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Definitions

- **Volatile Organic Compounds (VOCs)**: Harmful chemicals that easily become gases. They come from things like car exhaust, factories, and cigarette smoke.
- **Endothelial Cells**: Cells lining the inside of blood vessels, important for vascular health.
- **Circulating Angiogenic Cells (CACs)**: Cells that help repair damaged blood vessels.
- **Metabolites**: Substances made when the body breaks down chemicals, including VOCs.
- **Flow Cytometry**: A technology used to analyze the characteristics of cells.

Key Findings

- Exposure to VOCs is linked to lower levels of circulating angiogenic cells (CACs), indicating potential blood vessel damage.
- Different VOCs, such as ethylbenzene, styrene, and xylene, show strong negative associations with CAC levels.
- Sex, race, hypertension, and diabetes affect how VOC exposure impacts CAC levels.

Introduction

This study explores how exposure to volatile organic compounds (VOCs) affects the health of blood vessels. VOCs are common in both indoor and outdoor air, coming from sources like vehicle emissions and industrial processes. The researchers wanted to understand if these chemicals cause damage to blood vessel cells.

Main Content

Background

VOCs are harmful chemicals in the air from sources like car exhaust and industrial activities. These pollutants can cause health problems, including damage to blood vessels.

Objectives

The study aimed to determine how exposure to different VOCs affects the levels of circulating angiogenic cells (CACs), which are important for repairing blood vessels.

Methods

Researchers collected urine samples from 603 participants to measure 16 metabolites of 12 different VOCs. They also measured 15 types of CACs in blood samples using a technology called flow cytometry.

Results

- **VOC Exposure**: Participants had varying levels of VOC metabolites in their urine, indicating different exposure levels.
- **CAC Levels**: Higher levels of certain VOC metabolites, like ethylbenzene and styrene, were linked to lower levels of CACs, suggesting damage to blood vessels.
- **Non-Smokers**: In non-smokers, the negative impact of VOCs on CAC levels was consistent, highlighting the harmful effects of these pollutants even without smoking.
- **Subgroup Analysis**: The study found that the effects of VOCs on CAC levels were influenced by factors such as sex, race, hypertension, and diabetes.

Conclusion

The study shows that exposure to volatile organic compounds (VOCs) is associated with lower levels of circulating angiogenic cells (CACs), which are crucial for repairing blood vessels. This suggests that VOC exposure can lead to blood vessel damage and increase the risk of cardiovascular diseases. The findings highlight the importance of reducing VOC exposure to protect vascular health, especially in vulnerable populations. Further research is needed to confirm these results and develop strategies to mitigate the harmful effects of VOCs.

Word count: 420