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What are the 180 chemicals linked with breast and other cancers are used in food production and ...

Based on a September 2024 study in *Frontiers in Toxicology*, approximately 189 chemicals linked to breast cancer can be found in food production and packaging materials. The exact names and full list of all 189 chemicals are not detailed in the available search results, but the study did identify several major categories, including PFAS, bisphenols, and phthalates, and noted they can migrate from packaging into food. [↗](#)

Chemicals from food packaging and processing

These substances, which can end up in food through contact with packaging and processing equipment, have been associated with a range of negative health outcomes, including cancer. [↗](#)

- **Per- and polyfluoroalkyl substances (PFAS):** Often called "forever chemicals," PFAS are used to make packaging grease- and water-resistant. Exposure is linked to various cancers, thyroid disease, and impaired immune function.
- **Bisphenols (e.g., BPA):** Used to make plastics and can coatings, bisphenols are endocrine disruptors. BPA has been connected to breast cancer and other health issues, and some replacement bisphenols are now also raising similar concerns.
- **Phthalates (e.g., DEHP):** These chemicals are used to make plastics more flexible. They have been linked to breast cancer, endocrine disruption, and developmental problems. They can be found in food processing equipment, food containers, and adhesives.
- **Styrene:** Found in polystyrene products (like Styrofoam containers), styrene is listed as a reasonably anticipated human carcinogen by the U.S. National Toxicology Program.
- **Vinyl Chloride:** A known human carcinogen that can be present in PVC (polyvinyl chloride) packaging.
- **Heavy Metals:** Lead, cadmium, mercury, and arsenic can contaminate food through processing or the environment. [↗](#)

Chemicals formed during food processing

Some hazardous chemicals are not added directly but are created during high-temperature cooking or processing. [↗](#)

- **Acrylamide:** Formed when certain starchy foods like potatoes and grains are cooked at high temperatures (e.g., frying, roasting). It is considered a probable human carcinogen.
- **Heterocyclic Aromatic Amines (HAAs) and Polycyclic Aromatic Hydrocarbons (PAHs):** These form when protein-rich foods, particularly meats, are cooked at high temperatures.
- **N-Nitroso Compounds:** Found in processed meats preserved with sodium nitrite,

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- **Butylated hydroxyanisole (BHA):** A preservative used in some cereals and cured meats, BHA has been identified as a possible human carcinogen.
- **Titanium Dioxide:** A color additive used in candy and other products, it has been linked to DNA damage.
- **Artificial Dyes:** Certain dyes, such as Red 3, have been found to cause cancer in animal studies.
- **Sodium Benzoate:** A preservative that can form benzene—a known carcinogen—when combined with vitamin C. [↗](#)

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Foods and Beverages - Proposition 65 Warnings Website

The Proposition 65-listed chemicals commonly found in foods and...

California State Portal (.gov) [⋮](#)

Food Packaging Chemicals - Breast Cancer Prevention Partners

Science summary. ... Chemicals linked to breast cancer used in food...

Breast Cancer Prevention Partners [⋮](#)

Review Public Health Risks Associated with Food Process ...

Feb 3, 2025 — Ethyl carbamate (EC), glycidyl esters (GE), and 4-...

ScienceDirect.com [⋮](#)

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What other diseases are linked to these chemicals besides breast cancer?

In addition to breast cancer, the chemicals used in food production and packaging are linked to a wide range of other diseases and health issues. These include other cancers, reproductive and developmental problems, neurological disorders, and metabolic diseases. [↗](#)

Chemicals from packaging and processing

- **Per- and polyfluoroalkyl substances (PFAS):** Often called "forever chemicals," PFAS are linked to a host of other conditions besides cancer. These include high cholesterol, ulcerative colitis, thyroid disease, high blood pressure in pregnancy (preeclampsia), and liver damage. They can also impair immune function and are associated with decreased vaccine response.
- **Bisphenols (e.g., BPA):** These endocrine-disrupting chemicals are associated with obesity, type 2 diabetes, heart disease, decreased fertility, and neurodevelopmental issues such as hyperactivity, anxiety, and depression.
- **Phthalates (e.g., DEHP):** These plastics softeners are linked to developmental issues, decreased fertility, obesity, and asthma. Prenatal and early-life exposure is also associated with allergies and cognitive and behavioral problems.
- **Styrene:** In addition to its link with leukemia and lymphoma, styrene can cause central nervous system effects such as headaches, weakness, and dizziness with chronic exposure. Short-term exposure can cause eye, nose, and respiratory tract irritation.
- **Vinyl chloride:** This chemical, primarily used to make PVC plastic, has been linked to liver damage, low platelet counts, and toxicity in nearly every major organ system with long-term exposure. High-level, short-term exposure can cause nausea, vomiting, headaches, and malaise.

toxicity. 

Chemicals formed during processing

- **Acrylamide:** This substance formed during high-temperature cooking is a neurotoxin that can cause nerve damage, muscle weakness, and numbness in the hands and feet with sufficient exposure.
- **Heterocyclic aromatic amines (HAAs):** Formed in cooked meats, some HAAs have been found to induce neurotoxicity and are being studied for links to neurodegenerative diseases like Parkinson's and Alzheimer's disease.
- **Polycyclic aromatic hydrocarbons (PAHs):** These can cause respiratory diseases, such as asthma, and damage to the immune and reproductive systems. Fetal exposure is also associated with neurodevelopmental disorders in children.
- **N-nitroso compounds:** Found in cured and processed meats, these compounds can cause liver and kidney damage, especially with chronic exposure. 

Direct food additives

- **Potassium bromate:** This flour additive is linked to thyroid disease, kidney damage, gut irritation, and hearing loss.
- **Butylated hydroxyanisole (BHA):** In addition to potentially promoting tumors, high doses of this preservative have been found to cause liver enlargement, lung damage, and hemorrhaging in animal studies.
- **Titanium dioxide:** This coloring agent can induce intestinal inflammation, alter gut bacteria, and promote obesity-related metabolic disorders like type 2 diabetes. It has also been linked to neurotoxicity.
- **Artificial dyes:** Certain food colorings are associated with allergic reactions, asthma, digestive issues, and hyperactivity in children.
- **Sodium benzoate:** When combined with vitamin C, this preservative can form benzene. It has also been linked to hyperactivity in children and, with a high enough intake, can disrupt brain neurochemistry. 

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What neurological problems are linked to heavy metals in food?

Food and food packaging materials can contain heavy metals like lead, mercury, cadmium, and arsenic, which are linked to various neurological problems. These metals are known neurotoxins that can damage the nervous system, with effects ranging from cognitive impairment and behavioral issues to neurodegenerative diseases. 

 23 sites

Phthalates and Their Impacts on Human Health - PMC

May 18, 2021 — Table_title: Table 2. Table header: | Category | Health Concerns |

 National Institutes of Health (NIH) ... 

Toxicity, mechanism and health effects of heavy metals - PMC

The brain remains the target organ for heavy metals as it can impair any organ and lead to malfunctions. 

 National Institutes of Health (NIH) ... 

How Can PFAS Affect Your Health?

Human studies * High cholesterol. * Ulcerative colitis. * Cancer (testicular, prostate, colorectal, breast, thyroid, and pancreatic). 

 PFAS Exchange 

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- **Mental function decline:** In adults, lead poisoning can cause memory loss, impaired mental function, and concentration problems. Severe cases can lead to lead encephalopathy, causing symptoms like seizures, delirium, and coma.
- **Peripheral neuropathy:** Nerve damage in the extremities, characterized by numbness and weakness, can also occur. [↗](#)

Mercury (Hg)

- **Impaired coordination and sensation:** Mercury is primarily a neurotoxin that can cause poor coordination, numbness or a tingling "pins and needles" sensation in the hands and feet, tremors, and muscle weakness.
- **Psychological effects:** Exposure can cause psychological symptoms like irritability, anxiety, mood swings, and depression.
- **Neurodevelopmental issues:** Exposure in the womb or early childhood is particularly damaging and can cause permanent brain function impairment, developmental delays, and issues with attention, memory, and language.
- **Hearing and vision loss:** High levels of mercury can cause hearing loss and blurred or restricted peripheral vision. [↗](#)

Cadmium (Cd)

- **Cognitive and motor issues:** Chronic exposure to cadmium can harm the nervous system. Studies link it to a decline in cognitive functions, memory loss, learning difficulties, and impaired coordination.
- **Neurodegenerative diseases:** Cadmium is considered a possible factor in the development of neurodegenerative diseases such as Alzheimer's and Parkinson's disease.
- **Behavioral alterations:** Studies have also found associations between cadmium levels in children and behavioral problems, including social and attention issues.
- **Olfactory dysfunction:** Since cadmium can be taken up through the nasal mucosa, it can cause an impaired or complete loss of the sense of smell. [↗](#)

Arsenic (As)

- **Cognitive deficits:** Chronic low-level exposure to arsenic, often through contaminated food like rice, is linked to a reduction in IQ, especially in children. It can also cause memory impairment and difficulty with problem-solving.
- **Behavioral changes:** Anxiety and mood instability have been linked to chronic arsenic exposure, particularly during developmental stages.
- **Peripheral and central neuropathy:** In addition to its link with cancer, arsenic can cause peripheral neuropathy (nerve damage in the extremities) and, in more severe cases, encephalopathy.
- **Neurodegeneration:** Exposure has also been associated with an increased risk of neurodegeneration, which may contribute to the development of Alzheimer's and

 22 sites

Health Effects of Exposures to Mercury
Dec 5, 2024 — Effects on People of All Ages
Exposure to methylmercury most common

 U.S. Environmental Protection Agency

Mercury poisoning: Symptoms and early signs - MedicalNewsToday

Jan 9, 2018 — Mercury poisoning: Symptoms and treatment. ... There...

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 How can I reduce my exposure to these chemicals from food and packaging?

Overview. Mercury is naturally occurring only metal that is liquid at room temper

 iowa.gov ⋮

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