

## Keywords:

## Introduction

Airborne nanoparticles (ANPs) are tiny particles that can be inhaled and enter the body. They are found in the air from various sources, including traffic, industry, and nature. ANPs can cause health problems, such as lung disease and cancer. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Sources of Airborne Nanoparticles

Airborne nanoparticles (ANPs) are tiny particles that can be inhaled and enter the body. They are found in the air from various sources, including traffic, industry, and nature. ANPs can cause health problems, such as lung disease and cancer. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Industrial Emissions

Industrial emissions are a major source of airborne nanoparticles (ANPs). These particles are released into the air from various industrial processes, such as manufacturing, power generation, and mining. ANPs can cause health problems, such as lung disease and cancer. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Mechanisms of Genotoxicity

ANPs can cause damage to the body in several ways. One of the main mechanisms is through oxidative stress, which can lead to DNA damage and genetic mutations. ANPs can also cause inflammation, which can further damage the body. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Oxidative Stress

Oxidative stress is a state of imbalance between the production of reactive oxygen species (ROS) and the body's ability to detoxify them. ANPs can cause oxidative stress by generating ROS, which can damage DNA and lead to genetic mutations. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Inflammation

Inflammation is a natural response of the body to injury or infection. ANPs can cause inflammation by irritating the lungs and other tissues. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

## Direct Interaction with DNA

ANPs can interact directly with DNA, causing damage and genetic mutations. This article discusses the different sources of ANPs and how they can cause damage to the body. It also looks at the ways ANPs interact with DNA and how this can lead to genetic mutations and cancer. The article is divided into sections on sources of ANPs, mechanisms of genotoxicity, oxidative stress, inflammation, and direct interaction with DNA.

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- **Transcriptional Regulation:**

### Health Implications

#### Cancer

- **Mechanistic Evidence:** A

#### Respiratory Diseases

- **Cellular Response:**

#### Cardiovascular Effects

- **Systemic Effects:**

#### Neurotoxicity

- **Blood-Brain Barrier:**

#### Regulatory Implications

#### Exposure Assessment

#### Risk Characterization

#### Emission Control

#### Public Awareness

#### Future Directions

#### Conclusion

#### References

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