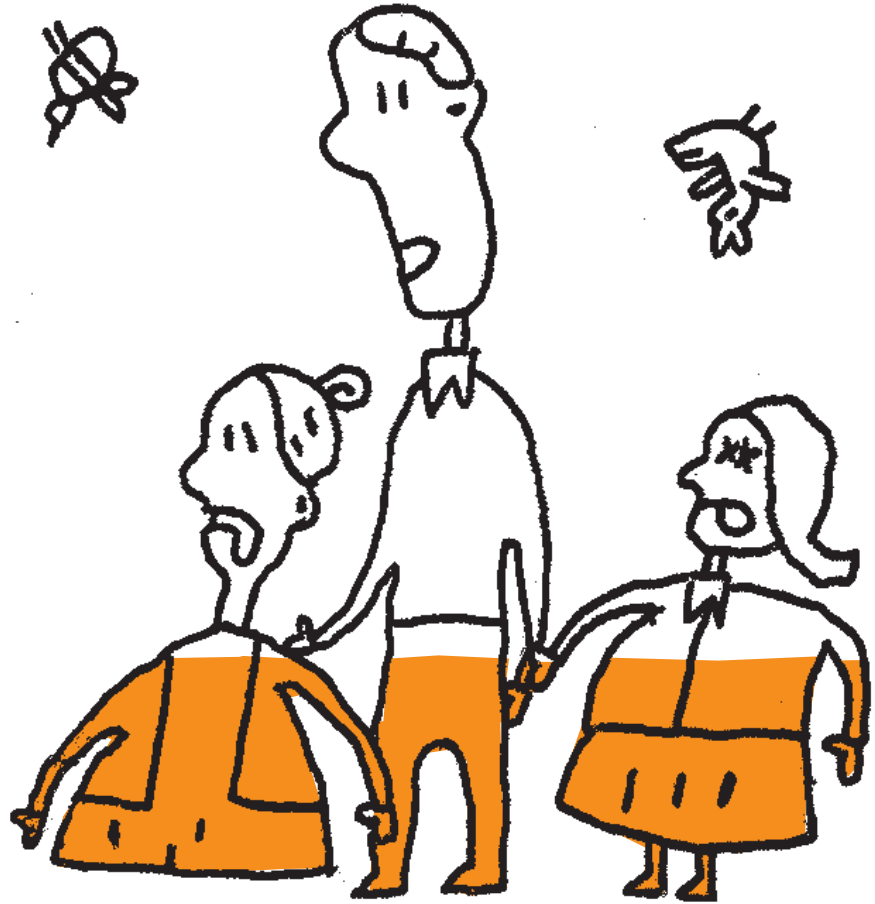
estrogens/DES, ethanol, ionizing radiation, aromatic amines (B-naphthylamine and benzidine), ethylene oxide, PAHs, tobacco smoke

Disease

Bronchitis (chronic)

«Strong» or «good» evidence links these chemicals

ammonia, aluminum, coal dust, cotton dust, isocyanates, metals (antimony, iron oxides, vanadium, osmium), oil mist, organic dusts (cotton, grain and wood dusts), particulate matter, portland cement, silica, smoke (tobacco smoke, fire smoke and engine exhaust), sulfur dioxide, grain dust, organic solvents, PCBs, phosgene, welding fumes



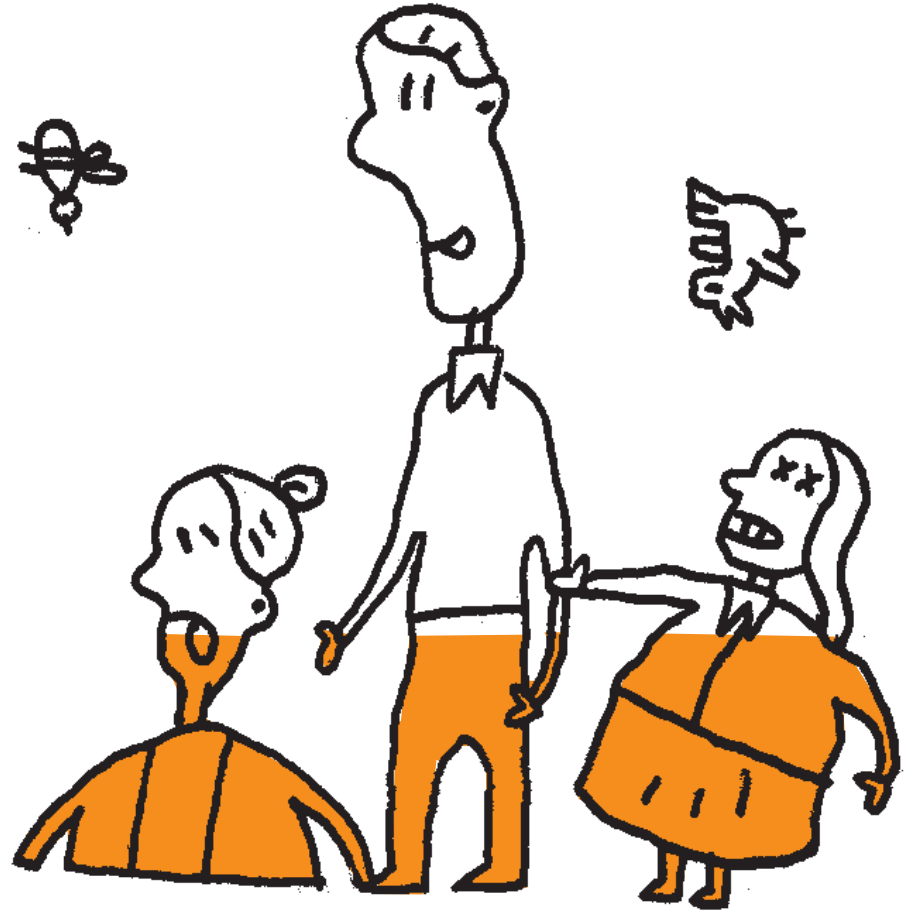
Disease

Cognitive Impairment

(includes impaired learning, impaired memory and decreased attention span)

«Strong» or «good» evidence links these chemicals

carbon disulfide, cocaine, ethanol, lead, methyl mercury, tobacco smoke/nicotine, carbon monoxide, nitrates, PCBs; pesticides (carbamates, methyl bromide, organochlorines, organophosphates); pentachlorophenol (PCP), toluene



Disease

Congenital Malformations (general)

«Strong» or «good» evidence links these chemicals

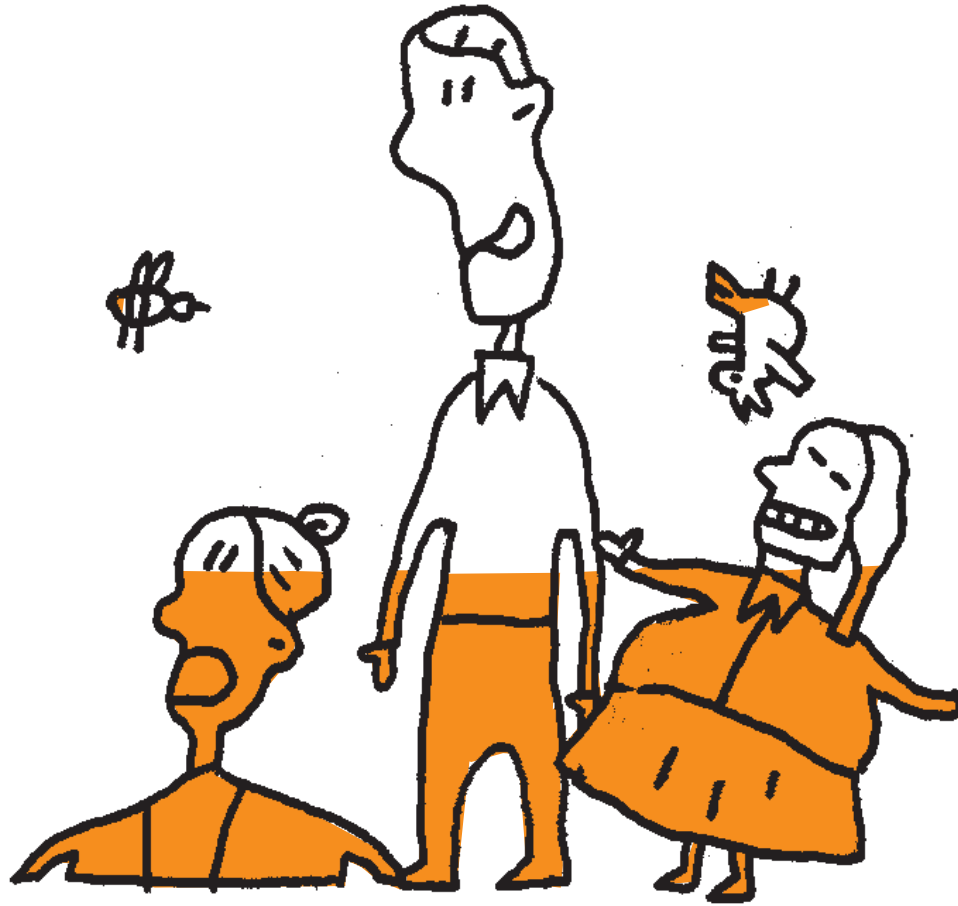
ethanol, ionizing radiation, arsenic, carbon monoxide, ethylene glycol ethers, mercury, organic solvents, tobacco smoke

Disease

Contact Dermatitis (allergic)

«Strong» or «good» evidence links these chemicals

antiseptics, aromatic amines, cement, colophony, cutting oils, dyes, formaldehyde, fragrances, glues and bonding agents, isothiazolins, lanolins, latex, metals, pesticides, potassium dichromate, preservatives, rubber products, rhus antigens



Disease

Contact Dermatitis (irritant)

«Strong» or «good» evidence links these chemicals

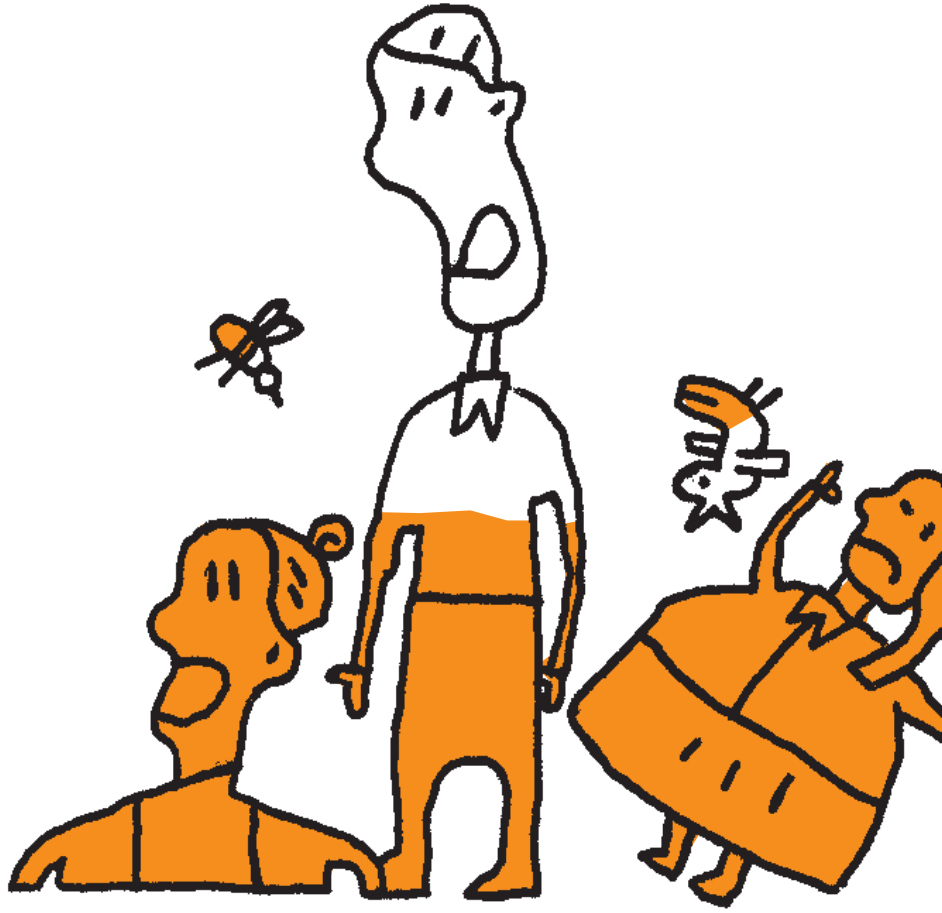
aminotriazole, abrasive dusts, chromic acid, cement, coal tars, detergents/soaps, ethylene oxide, metal salts, mild acids/alkalis, pesticides, solvents

Disease

Cirrhosis

«Strong» or «good» evidence links these chemicals

aflatoxins, ethanol, carbon tetrachloride, chloronaphthalenes, PCBs, tetrachloroethane, TNT, arsenic, halothane, organic solvents, trichloroethylene (TCE)

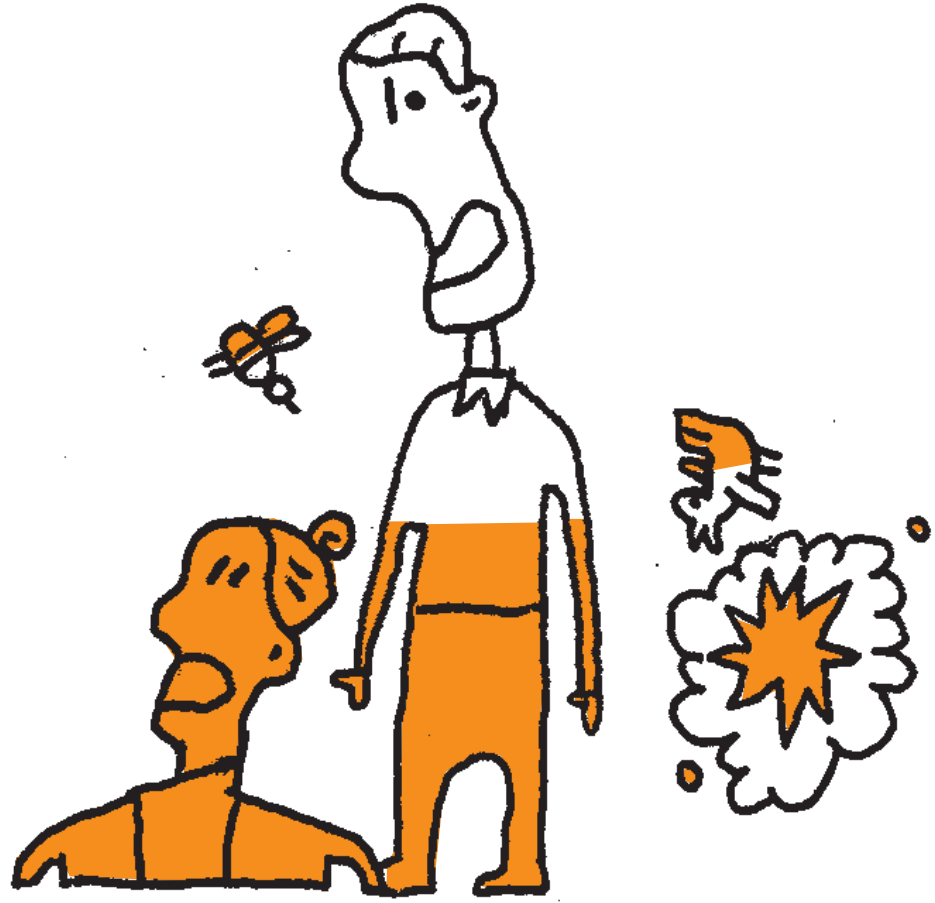


Disease

Developmental Delay

«Strong» or «good» evidence links these chemicals

ethanol, lead, methyl mercury, nicotine/tobacco smoke, PCBs, organic solvents (toluene)



Disease

Fetotoxicity (miscarriage/spontaneous abortion; stillbirth)

«Strong» or «good» evidence links these chemicals

anesthetic gases, ethanol, ethylene glycol ethers, ionizing radiation, nicotine/tobacco smoke, trihalomethanes (disinfection byproducts), arsenic, carbon monoxide, DES, ethylene oxide, lead, methyl isocyanate, mercury; organic solvents [methylene chloride, trichloroethane, trichloroethylene (TCE), toluenes, xylenes, carbon disulfide, chloroform, formaldehyde, N-methyl pyrrolidone (NMP), tetrachloroethylene (PCE)]; pesticides (dibromochloro-propane (DBCP), fungicides (dithiocarbamates), organochlorines (DDT/DDE), paraquat, triazines)

Disease

Hepatocellular Cancer (liver cancer)

«Strong» or «good» evidence links these chemicals

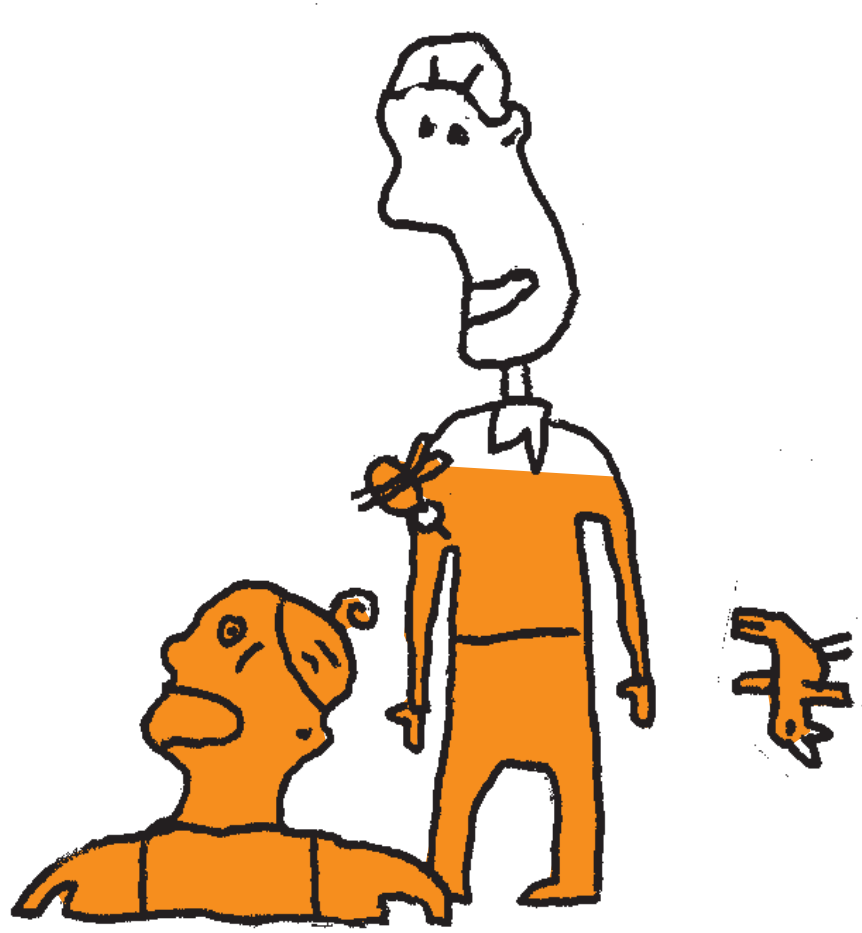
aflatoxin B1, androgens, ethanol, hydrocarbons, arsenical pesticides, dimethylnitrosamine, PCBs, thorium dioxide (thorostat), trichloroethylene (TCE), vinyl chloride

Disease

Leukemias (adult-onset)

«Strong» or «good» evidence links these chemicals

benzene, ethylene oxide, ionizing radiation,arsenic, aromatic amines, 1,3-butadiene, carbon disulfide, dioxins/TCDD, chlorinated solvents [carbon tetrachloride, 1,2-dichloroethane]; pesticides (alachlor, DDT, phenoxyacetic herbicides); tobacco smoke

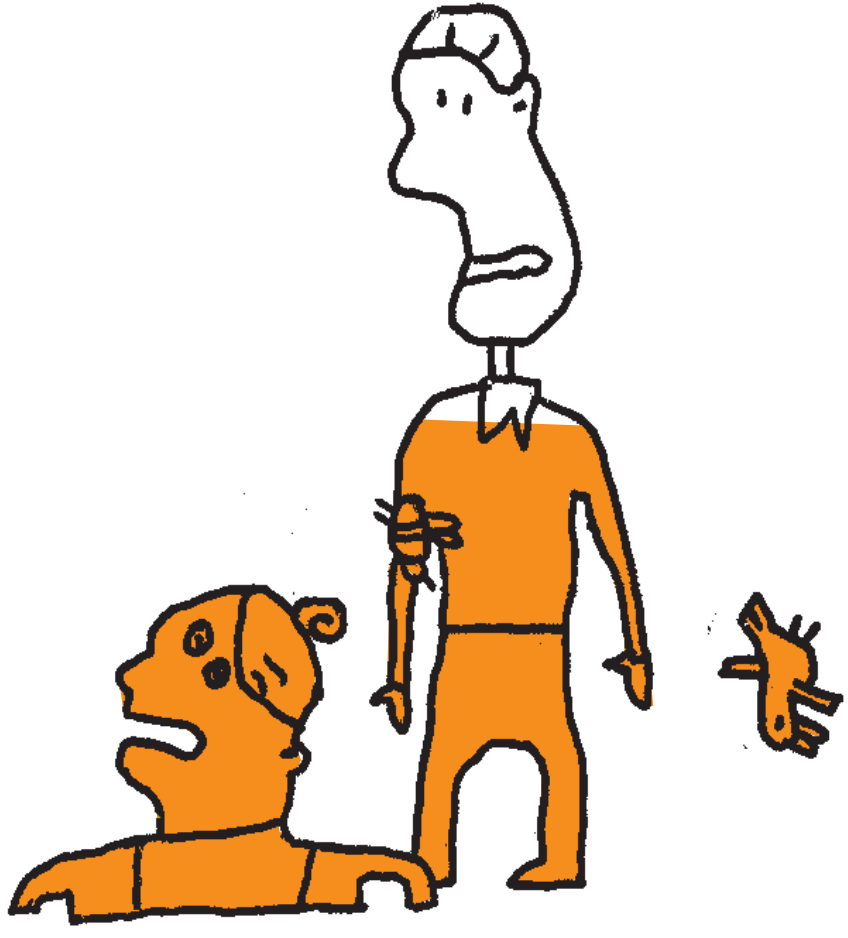


Disease

Leukemias (childhood)

«Strong» or «good» evidence links these chemicals

benzene, ionizing radiation, pesticides, metal dusts; chlorinated solvents: carbon tetrachloride, and trichloroethylene (TCE)

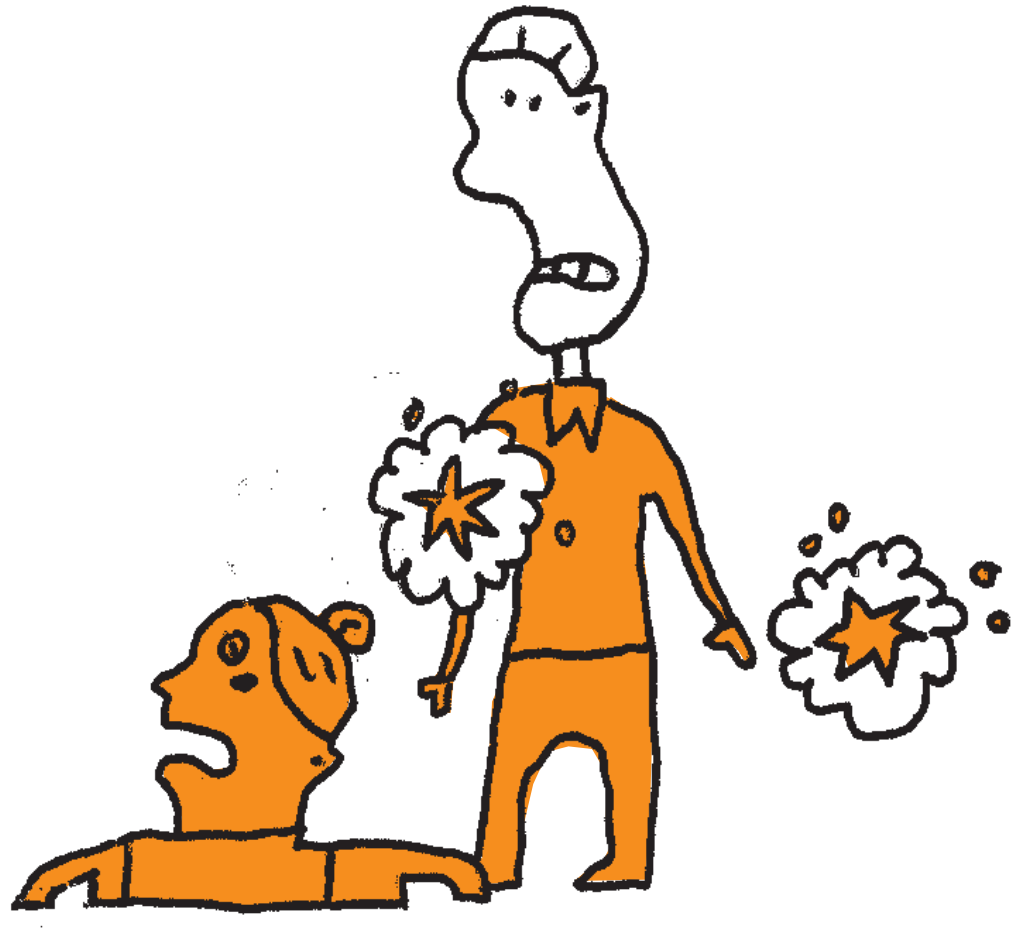


Disease

Lung Cancer

«Strong» or «good» evidence links these chemicals

aluminum, arsenic (including arsenical pesticides); asbestos, attapulgite, benzo(a)pyrene (PAH's), beryllium, cadmium, chloromethyl ethers, chromium, coal tars, diesel engine exhaust, ionizing radiation, mineral oils, mustard gas, nickel, radon, silica, soots, tobacco smoke, uranium, acid aerosols, acrylonitrile, aromatic amines, chlorophenols, coal dust, copper, dimethyl sulfate, formaldehyde, solvents, nitrosamines (NNK); PAHs (benz(a)anthracene, benzo(a)pyrene, dibenz(a,h) anthracene)

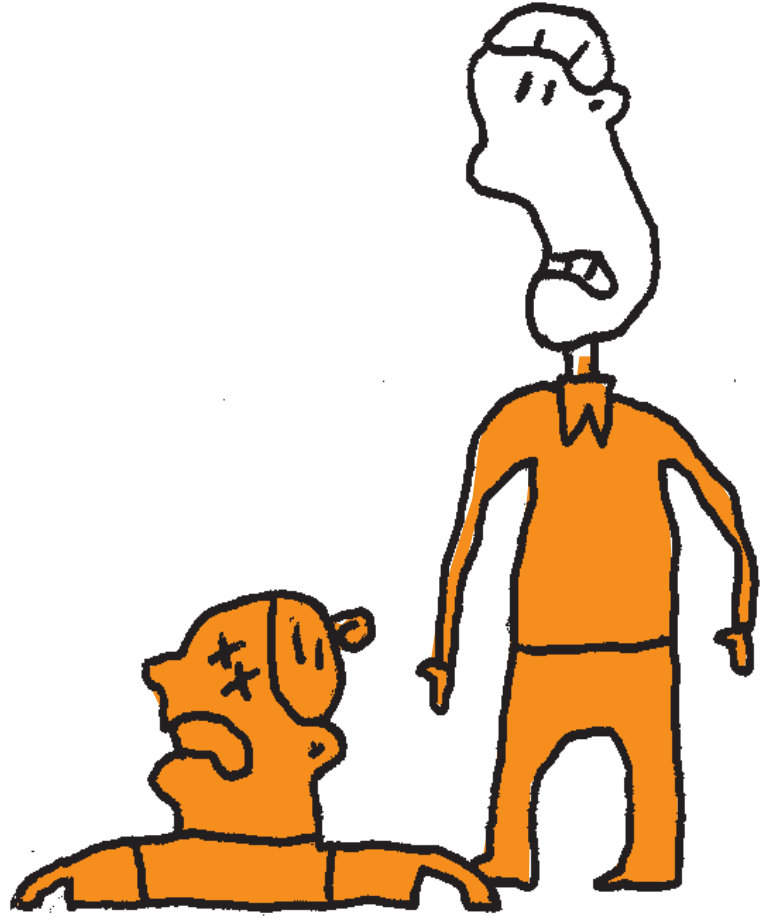


Disease

Lymphoma - Non-Hodgkin's

«Strong» or «good» evidence links these chemicals

dioxins (TCDD), aromatic amines, benzene, 1,3-butadiene, chlorophenols, creosote, ionizing radiation; organic solvents: carbon disulfide, carbon tetrachloride, trichloroethylene (TCE), tetrachloroethylene (PCE); PCBs, pesticides: carbamates (carbaryl), dicamba, fungicides (captan), organophosphates (dichlorovos, malathion), DDT, phenoxyacetic acid herbicides (2,4-D, MCPA, mecoprop)

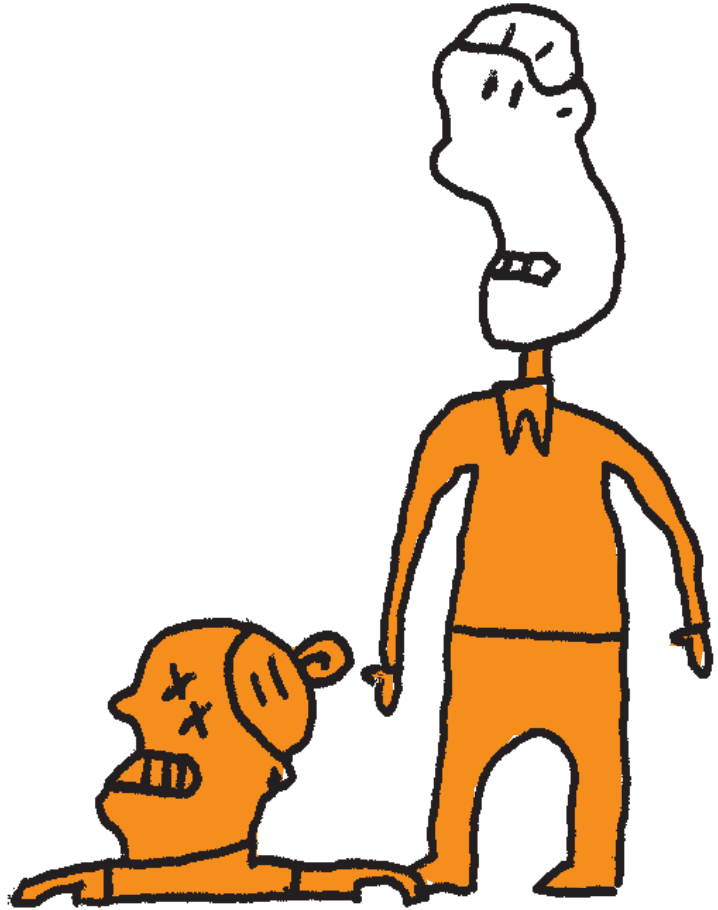


Disease

Multiple Chemical Sensitivity

«Strong» or «good» evidence links these chemicals

pesticides, solvents, cleaning agents, fragrances, vehicle exhaust

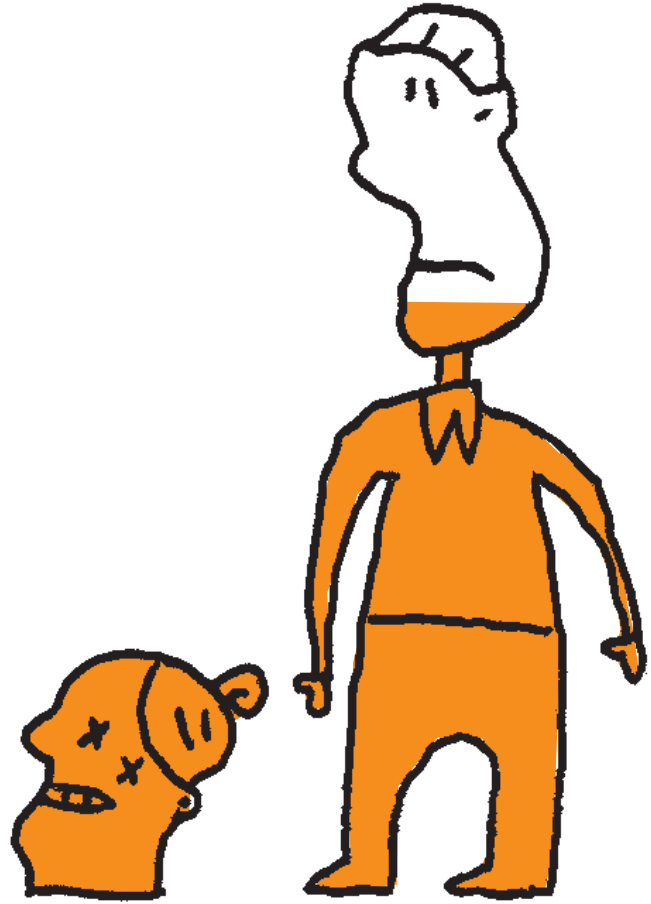


Disease

Myocardial Ischemia

«Strong» or «good» evidence links these chemicals

carbon disulfide, carbon monoxide, cyanide, dihalomethanes, methylene chloride, organic nitrates, particulate air pollution, arsenic

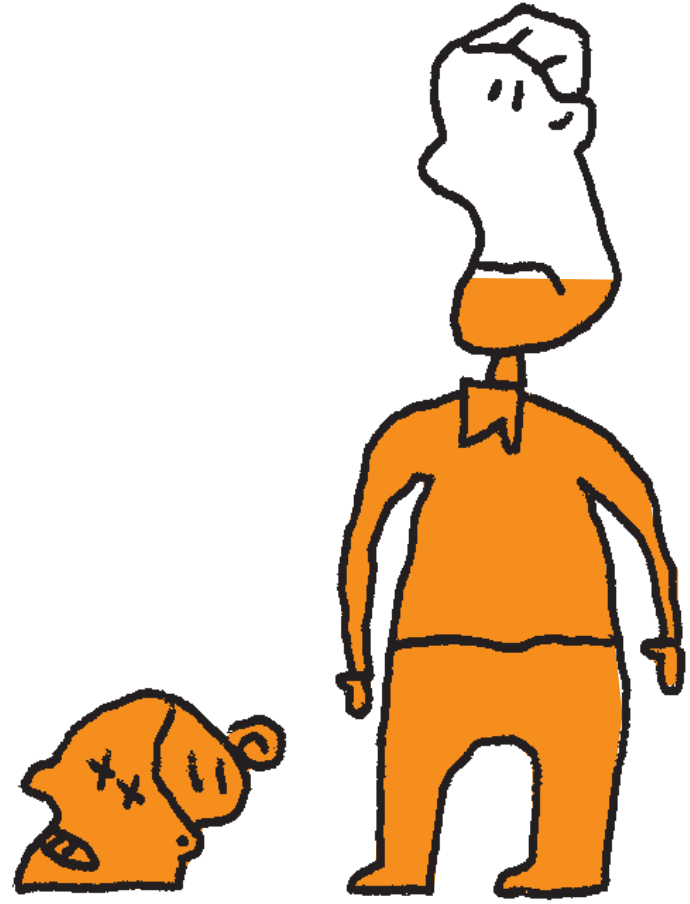


Disease

Polymer Fume Fever

«Strong» or «good» evidence links these chemicals

Teflon pyrolysis products - polyvinyl fluoride, polytetrafluoroethylene



Disease

Porphyria (toxic)

«Strong» or «good» evidence links these chemicals

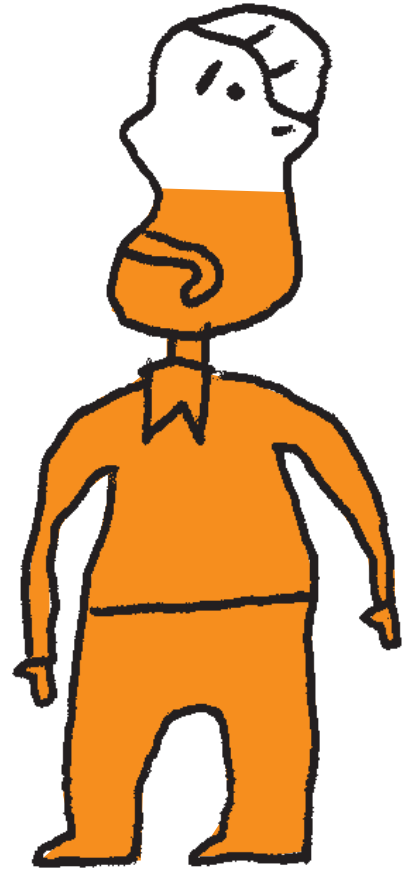
ethanol, hexachlorobenzene, PAHs, PCBs, dioxins (TCDD), halothane, lead; methyl chloride, organic solvents (carbon tetrachloride, chloroform, paints, paint fumes, formaldehyde); pesticides: organochlorines (chlordane, DDT), organophosphates (diazinon) and phenoxy herbicides (2,4-D, 2,4,5-T); vinyl chloride

Disease

Prostate Cancer

«Strong» or «good» evidence links these chemicals

acrylonitrile, aromatic amines, cadmium, organic solvents, PAHs

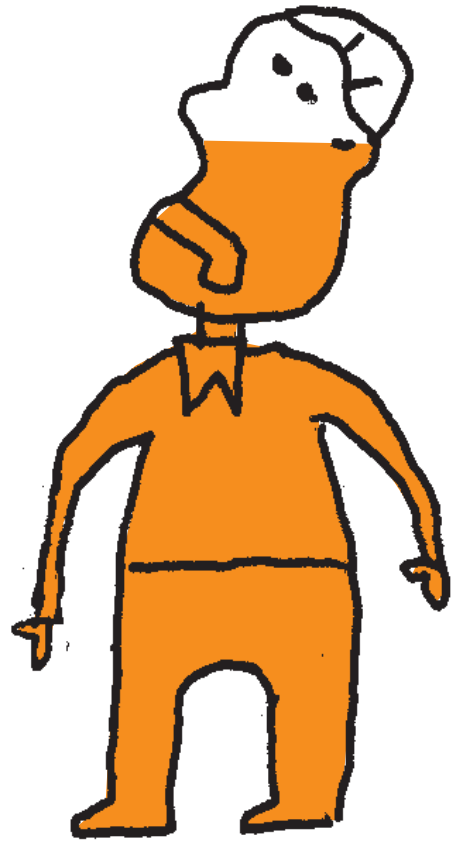


Disease

Reduced Male Fertility (infertility and subfertility)

«Strong» or «good» evidence links these chemicals

carbon disulfide, estrogens, ethylene glycol ethers, heat, ionizing radiation, lead; chlordecone, dibromochloropropane (DBCP), ethylene dibromide (EDB), cadmium, methylene chloride, radar, tetrachloroethylene (PCE), welding fumes

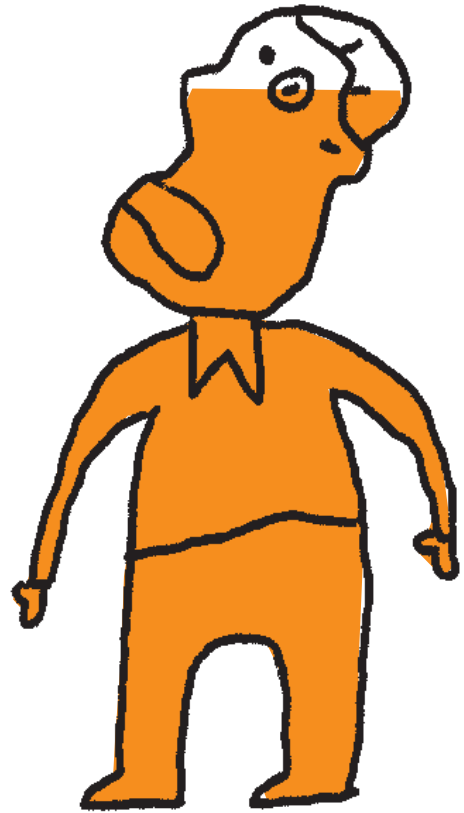


Disease

Reduced Female Fertility (infertility and subfertility)

«Strong» or «good» evidence links these chemicals

ionizing radiation, ethylene glycol ethers, formaldehyde, lead, nitrous oxide, organic solvents [tetrachloroethylene (PCE), toluene]; tobacco smoke

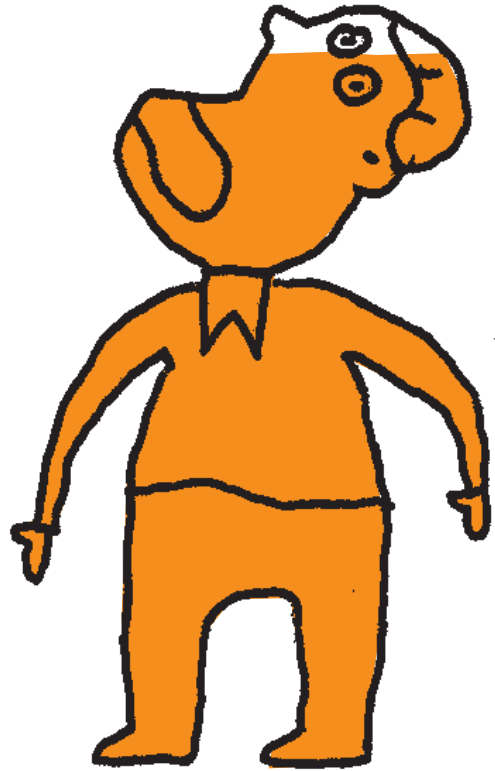


Disease

Scleroderma

«Strong» or «good» evidence links these chemicals

solvents (including: aromatic mixes, benzene, carbon tetrachloride, paint thinners/removers, trichloroethane, trichloroethylene (TCE), toluene, and xylene); vinyl chloride

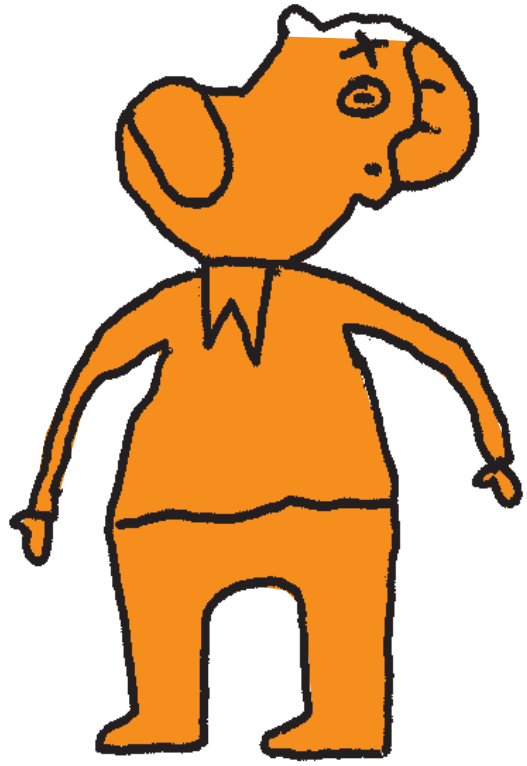


Disease

Stomach Cancer

«Strong» or «good» evidence links these chemicals

asbestos, aromatic amines, chromium, coal dust, dioxins/TCDD, ethylene oxide, ionizing radiation, nickel, nitrates, organic solvents, phenoxyacetic herbicides

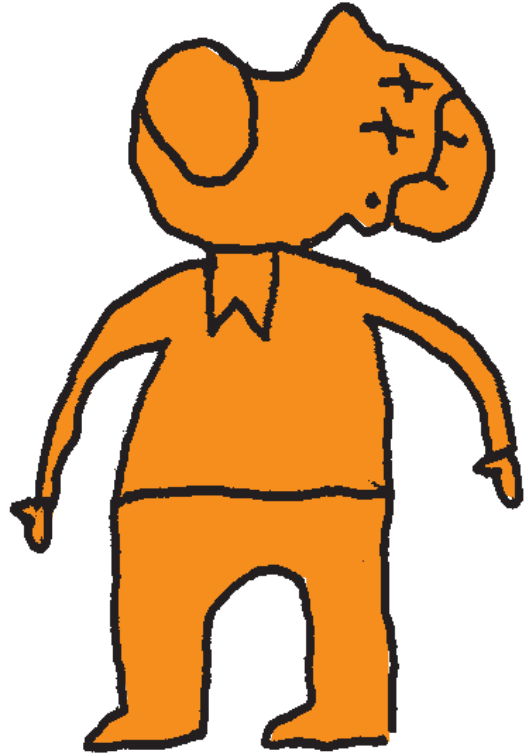


Disease

Steatosis (fatty liver)

«Strong» or «good» evidence links these chemicals

carbon tetrachloride, chloroform, ethanol, phosphorus, arsenic, halothane, hydrazine, hydrocarbons; organic solvents (chloroform, dimethylformamide, tetrachloroethane, trichloroethane, toluene); styrene, TNT



Disease

Thyroid Disorders (Hypothyroidism)

«Strong» or «good» evidence links these chemicals

cobalt, ionizing radiation, PBBs, PCBs, radioactive iodine, substituted phenols, thiocyanate, dioxins, ethylene thiourea (ETU), perchlorates, polybrominated diphenylethers (PBDEs)

Printed in January 2005 on recycled and chlorine-free paper with vegetable-based ink
Idea: Rodney Cottam, Christian Farrar-Hockley & Anja Leetz
Editors: Genon Jensen, Anja Leetz & Mary Taylor
Illustration: Frank Vanspauwen
Design: Agence A3/Herstal

To know more on how you might be exposed to the chemicals in your daily products and surroundings, see
http://www.greenpeaceweb.org/consumingchemicals/ddtest.asp
http://www.foe.co.uk/campaigns/safer_chemicals/

To find out how you can contact your legislator with your concerns on chemicals legislation, visit the Chemical Reaction website
http://www.chemicalreaction.org/ where information exists in 9 languages.

To learn more about other diseases which may be linked to chemicals, visit the database, Chemical Contaminants and Human Disease: A Summary of the Evidence at
http://www.protectingourhealth.org/corethemes/links/2004-0203spreadsheet.htm

CHEMICAL REACTION

EEB

een
epha environment network

Friends of the Earth Europe

GREENPEACE