G95 NMR and Bioinformatic Studies on the Metabolic Effects of Acetaminophen in Rat's and Human's in Urine: A Metabonomic Approach

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After attending this presentation, attendees will have learned how acetaminophen affects the body differently, depending on the individual, and how to identify biomarkers that are unique to that individual's response to acetaminophen.

This presentation will impact the forensic science community by discussing how once unique biomarkers are identified and correlated, and how further study can be done to help determine which individual's will have adverse side effects to certain medications.

Acetaminophen is one of the most widely used analgesic drugs in the United States today due to its therapeutic effects and high toxicity threshold. This research aims to measure the effects of various acetaminophen doses on rats and humans using ^{1}H-NMR spectroscopy. Previous work has been done to establish the therapeutic and toxic levels of acetaminophen and found them to be 10-15mg/kg and 150mg/kg respectively. The purpose of this research is to study the effects of acetaminophen on rats to determine if metabolic biomarkers can be identified and then compare those biomarkers to those found in a human study. This research will show that the unique metabolic biomarkers found are due to the specific responses of exposure to the acetaminophen. This particular experiment will involve three groups of five rats (control, low, and high dose) and two groups of five humans (control and low dose). Urine will be collected over the course of seven days post-dose. A pre-dose urine sample will also be collected and this will act as another control. Once samples have been prepared and analyzed using a water suppression method, data analysis will begin. The spectra will be analyzed using various bioinformatics methods to see if changes occurred metabolically and what those changes were. These results will then be compared to those found in the human study to see if any correlations can be established. The biomarkers identified will determine whether or not the subject in question is genetically predisposed in their metabolism of acetaminophen. This can then be expanded to other medications, including those still undergoing clinical trials, to help establish what biomarkers are indicative of certain adverse side effects of a medication. This will assist in prescribing medications to individuals who will not exhibit the adverse side effects.

Metabonomics, Acetaminophen, Biomarkers

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