



Analysis of IVC Microenvironments During 21 Day Cage Change Frequency Using 2 Different Rodent Bedding Types

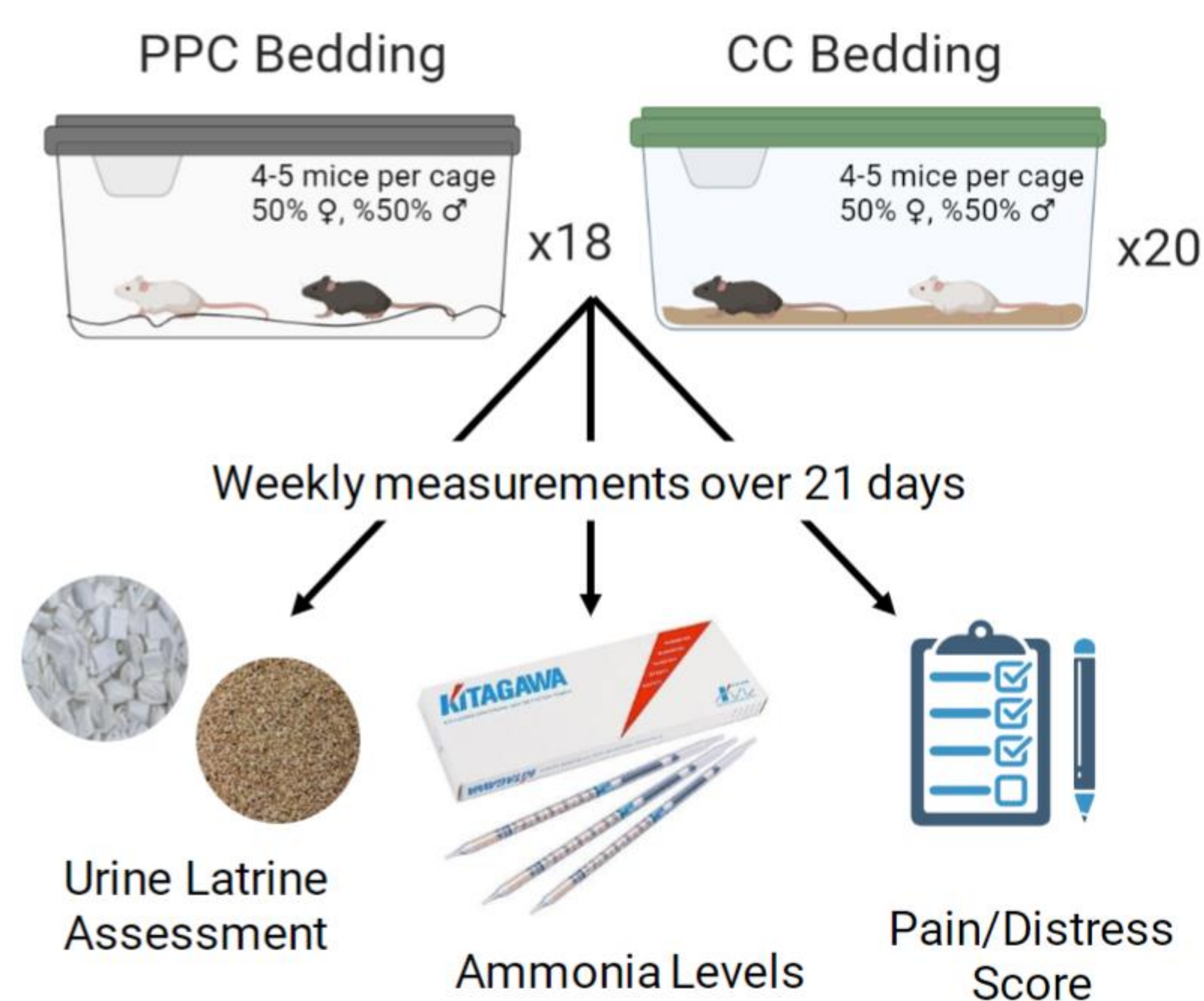


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Introduction

- The *Guide* recommends cage change intervals of one week for rodents housed in solid bottom cages.¹
- These cage change intervals may be extended if the microenvironment in the cages “is not compromised” such as with individually ventilated cages (IVC).¹
- Rodent bedding types can have different effects on microenvironmental parameters (humidity, temperature, ammonia).^{2,3}
- This study sought 2 aims:
 - Compare impact of different rodent bedding types (paper pulp cellulose [PPC] and corncob [CC]) on IVC microenvironmental ammonia levels over a 21 day period.
 - Develop visual guide for early cage change criteria.

Study Design

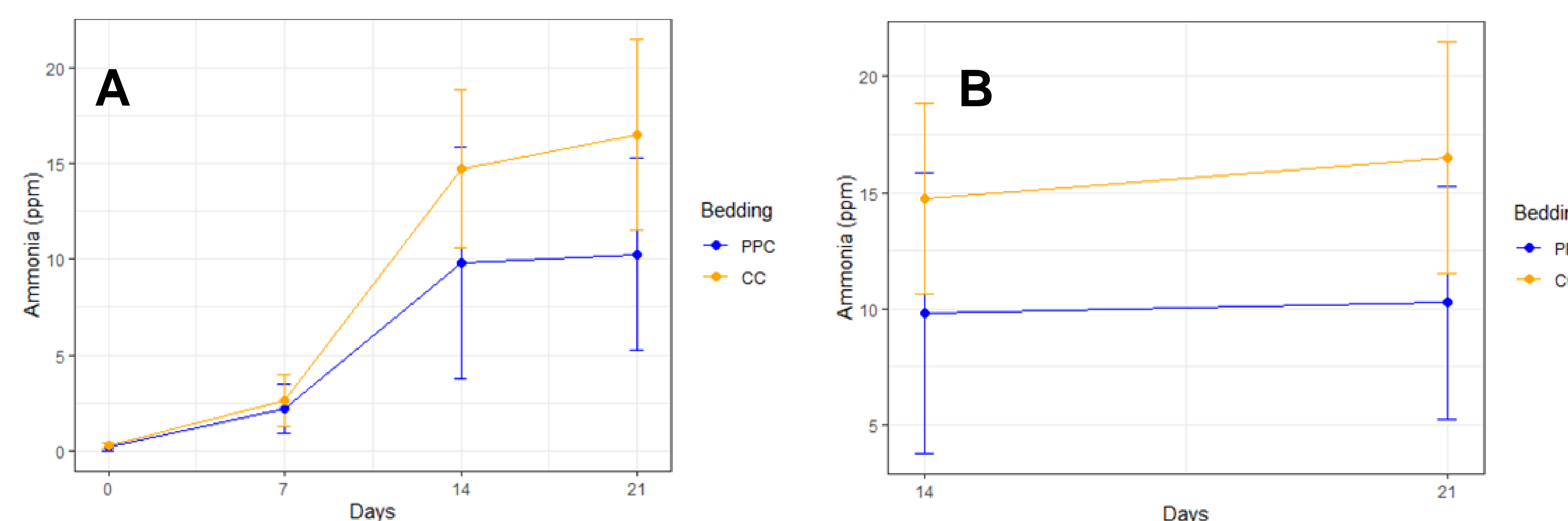


- Allentown IVC caging throughout duration of study
- Cages & accessories autoclaved before use
- 60 air changes per hour
- Tunnel handling and shredded paper as nesting enrichment

Hypothesis

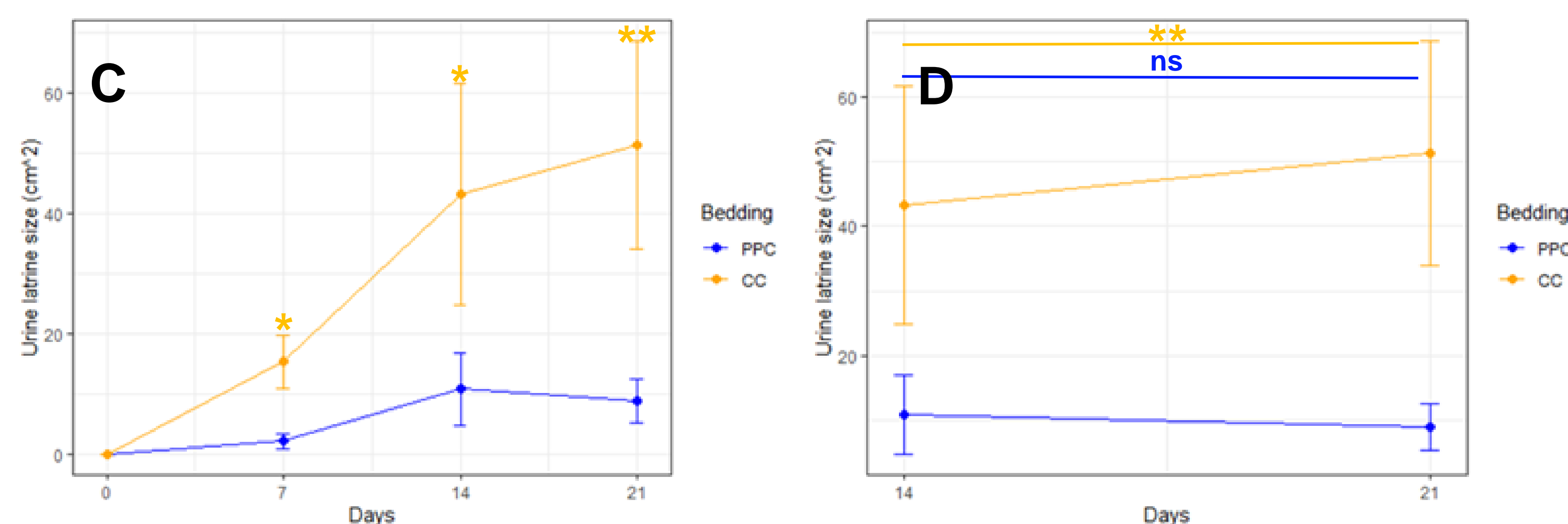
- There will be no significant difference in ammonia levels between the two rodent bedding types (paper pulp cellulose and corncob).
- There will be no significant difference at day 14 vs. day 21 post cage change compared to day 0 in urine latrine size and clinical score.

Results



Ammonia Levels:

- There was no significant difference in ammonia levels between bedding types at any time point (Figure A).
- There was no statistical difference in ammonia levels from day 14 to 21 in either bedding type (Figure B) when compared to themselves.



Urine Latrine Assessment:

- Urine latrine size in cages with CC bedding had statistically significant increase at day 7 ($p = 0.044$), day 14 ($p = 0.020$), and day 21 ($p = 0.010$) compared to cages with PPC (Figure C).
- PPC bedding showed no statistical difference in urine latrine size at day 14 vs day 21 (Figure D).
- CC bedding showed statistically significant increase urine latrine size at day 21 compared to day 14 ($p = 0.008$) (Figure D).

Results

Table 1: Rodent Bedding Type Comparison to Baseline Values Over Time

	Ammonia		Urine Latrine Size	
	Day	P-Value	Day	P-Value
PPC	7	0.77	7	0.72
	14	0.12	14	0.17
	21	0.19	21	0.25
CC	7	0.42	7	0.03*
	14	0.002**	14	0.002**
	21	0.009**	21	0.008**

- Table 1 compares data values for each bedding type at each progressive weekly time point to original baseline values (day 0), for both ammonia and urine latrine size, over the total study time.
- A statistically significant increase in ammonia levels was evident at day 14 and 21 compared to day 0 in cages containing CC bedding (Table 1)
- A statistically significant increase in urine latrine size was found at each subsequent week for cages containing CC bedding, compared to baseline values at day 0.

Pain and Distress Scoring

- No signs of pain or distress were noted throughout study duration; all mice received lowest numerical score of "1" during daily health checks.

Conclusion

Cage change can be extended to 21 days for either corncob or paper pulp cellulose bedding based on ammonia levels in IVC mouse caging systems; however, early cage change criteria may be met sooner based on the urine latrine assessment in cages housed on corncob.

Contact information,
Abstract, and
References:

