

Within-Subject Changes in Protein Preference with Changes in Dietary Protein Intake



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Introduction

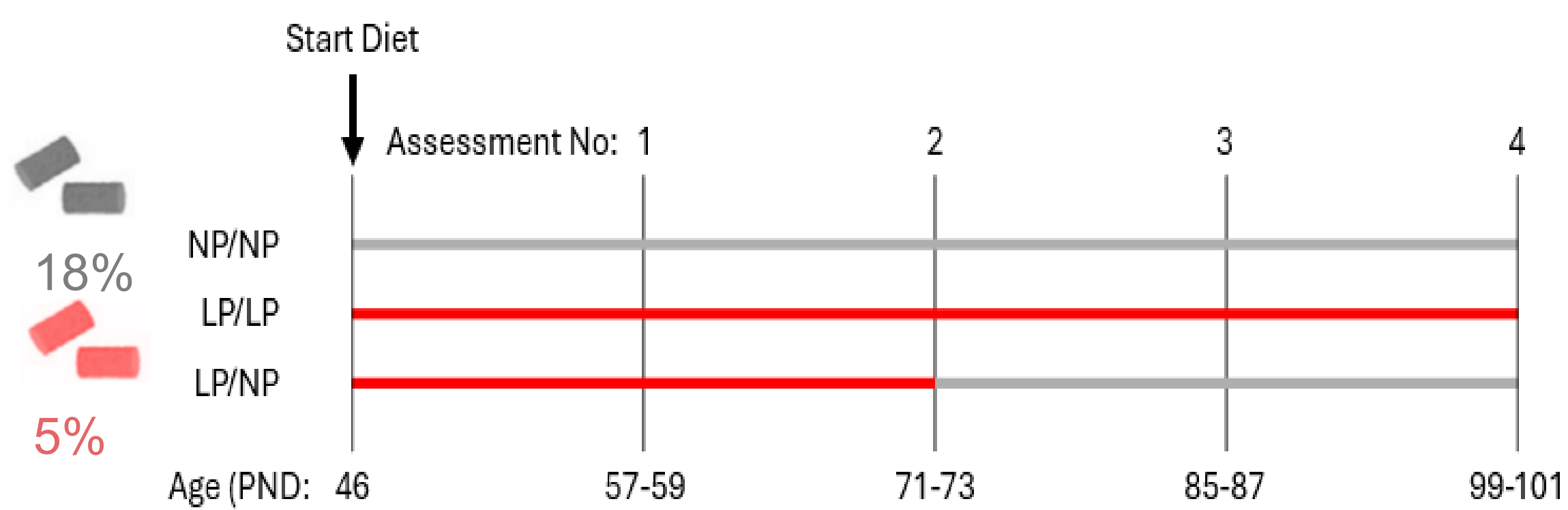
- Animals must consume different macronutrients to survive
- Regular protein intake may be critical because protein cannot be stored in the body
- Previous research has shown that dietary protein restriction increases
 - Intake of low protein food (e.g., Torres et al. 2022)
 - Preference for protein vs. carbohydrate solution (e.g., Hill et al., 2019)
- Most research on preference for protein has involved comparisons between groups of animals fed single diets varying in protein content between groups
- The current study evaluated how intermittently assessed preference for protein changed over time in animals fed a single diet (5% or 18% protein) and in animals in which dietary protein content changed from low (5%) to normal (18%)

Methods

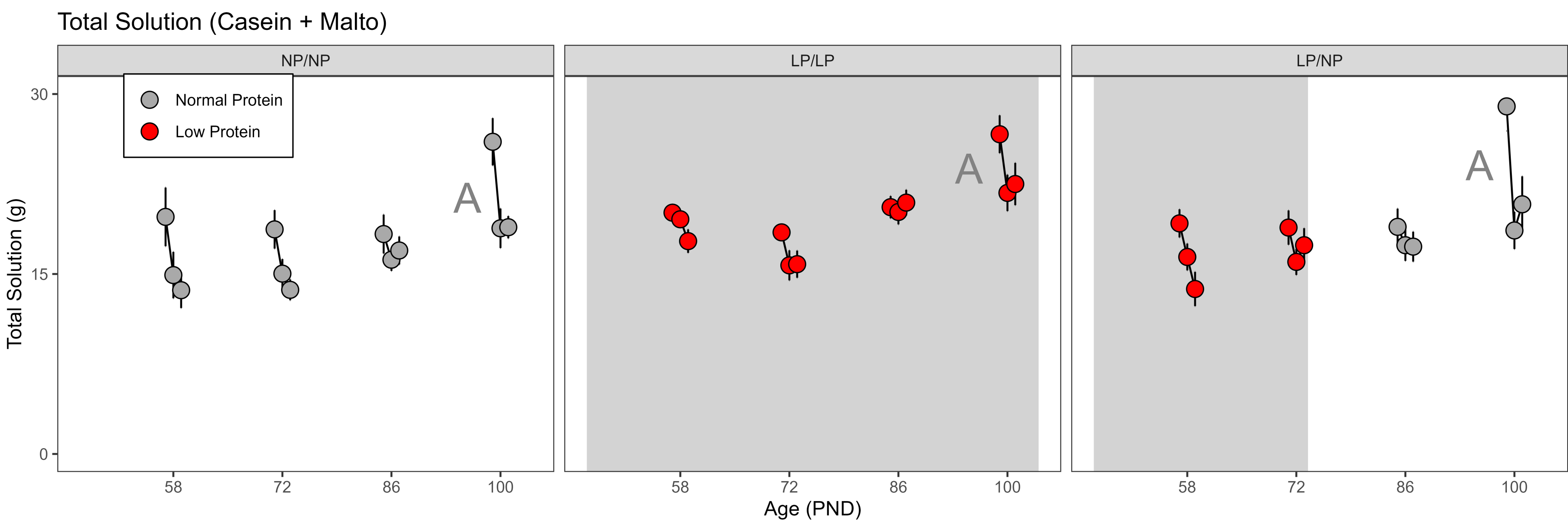
- Subjects:** 30 male C5BL/6J mice
- Housing:** Individually housed
- Preference assessments:**
 - Four 3-day assessments
 - 4% casein + 0.2% saccharin
 - 4% maltodextrin + 0.2% saccharin
 - Solution intake measured daily
- Timeline:**



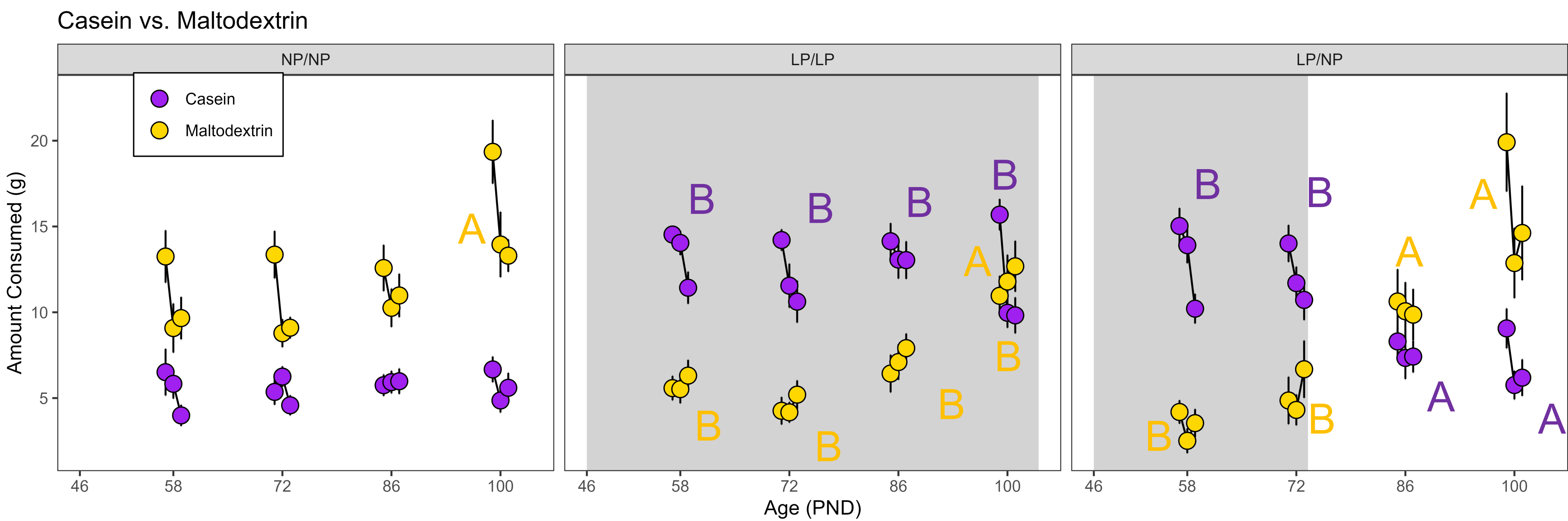
Preference Assessment Timeline



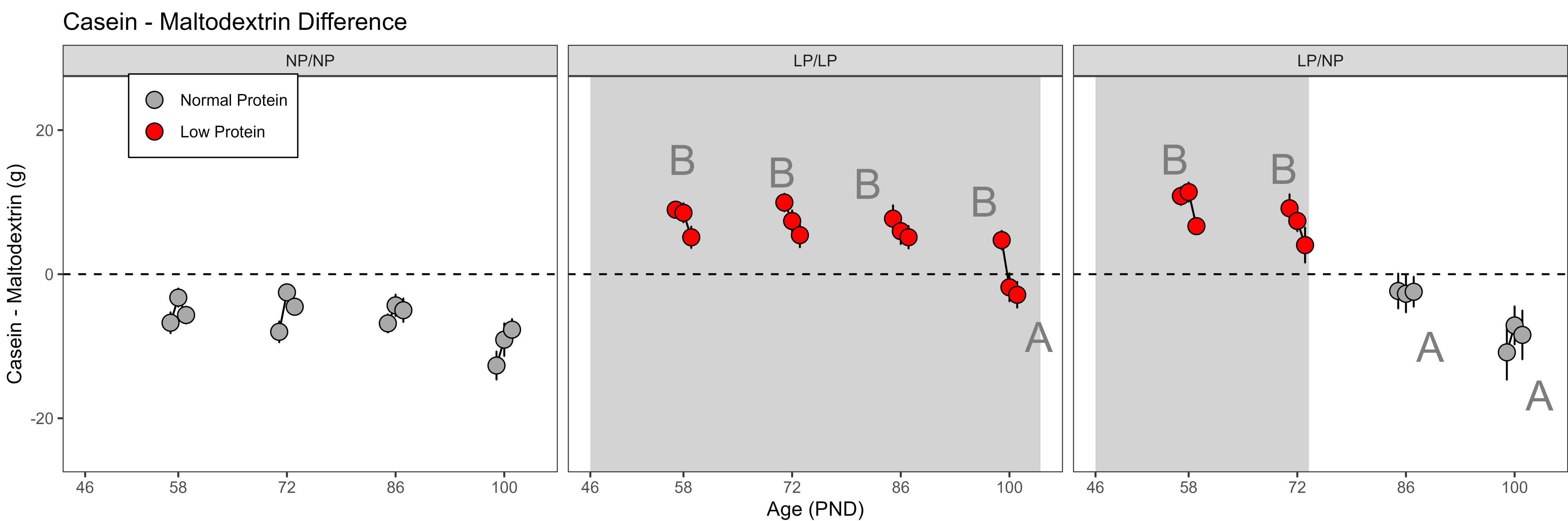
Results



Note. A = $p < 0.05$ vs. Assessment 1



Note. A = $p < 0.05$ vs. Assessment 1. B = $p < 0.05$ vs. NP/NP



Note. A = $p < 0.05$ vs. Assessment 1. B = $p < 0.05$ vs. NP/NP

Conclusions

- Mice fed a low protein diet exhibited preference for casein whereas mice fed a normal protein diet exhibited preference for maltodextrin
- When mice fed a low protein diet were switched to a normal protein diet, preference shifted toward maltodextrin and that shift increased across consecutive assessments
- Some evidence, from mice that remained on a single diet, that maltodextrin intake increases over time
- Within-group changes in preference indicate the utility for within-group manipulations to understand the neurobiological mechanisms underlying the effects of dietary protein restriction (e.g., using fiber photometry to measure neuronal activity in response to protein under conditions of normal and low protein intake)

Future Directions

- Preference shifts in female mice
- Evaluations of how VTA responses to protein change following changes in dietary protein intake (cf. Khan et al. 2025)

References

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