Xie, Z., Chen, J. Y., Gao, H., Keith, R. J., Bhatnagar, A., Lorkiewicz, P., & Srivastava, S. (2023). Global profiling of urinary mercapturic acids using integrated library-guided analysis. *Environmental Science & Technology*, *57*(29), 10563-10573. https://doi.org/10.1021/acs.est.2c09554

Definitions

- **Mercapturic Acids (MAs)**: Chemicals found in urine that indicate exposure to harmful substances.

- **Xenobiotics**: Foreign substances in the body, like pollutants or drugs.

- **Electrophilic Chemicals**: Highly reactive chemicals that can damage cells.

- **UPLC-QTOF/MS**: A technology used to identify and measure chemicals in samples.

- **Biomarkers**: Indicators found in the body that show exposure to certain chemicals.

Key Findings

- Researchers found about 500 mercapturic acid (MA) candidates in each urine sample.

- They identified 116 MAs from 63 different sources, including 25 new ones.

- Smokers had higher levels of certain MAs compared to non-smokers, indicating more exposure to harmful chemicals.

Introduction

This study aims to improve methods for identifying harmful chemicals in the body. By studying mercapturic acids (MAs) in urine, researchers can better understand exposure to toxic substances from sources like pollution and cigarette smoke.

Main Content

Background

People are exposed to many harmful chemicals throughout their lives. These chemicals can come from pollution, smoking, and even some foods. Detecting these chemicals in the body is important for understanding their impact on health.

Objectives

The goal was to create a better way to identify and measure MAs in urine, which can indicate exposure to harmful chemicals.

Methods

Researchers collected urine samples from 70 people, including smokers and non-smokers. They used a technology called UPLC-QTOF/MS to analyze these samples and identify MAs.

Results

- **Urine Analysis**: Each sample had about 500 MA candidates.

- **Identified MAs**: 116 MAs were identified from 63 different sources. This included chemicals from cigarette smoke and industrial pollution.

- **New Discoveries**: 25 of these MAs were new, mostly from substances found in pollutants.

- **Smokers vs. Non-Smokers**: Smokers had higher levels of certain MAs, showing more exposure to harmful chemicals.

Conclusion

This study developed a new method to identify harmful chemicals in urine more effectively. It found that smokers have higher levels of certain harmful chemicals, highlighting the risks of smoking. This method can be used in future studies to better understand and reduce exposure to toxic substances. The findings show the importance of reducing exposure to harmful chemicals, especially for smokers. The new method can help in monitoring and preventing health issues related to these exposures. Further research is needed to continue improving our understanding of how these chemicals affect health.

Word Count: 371