

The Gut Microbiota’s Metabolism of Allopurinol

Spencer Murphy
Renuka Nayak, PhD, MD

BACKGROUND

With a prevalence of 3.9%, gout is one of the most frequent causes of arthritis in the US. By reducing serum uric acid levels, allopurinol is a common first-line medication for gout patients. However, allopurinol can vary widely in its efficacy. While prior research has considered variations in absorption, metabolism, and excretion on the human-level as a cause for this discrepancy, limited research has looked into the possibility that metabolism from the gut microbiota can be contributory. We hypothesize that the gut microbiota is capable of metabolizing allopurinol.

METHODS

- Grow six fecal slurries from healthy individuals in allopurinol-containing brain-heart infusion (BHI) growth medium
- Using high-performance liquid chromatography (HPLC), analyze the relative concentrations of allopurinol in the bacterial supernatants

RESULTS

Fecal Slurries <i>with</i> Decrease in Allopurinol Peak’s Area Compared to Control	Fecal Slurries <i>without</i> Changes in Allopurinol Peak’s Area Compared to Control
3	3

DISCUSSION

The supernatants from three of the six tested fecal slurries had allopurinol peaks with areas less than the controls, which suggests that bacteria in these slurries metabolized allopurinol and supports our hypothesis. The fact that half of the tested samples did not exhibit this decrease also shows that there exists variability in the gut microbiota’s capacity to metabolize allopurinol. Therefore, differences in gut microbial metabolism may contribute to allopurinol’s variable efficacy.

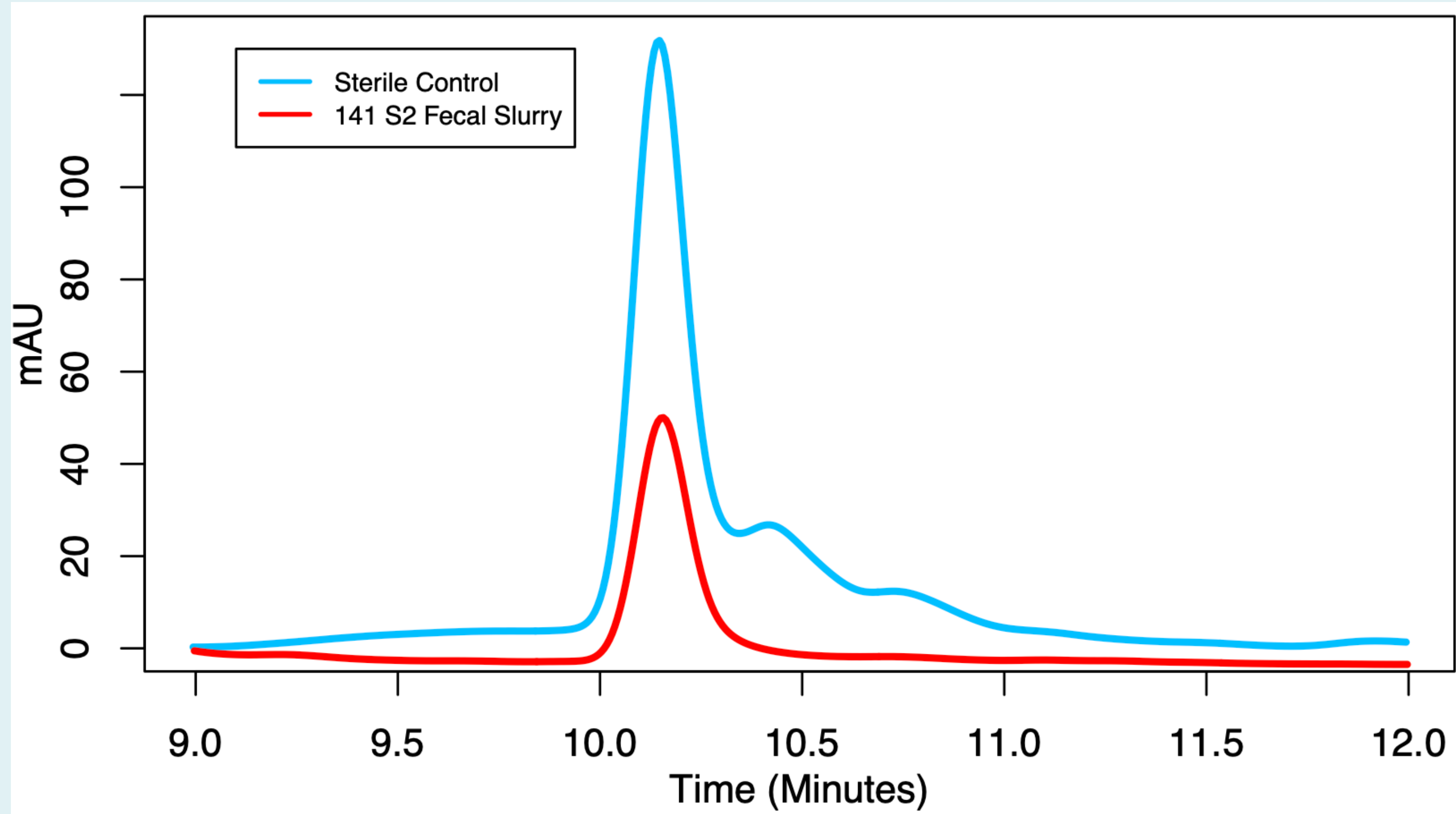
ACKNOWLEDGEMENTS

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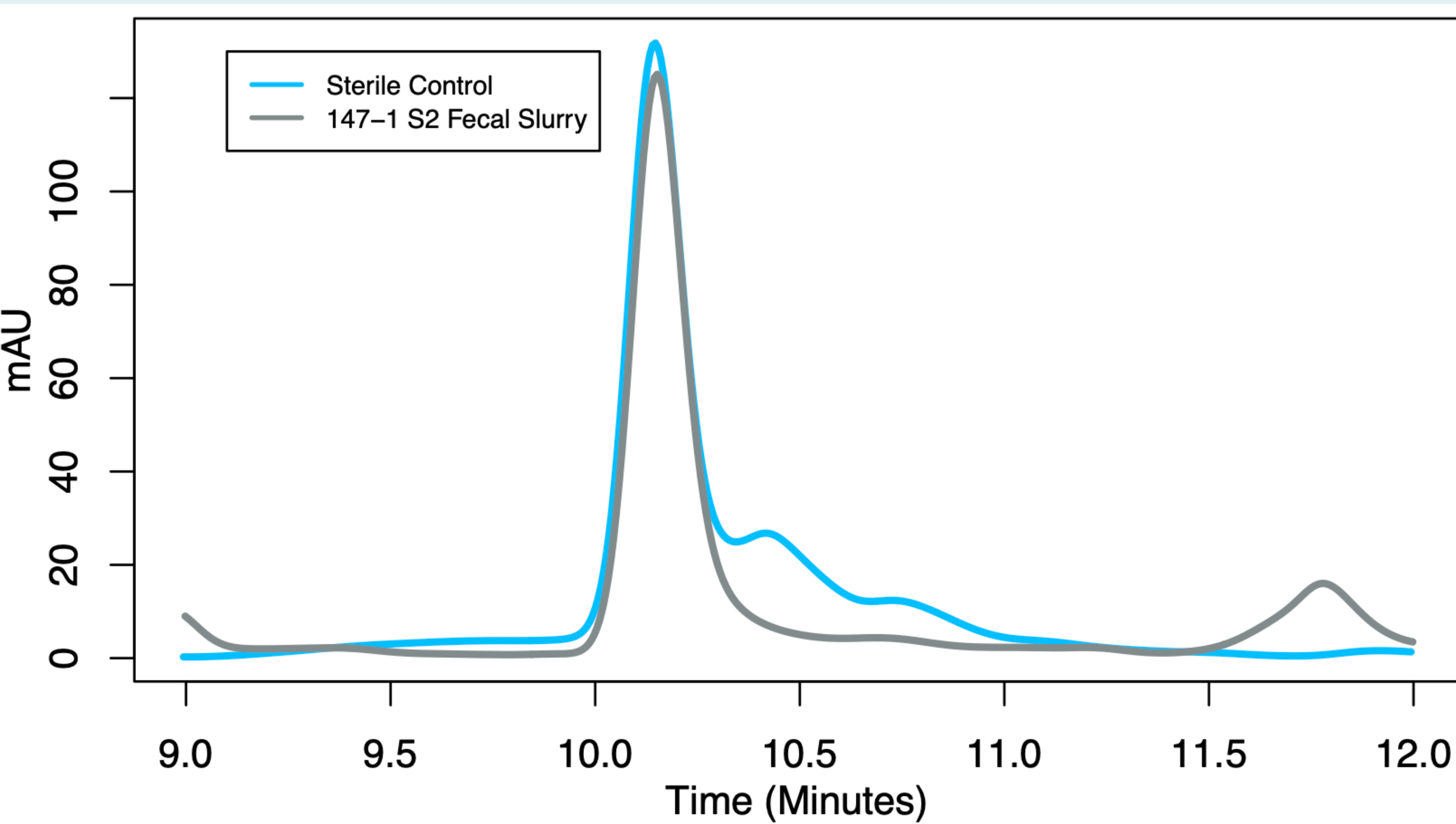


The Gut Microbiota Exhibits Variability in its Ability to Metabolize Allopurinol

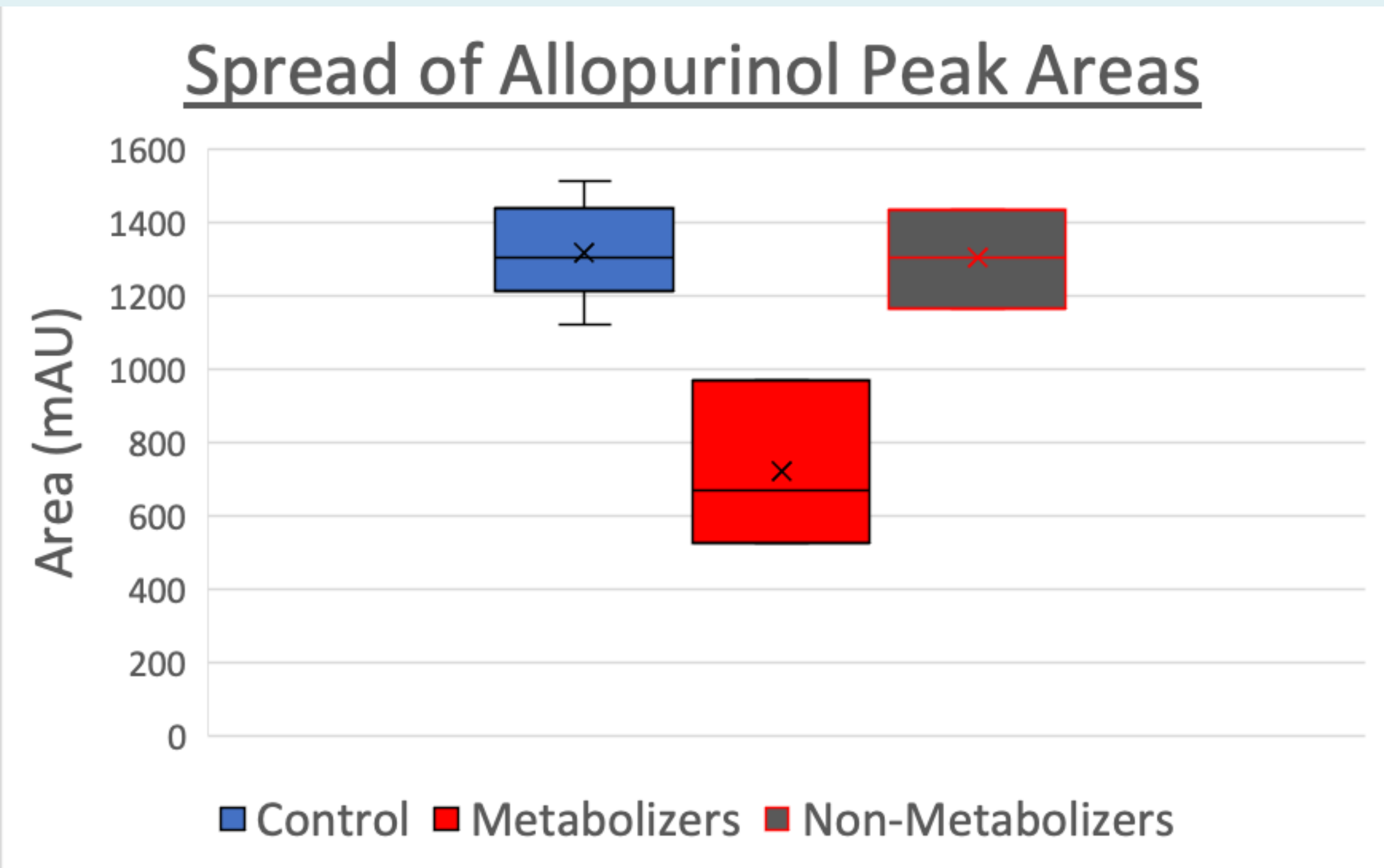
a. HPLC results showing a decrease in the area of a fecal slurry allopurinol peak compared to the control, indicating allopurinol metabolism by fecal slurry bacteria



b. HPLC results showing the allopurinol peaks of the fecal slurry and control have similar areas, indicating insignificant allopurinol metabolism by fecal slurry bacteria



c. Boxplots of the area of allopurinol peaks from the six control samples, three metabolizing fecal slurries, and three non-metabolizing fecal slurries



University of California
San Francisco