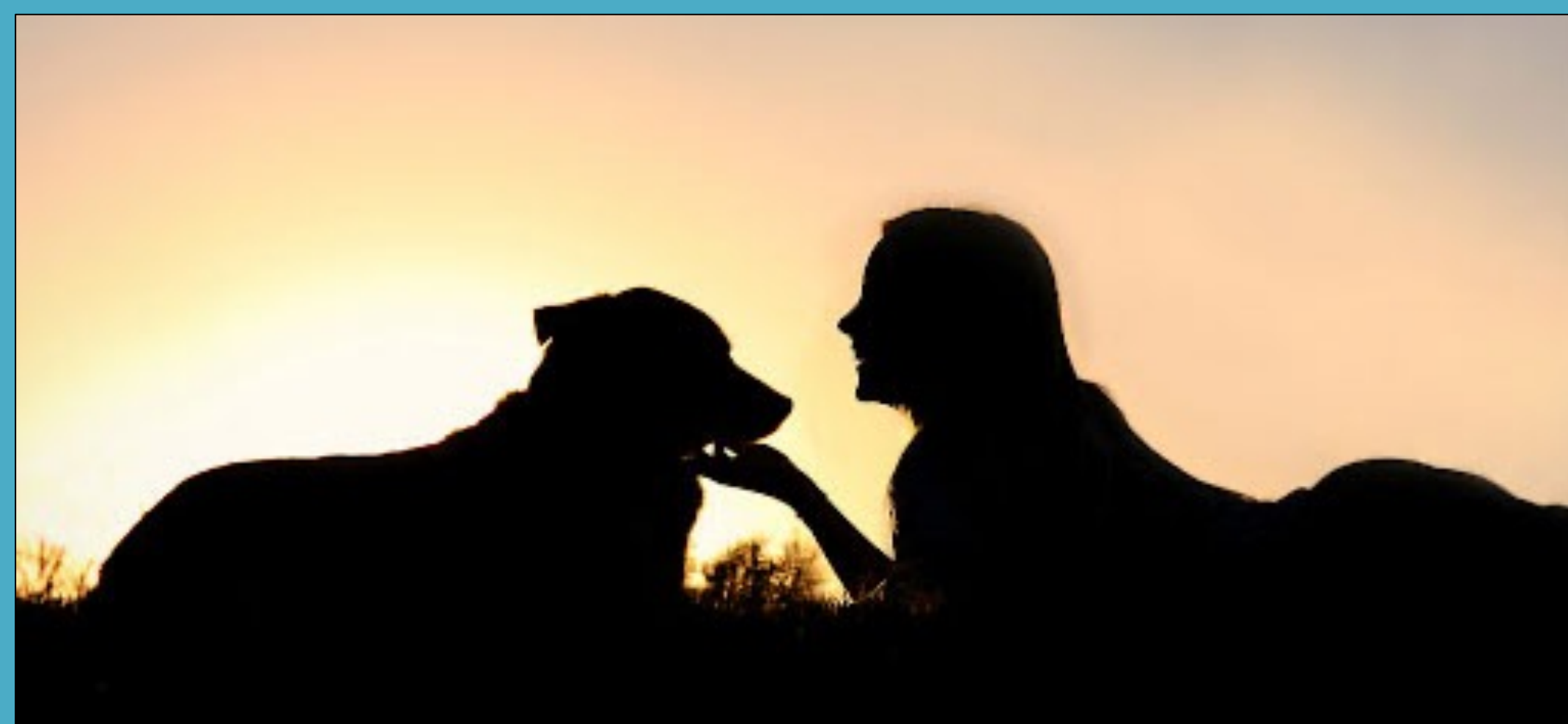




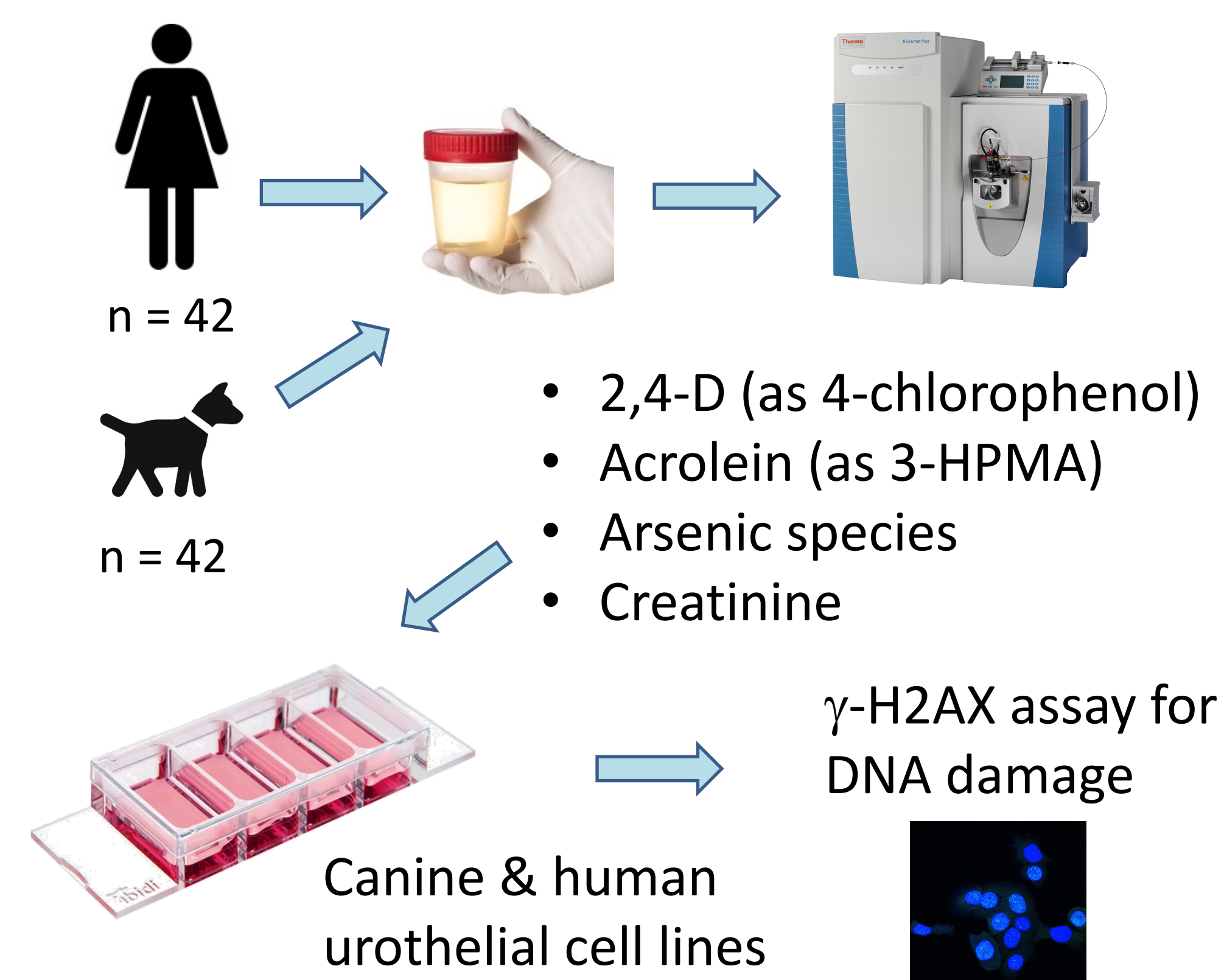
Background

- 30% of urothelial carcinoma (UCC) in people is not explained by tobacco or occupational exposures.
- UCC in both dogs and people tracks to regions of high industrial activity.
- We hypothesize that **dogs with UCC may act as sentinels for non-tobacco, non-occupational urothelial carcinogen exposures in people.**
- The goal of this study was to first establish whether dogs and people share household exposures to urothelial carcinogens.

Research aims

- To determine whether healthy people and their pet dogs share urinary exposures to acrolein, arsenic, or 2,4-D, which are chemicals associated with bladder cancer in people and animals.
- To evaluate whether urinary chemical exposures reached mutagenic levels.

Approach



Mutagenic urinary chemical exposures in dogs and people sharing the same households

Hannah Peterson,¹ Kaitlyn Craun,¹ Kristofer Ross Luethcke,¹ Martin Shafer,² Noel Stanton,² Chen Zhang,² James Schauer,² Kristen Malecki,³ Lauren Trepanier¹

¹ Department of Medical Sciences, School of Veterinary Medicine; ² Wisconsin State Laboratory of Hygiene; ³ Department of Population Health Sciences, School of Medicine and Public Health, University of Wisconsin-Madison

Fig 1. Urinary exposures to mutagenic chemicals in dogs and their owners¹

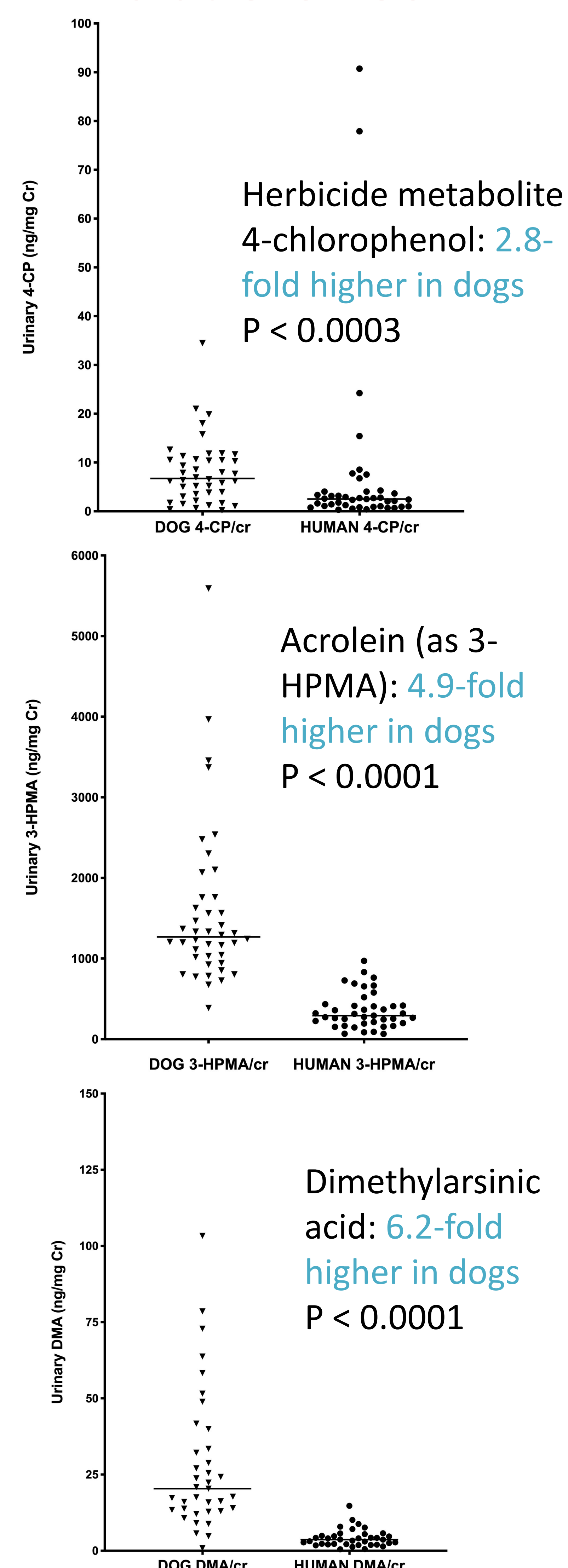


Fig 2. Acrolein and inorganic As exposures correlate between dogs and their owners

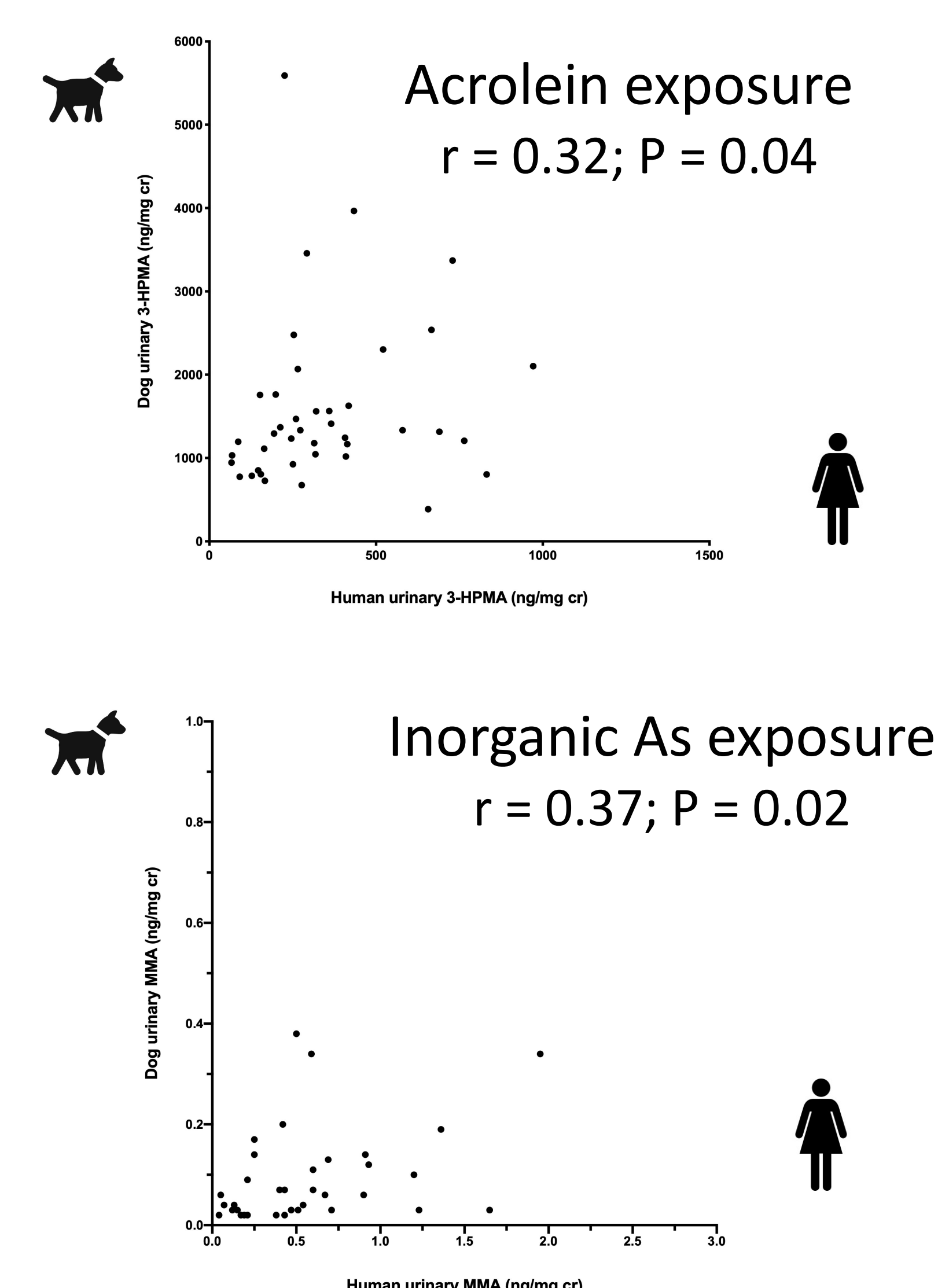


Fig 3. Urothelial mutagenicity *in vitro* from observed acrolein exposures

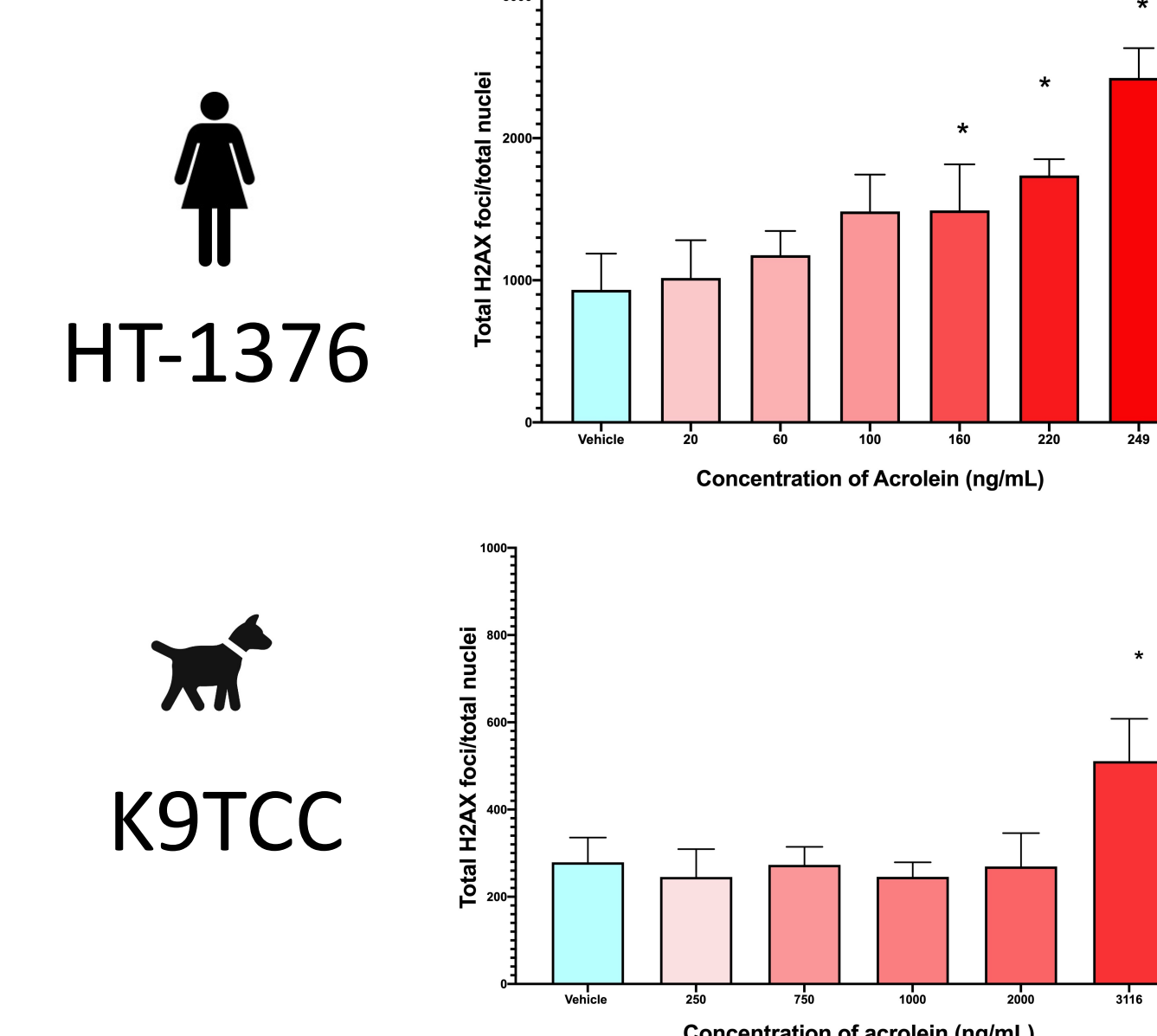
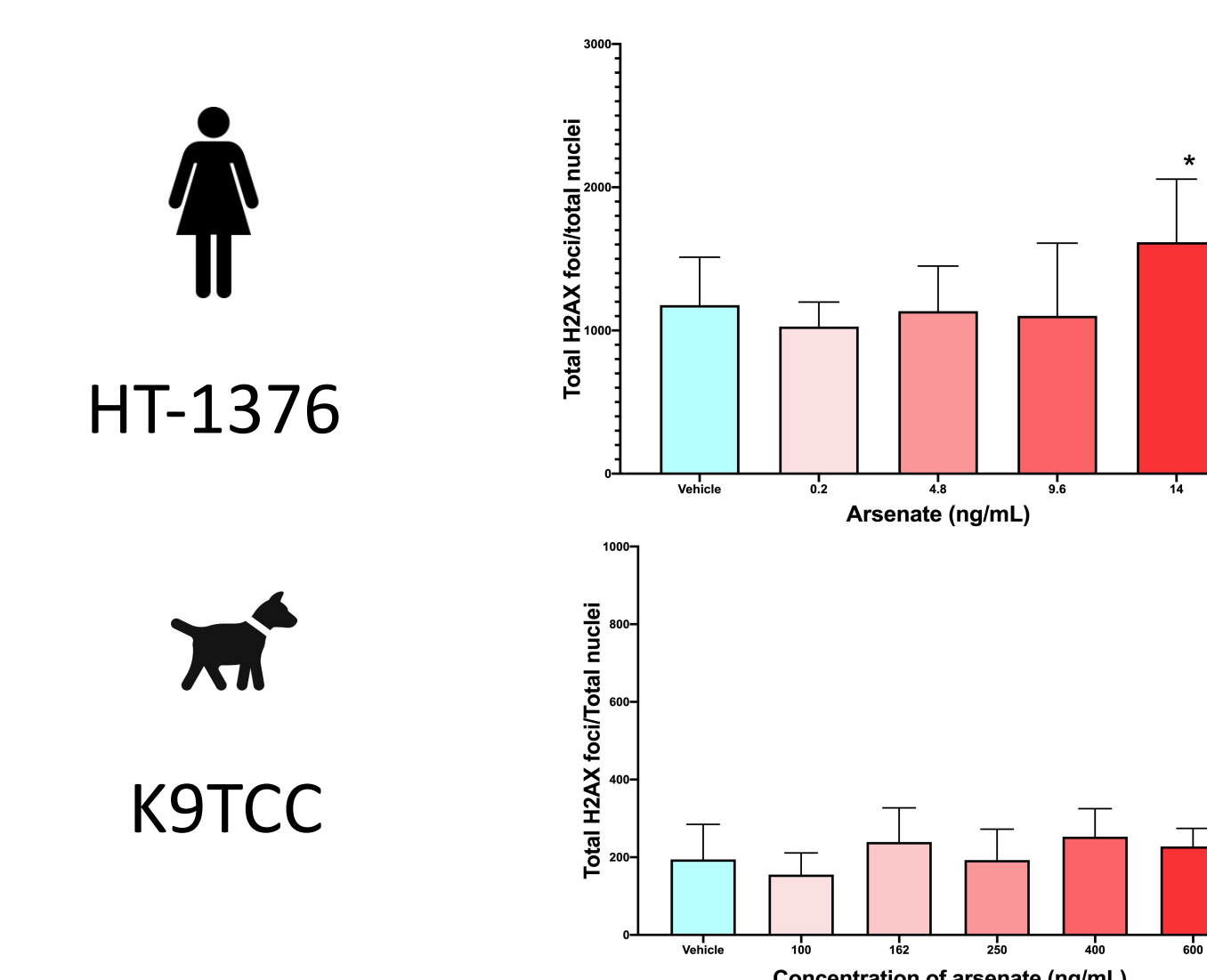


Fig 4. Urothelial mutagenicity *in vitro* from observed arsenic exposures



Summary

- **Healthy people and their pet dogs share urinary exposures to mutagenic chemicals linked to bladder cancer.**
- Urinary exposures to acrolein or arsenic, but not 4-chlorophenol, reached mutagenic levels in 3 of 42 (7.1%) healthy people and 2 of 42 (4.8%) healthy dogs.

Ongoing work

- Assessment of additional cell lines.
- Case-control study to compare urinary exposures to acrolein and inorganic arsenic in dogs with urothelial carcinoma and their owners, compared to control households.

Cited work

1. Craun et al, Environmental chemical exposures in the urine of dogs and people sharing the same households. *J Clin Trans Sci* 5:e54, Oct 2020.

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