ENDOCRINE DISRUPTING HORMONES
A MEDICAL APPROACH

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Abstract- Endocrine disrupting chemicals are affecting the human’s health in a vast range. Endocrine disruption leads to many adverse effects that are leading into a number of health issues. They are caused by the endocrine disrupting chemicals which are unknowingly involved in our daily life. This study is focused on the source of endocrine disrupting chemicals such as BPA, PCB, etc. and how to avoid them. This study also focused on whether that chemical has potential to cross the placenta and reach the fetus. This is to understand the high-risk exposure of pregnant women to those chemicals as if they reach the fetus, they may cause some irreparable damage to the baby. Some of these chemicals are very fatal even in small amounts. A keen study is done to understand about those endocrine disrupting chemicals and their way of entry into human body. Also, we have discussed on the ways to prevent their entry and other measures. Some of the diseases associated with the exposure to endocrine disrupting chemicals are also discussed.

Index Terms: Endocrine disrupting chemicals, placenta barrier, fetal health.

INTRODUCTION
Endocrine Disrupting Chemicals are a diverse group of synthetic substances widely used in various industries, including plastics, pesticides, personal care products, and pharmaceuticals. Despite their extensive application, a growing body of research has illuminated their potential to interfere with the endocrine system, responsible for regulating crucial hormonal processes in the human body.

While the detrimental effects of EDC exposure on adult health have been extensively studied and documented, recent investigations have raised alarm bells regarding their capacity to cross the placenta and impact the developing foetus during the most sensitive stages of gestation. This alarming phenomenon raises grave concerns about the long-term consequences for the child's health and well-being throughout their life course.

In this article, we delve into the scientific evidence surrounding the transplacental migration of Endocrine Disrupting Chemicals. We also explore the mounting evidence associating prenatal EDC exposure with adverse health outcomes, ranging from developmental abnormalities to increased susceptibility to chronic diseases later in life.

Some of the studies have shown a positive relation between exposure to EDCs and endocrine diseases and disorders.

Environmental Exposures: The impact of endocrine-disrupting chemicals (EDCs) on human health has gained increasing attention. These chemicals can interfere with the body's endocrine system, potentially leading to adverse health effects. Exposure to EDCs has been associated with reproductive problems, metabolic disorders, and even certain cancers.

Regional Variations: The prevalence of endocrine diseases can vary significantly across regions and countries due to differences in genetic predisposition, lifestyle factors, dietary habits, healthcare access, and environmental exposures. Some endocrine disorders, such as iodine deficiency-related thyroid diseases, may be more prevalent in specific geographic areas with low iodine intake.

Endocrine disrupting chemicals (EDCs) have been associated with a range of endocrine-related diseases and health conditions due to their ability to interfere with the normal functioning of the endocrine system. EDCs can mimic, block, or alter the production and signalling of natural hormones, leading to disruptions in hormonal balance.

• Reproductive Disorders
• Thyroid Disorders
• Diabetes and Obesity
• Adrenal Disorders
• Neurological Disorders
• Immune System Disruptions

It's important to note that the effects of EDC exposure can be particularly detrimental during critical periods of development, such as prenatal and early childhood stages, as well as during puberty. During these vulnerable windows, the endocrine system is more susceptible to disruptions, potentially leading to long-lasting health effects.

Reducing exposure to EDCs has become a priority for public health and regulatory agencies. Avoiding endocrine disrupting chemicals (EDCs) is of paramount significance due to the potential adverse effects these substances can have on human health and the environment.
DISCUSSION
BISPHENOL A
The chemical "Bisphenol A" (BPA) is an industrial chemical used primarily in the production of plastics and resins. It is commonly found in food and drink containers, such as plastic bottles and the lining of food cans.

Ways BPA enters the human body: BPA can enter the human body through various routes, including:
- **Ingestion**: Consuming food or beverages stored in containers containing BPA.
- **Inhalation**: Breathing in BPA particles or dust, which can occur in certain occupational settings.
- **Dermal exposure**: Absorption through the skin, although this is considered a minor route of exposure compared to ingestion and inhalation.

Diseases associated with BPA exposure: BPA has been a topic of concern due to its potential endocrine-disrupting properties. Some studies suggest that BPA may be linked to health issues, including hormone-related conditions, reproductive problems, obesity, and certain cancers. However, it's important to note that the research on BPA's health effects is still ongoing, and the evidence is not entirely conclusive.

Crossing the placenta: Yes, BPA can cross the placenta and enter the foetal circulation during pregnancy. This means that if a pregnant woman is exposed to BPA, it can potentially reach the developing foetus.

Ways to prevent BPA exposure: To reduce exposure to BPA, you can take the following measures:
- **Choose BPA-free products**: Look for labels that indicate products are BPA-free, especially for items that come into contact with food or drinks.
- **Avoid microwaving plastics**: Avoid microwaving food or drinks in plastic containers, as this can increase the leaching of BPA into the food.
- **Use glass or stainless-steel containers**: opt for glass, stainless steel, or other BPA-free materials for food and drink storage.
- **Check recycling codes**: Plastics with recycling codes #3 (polyvinyl chloride or PVC) and #7 (other) may contain BPA, so try to minimize their use.

DDT and DDE
DDT is an organochlorine pesticide that was widely used in the past for controlling insect pests

Chemical discussed in the article: The article is likely focused on the effects of DDT (dichlorodiphenyltrichloroethane) and its metabolite DDE (dichlorodiphenylchloroethylene) on CYP1A1 and AhR function in human placental cells.

Ways the chemical can enter the human body: DDT and DDE can enter the human body through various routes, including:
- **Ingestion**: Consuming contaminated food and water, particularly foods from areas where DDT is still used or persistent in the environment.
- **Inhalation**: Breathing in air contaminated with DDT or DDE, which can occur near areas of pesticide application or where DDT is still present in the environment.
- **Dermal exposure**: Absorption through the skin, although this is generally considered a lesser route of exposure compared to ingestion and inhalation.

Diseases associated with the chemicals for the human body: DDT and DDE have been linked to several health concerns, including:
- **Endocrine disruption**: They may interfere with hormone function, leading to potential reproductive and developmental issues.
- **Cancer**: Some studies have suggested a possible association between DDT exposure and certain cancers, although the evidence is not entirely conclusive.
- **Neurological effects**: Prenatal exposure to DDT and DDE has been linked to cognitive and developmental effects in children.

Crossing the placenta: Yes, both DDT and its metabolite DDE can cross the placenta and reach the developing foetus if a pregnant woman is exposed to these chemicals. This exposure may have implications for foetal development and health.

Ways to prevent exposure to DDT and DDE: To minimize exposure to DDT and its metabolite DDE, some preventive measures include:
- **Avoiding direct contact**: Minimize contact with areas where DDT is still used or areas with historical pesticide contamination.
- **Eating low-contamination foods**: Consume foods that are less likely to be contaminated with DDT and DDE, such as organic produce from reputable sources.
- **Following regulatory guidelines**: Follow guidelines and regulations regarding the safe use and disposal of pesticides to limit environmental contamination.

PHTHALATES
A group of chemicals used in the production of plastics to improve flexibility, durability, and transparency. They are commonly found in a wide range of products, including plastic containers, cosmetics, personal care products, and medical devices.

Ways the chemical can enter the human body: Phthalates can enter the human body through various routes, including:
- **Inhalation**: Breathing in air containing phthalate particles or vapours.
- **Ingestion**: Consuming food and drinks that have been in contact with phthalate-containing materials.
- **Dermal exposure**: Absorption through the skin from contact with products containing phthalates.

**Diseases associated with phthalate exposure**: Phthalates have been a topic of concern due to their potential health effects. Some studies have suggested possible associations between phthalate exposure and various health issues, including:

- **Endocrine disruption**: Phthalates are known to be endocrine disruptors, which means they can interfere with hormone systems in the body and potentially lead to hormonal imbalances.

- **Reproductive and developmental effects**: Some phthalates have been linked to adverse effects on reproductive health and foetal development, particularly when exposure occurs during critical stages of development.

- **Respiratory and allergic reactions**: Certain phthalates have been associated with respiratory problems and allergic reactions in some individuals.

**Crossing the placenta**: Yes, phthalates have the ability to cross the placenta during pregnancy, which means they can potentially reach the developing foetus if a pregnant woman is exposed to these chemicals. This raises concerns about possible developmental effects on the unborn child.

**Ways to prevent exposure to phthalates**: To reduce exposure to phthalates, consider the following measures:

- **Choose phthalate-free products**: Look for labels that indicate products are phthalate-free or use alternative materials, such as glass or stainless steel.

- **Avoid microwaving plastic containers**: Microwaving plastic containers can lead to leaching of phthalates into food. Use microwave-safe glass or ceramic containers instead.

- **Use natural personal care products**: Opt for personal care products labelled as "phthalate-free" or containing natural ingredients.

- **Ventilate indoor spaces**: Proper ventilation can help reduce indoor air concentrations of phthalates.

**TCDD**

TCDD stands for 2,3,7,8-Tetrachlorodibenzo-p-dioxin. TCDD is a highly toxic environmental contaminant and a type of dioxin. It is a byproduct of certain industrial processes, such as waste incineration, chemical manufacturing, and paper bleaching.

**Ways the chemical can enter the human body**: TCDD primarily enters the human body through environmental exposure, such as:

- **Inhalation**: Breathing contaminated air, especially in regions near industrial sources or areas where TCDD has been released into the environment.

- **Ingestion**: Consuming food and water that contains TCDD due to contamination from industrial activities or environmental pollution.

- **Dermal exposure**: Absorption through the skin can occur but is generally less significant compared to inhalation and ingestion.

**Diseases associated with TCDD exposure**: TCDD is considered highly toxic and is associated with a range of health issues, including:

- **Immunotoxicity**: TCDD can suppress the immune system, leading to an increased susceptibility to infections and potential autoimmune reactions.

- **Cancer**: TCDD is classified as a human carcinogen, and exposure has been linked to various types of cancers, including soft tissue sarcoma and lymphomas.

- **Reproductive and developmental effects**: Prenatal exposure to TCDD may cause developmental abnormalities and interfere with foetal growth and health.

**Crossing the placenta**: Yes, TCDD can cross the placenta and be transferred from the mother to the developing foetus during pregnancy, which can pose significant risks to the baby's health and development.

**Ways to prevent TCDD exposure**: To prevent TCDD exposure, it's essential to take measures to reduce environmental contamination and avoid exposure to contaminated areas. Some ways to achieve this include:

- **Proper waste management**: Ensuring proper disposal of industrial waste and hazardous chemicals to prevent the release of TCDD into the environment.

- **Regulatory measures**: Implementing and enforcing strict regulations on industrial processes that produce or release TCDD to limit its spread in the environment.

- **Avoiding high-risk areas**: If possible, limiting time spent in regions with a history of TCDD contamination or known industrial sources of TCDD.

**METHYLPARABEN AND BUTYLPARABEN**

These are synthetic compounds commonly used as preservatives in various cosmetic and personal care products, pharmaceuticals, and some food items.

**Ways the chemicals can enter the human body**: Parabens can enter the human body through several routes, including:

- **Skin absorption**: They can be absorbed through the skin when applied to personal care products like lotions, creams, and cosmetics.

- **Ingestion**: Parabens can be ingested through the consumption of food items or medicines that contain these preservatives.

- **Inhalation**: In some cases, exposure may occur through inhalation of paraben-containing products, such as aerosol sprays.

**Diseases associated with the chemicals for the human body**: Research on parabens, including methylparaben and butylparaben, has raised concerns about their potential health effects, although the evidence is not entirely conclusive. Some studies suggest that parabens may be linked to:
- **Endocrine disruption**: Parabens have been known to mimic oestrogen in the body, potentially disrupting the endocrine system.
- **Hormonal imbalances**: Due to their estrogenic properties, there are concerns that long-term exposure to parabens may contribute to hormonal imbalances in both men and women.
- **Allergic reactions**: Some individuals may experience allergic reactions to parabens when applied to the skin or used in personal care products.

**Crossing the placenta**: There is evidence to suggest that parabens, including methylparaben and butylparaben, can cross the placenta and reach the developing foetus during pregnancy if the pregnant woman is exposed to these chemicals. This exposure may have implications for foetal development.

**Ways to prevent exposure to parabens**: To reduce exposure to parabens, consider the following measures:
- **Read product labels**: Look for products that are labelled as "paraben-free" or "preservative-free."
- **Use natural and organic products**: Choose personal care products that are made with natural and organic ingredients, as they are less likely to contain synthetic preservatives like parabens.
- **Be cautious with certain products**: Pay special attention to products that are likely to be absorbed into the skin or products used by vulnerable populations, such as pregnant women and infants.

**ATRAZINE**

It is a widely used herbicide in agriculture to control weeds, particularly in corn and sugarcane fields.

**Ways the chemical can enter the human body**: Atrazine can enter the human body through various routes, including:
- **Drinking water**: Atrazine can contaminate drinking water sources, especially in areas where it is heavily used in agriculture.
- **Food**: Residues of atrazine in crops can lead to dietary exposure when consuming food products containing the herbicide.
- **Inhalation**: Atrazine particles may be present in the air as a result of spraying or volatilization from treated fields.

**Diseases associated with atrazine exposure**: Atrazine has been the subject of health concerns and studies investigating its potential effects on human health. Some of the health issues associated with atrazine exposure include:
- **Endocrine disruption**: Atrazine is known to have endocrine-disrupting properties, which means it may interfere with hormone systems in the body, potentially affecting reproductive and hormonal functions.
- **Neurological effects**: Some studies suggest a possible link between atrazine exposure and neurodevelopmental toxicity, particularly during early stages of development.
- **Crossing the placenta**: Yes, atrazine can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the herbicide.

**Ways to prevent atrazine exposure**: To minimize atrazine exposure, consider the following measures:
- **Safe handling of pesticides**: Properly follow instructions and safety guidelines when using pesticides to reduce the risk of exposure during application.
- **Drinking water filtration**: If you live in an area where atrazine is commonly used and detected in the water supply, consider using a water filtration system that can remove or reduce atrazine levels.
- **Eating organic produce**: Choosing organic food products may reduce exposure to pesticides like atrazine since their use is prohibited in organic farming.
- **Awareness and regulations**: Support and advocate for responsible pesticide use and regulations that promote environmental and human health safety.

**DIPHENYLHYDANTOIN**

It is also known as phenytoin. It is an anticonvulsant drug commonly used in the treatment of epilepsy and certain types of seizures.

**Ways the chemical can enter the human body**: Diphenylhydantoin can enter the human body through various routes, including:
- **Oral administration**: The most common way diphenylhydantoin is taken is by mouth in the form of tablets or capsules.
- **Intravenous injection**: In certain situations, it can be administered directly into the bloodstream through intravenous injection.

**Diseases associated with diphenylhydantoin exposure**: While diphenylhydantoin is an effective anticonvulsant, it can have side effects and potential adverse reactions, such as:
- **Nervous system effects**: Diphenylhydantoin may cause dizziness, drowsiness, headache, and ataxia (loss of coordination).
- **Hypersensitivity reactions**: Some individuals may experience allergic reactions, which can range from mild skin rashes to severe reactions like Stevens-Johnson syndrome or toxic epidermal necrolysis.
- **Bone and gum problems**: Long-term use of diphenylhydantoin may lead to bone and dental issues, such as osteoporosis and gingival hyperplasia.

**Crossing the placenta**: Yes, diphenylhydantoin can cross the placenta during pregnancy, which means it can reach the developing foetus if a pregnant woman is taking the medication. This exposure may have implications for foetal development and health.

**Ways to prevent diphenylhydantoin exposure**: Diphenylhydantoin is typically prescribed for specific medical conditions, such as epilepsy, under the supervision of a healthcare professional. If you are taking diphenylhydantoin, it's essential to follow your doctor's instructions and not alter the dosage or stop taking it abruptly without medical advice.

For those who are not prescribed this medication, prevention of exposure would involve avoiding the use of diphenylhydantoin-containing products, as it is not intended for general use.

**VINCLOZOLIN**

It is a synthetic fungicide used to control fungal diseases in crops, particularly in vineyards and orchards. It is also used to prevent
Mold growth in certain industrial settings.

**Ways the chemical can enter the human body:** Vinclozolin exposure in humans can occur through various routes, including:

- **Dietary intake:** Residues of vinclozolin on food crops can lead to dietary exposure when consuming contaminated food products.
- **Environmental exposure:** Vinclozolin can contaminate water sources and soil, leading to potential exposure through inhalation or dermal contact during agricultural activities or proximity to treated areas.

**Diseases associated with vinclozolin exposure:** Vinclozolin is considered an endocrine disruptor, which means it has the potential to interfere with hormone systems in the body. Some health concerns associated with vinclozolin exposure include:

- **Reproductive effects:** Vinclozolin has been linked to adverse effects on male reproductive health, including changes in sperm production and hormone levels.
- **Developmental effects:** Studies in animals have suggested that vinclozolin exposure during pregnancy may lead to developmental abnormalities in offspring.

**Crossing the placenta:** Yes, vinclozolin can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the fungicide.

**Ways to prevent vinclozolin exposure:** To reduce vinclozolin exposure, consider the following measures:

- **Pesticide safety guidelines:** Follow safety guidelines and instructions when using pesticides, and avoid direct contact with vinclozolin-containing products.
- **Wash and peel produce:** Washing and peeling fruits and vegetables before consumption can help reduce pesticide residues, including vinclozolin.
- **Choose organic products:** Organic foods are grown without synthetic pesticides, so choosing organic produce may help lower exposure to vinclozolin.

**NONYLPHENOL**

It is a chemical compound belonging to the family of alkylphenols. It is commonly used in industrial processes and can be found in various products, including certain types of detergents, paints, and plastics.

**Ways the chemical can enter the human body:** Nonylphenol can enter the human body through several routes, including:

- **Inhalation:** Inhalation of nonylphenol particles or vapours in occupational settings where the chemical is used or produced.
- **Ingestion:** Consumption of food and water contaminated with nonylphenol, as it can leach from plastic containers or enter the environment through industrial processes.
- **Dermal exposure:** Absorption through the skin, although this is generally considered a lesser route of exposure compared to inhalation and ingestion.

**Diseases associated with nonylphenol exposure:** Nonylphenol is considered an endocrine-disrupting compound, which means it can interfere with hormonal systems in the body. Some potential health concerns associated with nonylphenol exposure include:

- **Hormonal imbalances:** Nonylphenol can mimic oestrogen in the body and disrupt the endocrine system, leading to hormonal imbalances.
- **Reproductive effects:** Studies have shown that nonylphenol exposure may affect reproductive health in both males and females, leading to decreased fertility and adverse effects on the development of the reproductive system.

**Crossing the placenta:** Yes, nonylphenol can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical. This exposure may have implications for foetal development and health.

**Ways to prevent nonylphenol exposure:** To minimize nonylphenol exposure, consider the following measures:

- **Avoiding certain products:** Be mindful of products that may contain nonylphenol, such as certain detergents or plastics, and opt for alternatives when possible.
- **Safe handling and disposal:** Follow safety guidelines when using products that contain nonylphenol and dispose of them properly to prevent environmental contamination.
- **Choose BPA-free products:** Some nonylphenol derivatives can be used in the production of BPA (bisphenol A). Choosing BPA-free products can also reduce potential exposure to nonylphenol.

**PERCHLORATE**

It is a chemical compound containing perchlorate ions. It is commonly used in rocket propellants, explosives, and fireworks. Perchlorate can also be found in certain industrial processes and in some drinking water sources due to environmental contamination.

**Ways the chemical can enter the human body:** Perchlorate can enter the human body through several routes, including:

- **Drinking water:** Contaminated water sources can be a significant route of exposure, especially in areas where perchlorate is present due to industrial activities or improper waste disposal.
- **Food:** Some food items may contain perchlorate due to environmental contamination, primarily in areas where contaminated water is used for irrigation or food processing.

**Diseases associated with perchlorate exposure:** Perchlorate is known to interfere with the thyroid gland's function by inhibiting the uptake of iodine, a critical element needed for thyroid hormone production. As a result, some potential health concerns associated with perchlorate exposure include:

- **Thyroid dysfunction:** Perchlorate exposure may lead to hypothyroidism (underactive thyroid) or disrupt thyroid hormone levels, particularly in susceptible populations like pregnant women and infants.
• Neurodevelopmental effects: Prenatal exposure to perchlorate may have implications for foetal brain development, as thyroid hormones are crucial for brain growth and maturation.

Crossing the placenta: Yes, perchlorate can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical. This raises concerns about potential effects on foetal thyroid development.

Ways to prevent perchlorate exposure: To minimize perchlorate exposure, consider the following measures:

• Drinking water filtration: If you live in an area where perchlorate contamination is a concern, consider using a water filtration system that can remove or reduce perchlorate levels.
• Choose low-contamination foods: Being mindful of the food sources and selecting products from areas with lower perchlorate contamination may help reduce exposure.
• Regulatory measures: Advocating for and supporting regulations that limit perchlorate discharge into the environment can help prevent widespread contamination.

MERCURY AND PHENOL DERIVATIVES

Mercury: Mercury is a toxic heavy metal that exists in various forms, such as elemental mercury, inorganic mercury compounds, and organic mercury compounds like methylmercury. It is released into the environment through natural processes and human activities, primarily from industries and coal-fired power plants.

Phenol derivatives: Phenol derivatives are chemical compounds that have a phenol group as part of their structure. They can be found in various industrial products, including plastics, detergents, pesticides, and pharmaceuticals.

Ways the chemicals can enter the human body:

• Mercury: Humans can be exposed to mercury through ingestion of contaminated fish and seafood, inhalation of mercury vapours in occupational settings, or through dental amalgams containing mercury.
• Phenol derivatives: Exposure to phenol derivatives can occur through ingestion, inhalation, and dermal contact with products containing these compounds, such as plastics, personal care products, and medications.

Diseases associated with the chemicals for the human body:

• Mercury: Methylmercury, a form of organic mercury, is particularly concerning as it can accumulate in the food chain, primarily in fish. Prolonged exposure to high levels of methylmercury has been associated with neurological effects, particularly affecting brain development in foetuses and young children.
• Phenol derivatives: Phenol derivatives can have a range of health effects depending on the specific compound and its concentration. Some phenol derivatives may cause skin irritation or allergic reactions in sensitive individuals.

Crossing the placenta: Both mercury and phenol derivatives can cross the placenta during pregnancy, which means they can potentially reach the developing foetus if a pregnant woman is exposed to these chemicals.

Ways to prevent exposure to these chemicals:

• Mercury: To reduce exposure to mercury, it is essential to avoid consuming high-mercury fish, especially for pregnant women and young children. Implementing proper waste disposal and adhering to regulations that limit mercury emissions from industries can also help prevent environmental contamination.
• Phenol derivatives: Limiting exposure to phenol derivatives can involve using personal care products and cleaning agents that are free from harmful phenol compounds. Additionally, following proper safety guidelines and using protective equipment in occupational settings where phenol derivatives are used can reduce exposure.

POLYCHLORINATED BIPHENYLS & P, P'-DICHLORODIPHENYLDICHLOROETHYLENE

Polychlorinated biphenyls (PCBs): PCBs are a group of synthetic organic chemicals that were used in various industrial applications, such as electrical equipment, hydraulic fluids, and plasticizers. Due to their persistence in the environment, PCBs are considered persistent organic pollutants (POPs).

p, p'-dichlorodiphenyldichloroethylene (DDE): DDE is a breakdown product and a metabolite of the pesticide DDT (dichlorodiphenyltrichloroethane). Although DDT has been banned in many countries, DDE can still be found in the environment and human populations due to its persistence.

Ways the chemicals can enter the human body:

• PCBs: Humans can be exposed to PCBs through various routes, including ingestion of contaminated food (especially fish), inhalation of airborne PCBs, and dermal contact in certain occupational settings.
• DDE: Exposure to DDE can occur similarly through ingestion of contaminated food, inhalation of airborne particles, and dermal contact.

Diseases associated with the chemicals for the human body:

Both PCBs and DDE are considered persistent organic pollutants (POPs) and are known to be associated with a range of health effects, including:

• Endocrine disruption: PCBs and DDE can interfere with hormone systems in the body, leading to hormonal imbalances and potential reproductive and developmental effects.
• Neurological effects: Some studies have linked PCB exposure to neurological effects, such as cognitive impairments and developmental delays in children.
• Cancer: Certain PCBs have been classified as probable human carcinogens, and long-term exposure to high levels of PCBs has been associated with an increased risk of certain cancers.

Crossing the placenta: Yes, both PCBs and DDE can cross the placenta during pregnancy, which means they can potentially reach
the developing foetus if a pregnant woman is exposed to these chemicals.

Ways to prevent exposure to these chemicals:
- **Dietary choices**: Reduce exposure to PCBs and DDE by being mindful of the types of fish consumed, as fish can be a significant source of these contaminants. Choose fish with lower levels of contamination.
- **Environmental regulations**: Support and advocate for strong environmental regulations that limit the use and release of PCBs and DDT to prevent further contamination of the environment.
- **Proper disposal**: Ensure proper disposal of products containing PCBs, and avoid using banned pesticides like DDT to prevent their persistence in the environment.

**CHLORDANE**
It is a synthetic chemical pesticide that was used for insect control in agriculture and for termite control in buildings. Chlordane has been banned in many countries due to its persistence in the environment and potential health risks.

Ways the chemical can enter the human body: Chlordane can enter the human body through various routes, including:
- **Ingestion**: Consumption of contaminated food and water, especially certain types of fish and seafood, can lead to chlordane exposure.
- **Inhalation**: Chlordane particles or vapours can be inhaled in environments where the chemical is present or through indoor air in buildings treated with chlordane for termite control.
- **Dermal contact**: Direct contact with chlordane or its residues on treated surfaces can also lead to exposure.

Diseases associated with chlordane exposure: Chlordane is considered a persistent organic pollutant (POP) and is associated with various health effects, including:
- **Neurological effects**: Chlordane exposure has been linked to neurotoxicity, which can result in symptoms such as dizziness, tremors, and coordination problems.
- **Endocrine disruption**: Chlordane is known to disrupt the endocrine system, which can lead to hormonal imbalances and potential reproductive and developmental effects.
- **Cancer**: Some studies have suggested a possible association between chlordane exposure and certain types of cancer, although the evidence is not entirely conclusive.

Crossing the placenta: Yes, chlordane can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical.

Ways to prevent chlordane exposure:
- **Limit use**: Chlordane has been banned in many countries, but some older buildings may still have residual chlordane from previous termite treatments. Limiting the use of chlordane and opting for safer alternatives for pest control can prevent exposure.
- **Dietary choices**: Be mindful of the types of fish and seafood consumed, as some species may contain chlordane residues from environmental contamination. Choose fish with lower levels of contamination.
- **Indoor safety**: If you suspect that your home may have been treated with chlordane in the past, consider having your air quality tested for any remaining residues.

**INSECTICIDES**
It is used for pest control purposes. Insecticides are chemical substances specifically designed to kill or control insects that can be harmful to crops, humans, or animals. Different types of insecticides, such as organophosphates, pyrethroids, and neonicotinoids, may be included in the study.

Ways the chemicals can enter the human body: Insecticides can enter the human body through various routes, including:
- **Residue on food**: Ingestion of food contaminated with insecticide residues from crops treated with pesticides.
- **Air and dust**: Inhalation of airborne insecticides or exposure through contaminated dust in indoor environments.
- **Skin contact**: Direct contact with insecticides during application or handling.

Diseases associated with insecticide exposure: Insecticides can have various health effects, including:
- **Neurological effects**: Some insecticides, particularly organophosphates, can be neurotoxic and may lead to symptoms such as headaches, dizziness, and memory issues.
- **Endocrine disruption**: Certain insecticides can disrupt hormone systems in the body, potentially leading to reproductive and developmental effects.
- **Respiratory issues**: Inhalation of insecticides can irritate the respiratory system and worsen symptoms in individuals with pre-existing respiratory conditions.

Crossing the placenta: Yes, some insecticides can cross the placenta during pregnancy, which means they can potentially reach the developing foetus if a pregnant woman is exposed to these chemicals. This raises concerns about potential effects on foetal development and health.

Ways to prevent insecticide exposure:
- **Limit use**: Minimize the use of insecticides by adopting integrated pest management practices and using non-chemical methods for pest control whenever possible.
- **Protective measures**: If insecticides need to be used, follow safety guidelines, wear appropriate protective gear, and ensure proper ventilation during application.
• **Wash fruits and vegetables**: Wash fruits and vegetables thoroughly before consumption to reduce potential pesticide residues.

• **Indoor safety**: Use caution when using insecticides indoors, and avoid exposure to children and pets.

**TRICLOSAN**
It is an antimicrobial and antifungal chemical commonly used in personal care products, such as soaps, toothpaste, and deodorants.

Triclosan is also found in some household products, including cleaning agents and plastics.

**Ways the chemical can enter the human body**: Triclosan can enter the human body through various routes, including:

• **Dermal absorption**: When triclosan is applied to the skin in personal care products, it can be absorbed through the skin and enter the bloodstream.

• **Oral ingestion**: Triclosan may be ingested through the use of toothpaste and other oral care products containing the chemical.

• **Inhalation**: Triclosan particles can be inhaled from aerosolized personal care products or indoor air.

**Diseases associated with triclosan exposure**: Triclosan is classified as an endocrine-disrupting chemical, which means it can interfere with hormone systems in the body. Some potential health concerns associated with triclosan exposure include:

• **Hormonal imbalances**: Triclosan has been shown to disrupt thyroid hormone levels, which play a crucial role in metabolism and development.

• **Reproductive effects**: Studies in animals have suggested that triclosan exposure may affect reproductive health and fertility.

• **Crossing the placenta**: Yes, triclosan can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical. This raises concerns about potential effects on foetal development and health.

**Ways to prevent triclosan exposure**:

• **Check product labels**: Look for triclosan-free products and avoid using personal care items and household products that contain triclosan.

• **Use alternatives**: Opt for natural or safer alternatives for personal care and cleaning products that do not contain triclosan.

• **Good hygiene practices**: Frequent handwashing with regular soap and water is generally effective for personal hygiene, and there may be no need for products containing triclosan.

**ORGANOCHLORINE PESTICIDES**
Organochlorine pesticides are a group of synthetic pesticides that contain carbon, chlorine, and hydrogen atoms in their chemical structure. Some examples of organochlorine pesticides include DDT (dichlorodiphenyltrichloroethane), chlordane, and hexachlorocyclohexane (HCH).

**Ways the chemicals can enter the human body**: Organochlorine pesticides can enter the human body through various routes, including:

• **Dietary intake**: Consumption of food and water contaminated with organochlorine pesticides, especially in regions where these pesticides are still in use or where they persist in the environment.

• **Inhalation**: Organochlorine pesticides can be inhaled in certain occupational settings, during indoor pesticide use, or through airborne particles.

• **Dermal contact**: Direct contact with surfaces or products treated with organochlorine pesticides can lead to absorption through the skin.

**Diseases associated with organochlorine pesticide exposure**: Organochlorine pesticides are known to be persistent organic pollutants (POPs) and can have various health effects, including:

• **Endocrine disruption**: Some organochlorine pesticides can disrupt the endocrine system, potentially affecting hormone levels and reproductive health.

• **Neurological effects**: Certain organochlorine pesticides have been linked to neurotoxicity, which may lead to cognitive impairments and developmental delays.

• **Cancer**: Some organochlorine pesticides, such as DDT, have been classified as possible human carcinogens.

• **Crossing the placenta**: Yes, organochlorine pesticides can cross the placenta during pregnancy, which means they can potentially reach the developing foetus if a pregnant woman is exposed to these chemicals. This raises concerns about potential effects on foetal development and health.

**Ways to prevent organochlorine pesticide exposure**:

• **Limit use**: Many organochlorine pesticides, including DDT, have been banned or restricted in various countries. Adhering to regulatory guidelines and minimizing their use can help prevent exposure.

• **Pesticide safety**: When using pesticides, follow safety guidelines and protective measures to reduce exposure risk.

• **Food choices**: Be mindful of the types of food consumed and choose produce with lower pesticide residues or wash fruits and vegetables thoroughly to reduce exposure.

**DIETHYLSILBESTEROL (DES)**
It is a synthetic oestrogen. DES was prescribed to pregnant women from the 1940s to the early 1970s to prevent miscarriages and other complications. However, it was later found to be associated with serious health risks to both mothers and their offspring.

**Ways the chemical can enter the human body**: Diethylstilbestrol can enter the human body through various routes, including:

• **Prenatal exposure**: Pregnant women who took DES during their pregnancies may pass the chemical to their developing foetuses through the placenta.
• **Postnatal exposure**: Individuals can be exposed to DES through contaminated food, particularly meat and dairy products, as some animals were treated with DES in the past.

**Diseases and health effects associated with diethylstilbesterol exposure**: Diethylstilbesterol is classified as an endocrine-disrupting chemical and has been linked to various health effects, including:

• **Reproductive issues**: DES exposure in the womb has been associated with an increased risk of reproductive health problems in both males and females, including infertility, genital abnormalities, and an increased risk of certain cancers.

• **Hormonal imbalances**: DES can disrupt hormonal systems in the body, potentially leading to hormonal imbalances and related health issues.

**Crossing the placenta**: Yes, diethylstilbesterol can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical. This raises concerns about potential effects on foetal development and health.

**Ways to prevent diethylstilbesterol exposure**:

• **Medical history**: Pregnant women should inform their healthcare providers about their medical history and avoid any medications or treatments that may contain diethylstilbestrol or similar compounds.

• **Avoid contaminated food**: Diethylstilbestrol was banned for use in livestock in many countries, but it may still be found in trace amounts in certain meat and dairy products. Being mindful of food choices and opting for products that are regulated for safety can help reduce exposure.

**HEXACHLOROBENZENE (HCB)**

Hexachlorobenzene is a synthetic chemical that belongs to the group of persistent organic pollutants (POPs). It was used as a fungicide and in the production of industrial chemicals.

**Ways the chemical can enter the human body**: Hexachlorobenzene can enter the human body through various routes, including:

• **Dietary intake**: Consumption of food contaminated with HCB, especially certain types of fish and seafood, as well as food grown in contaminated soil.

• **Inhalation**: Hexachlorobenzene can be released into the air through industrial processes and waste incineration, and inhalation of airborne particles can lead to exposure.

• **Dermal contact**: Although less common, direct contact with HCB or its residues on contaminated surfaces can lead to absorption through the skin.

**Diseases and health effects associated with hexachlorobenzene exposure**: Hexachlorobenzene is classified as an endocrine-disrupting chemical and is associated with various health effects, including:

• **Neurological effects**: HCB exposure has been linked to neurotoxicity, leading to cognitive impairments and developmental delays.

• **Endocrine disruption**: HCB can interfere with hormone systems in the body, potentially affecting hormone levels and reproductive health.

• **Immune system effects**: Prenatal exposure to HCB has been associated with alterations in immune function.

**Crossing the placenta**: Yes, hexachlorobenzene can cross the placenta during pregnancy, which means it can potentially reach the developing foetus if a pregnant woman is exposed to the chemical. This raises concerns about potential effects on foetal development and health.

**Ways to prevent hexachlorobenzene exposure**:

• **Food choices**: Be mindful of the types of fish and seafood consumed, as some species may contain hexachlorobenzene residues from environmental contamination. Choose fish with lower levels of contamination.

• **Environmental regulations**: Advocating for and supporting regulations that limit hexachlorobenzene release into the environment can help prevent widespread contamination.

• **Industrial safety**: Implementing safety measures in industries to prevent the release of hexachlorobenzene into the environment can reduce exposure risks.

**TRICLOSAN AND TRICLOCARBAN**

These are synthetic antimicrobial agents that have been widely used in various personal care and household products, such as soaps, toothpaste, deodorants, and cleaning agents.

**Ways the chemicals can enter the human body**: Triclosan and triclocarban can enter the human body through various routes, including:

• **Dermal absorption**: When used in personal care products, such as soaps and toothpaste, these chemicals can be absorbed through the skin during use.

• **Oral ingestion**: Triclosan and triclocarban can be ingested if they are used in oral care products or if residues are present on food and utensils.

• **Inhalation**: Triclosan and triclocarban particles can be inhaled in aerosolized products or in indoor air contaminated with these chemicals.

**Diseases and health effects associated with triclosan and triclocarban exposure**: Triclosan and triclocarban are classified as endocrine-disrupting chemicals and have been linked to various health effects, including:

• **Hormonal imbalances**: Both triclosan and triclocarban can interfere with hormone systems in the body, potentially affecting reproductive health and development.
Antibiotic resistance: There are concerns that the widespread use of triclosan and triclocarban may contribute to the development of antibiotic-resistant bacteria.

Crossing the placenta: Yes, triclosan and triclocarban can cross the placenta during pregnancy, which means they can potentially reach the developing foetus if a pregnant woman is exposed to these chemicals. This raises concerns about potential effects on foetal development and health.

Ways to prevent triclosan and triclocarban exposure:
- **Check product labels:** Look for triclosan- and triclocarban-free products and avoid using personal care items and household products that contain these chemicals.
- **Use alternatives:** Opt for natural or safer alternatives for personal care and cleaning products that do not contain triclosan and triclocarban.
- **Good hygiene practices:** Frequent handwashing with regular soap and water is generally effective for personal hygiene, and there may be no need for products containing triclosan and triclocarban.

CONCLUSION
Avoiding endocrine disrupting chemicals is essential for protecting human health, preserving the environment, and promoting overall well-being. With this, we conclude that the above-mentioned chemicals are injurious to endocrine health. Avoiding these chemicals may not make epidemiology of endocrine diseases zero, but definitely rescues the number and severity of these diseases. They need to be more conscious with these EDCs. These chemicals cross placenta and reaches to foetus. Thereby causing anomalies in children in long run. One can avoid these chemicals by avoiding packed foods and packed water. Consuming EDCs is inevitable in this modern world but can be reduced by choosing food consciously.

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