

CHRD 2024: Abstract Submission Form

Presenter Name

Leila Tavakoli

Presenter Status

Masters Student

Role in the project

Perform Experiments
Analyze Data
Write Abstract

Research Category

Basic Science

Title

Ultra-Processed Compared to Whole Foods Worsen Disease in a Mouse Model of Pediatric Kidney Disease

Background

Recent research has strongly linked ultra-processed foods (UPFs) in adults to many diseases, including kidney disease. However, the effects of UPFs on disease progression in pediatric kidney disease remain unstudied. Additionally, the impact of plant- vs. animal-based diets on kidney disease progression in pediatric kidney disease are unknown.

Objective

This study therefore examined how food processing and food source affect disease progression in a mouse model of adolescent nephronophthisis, a disorder in which renal cysts grow and enlarge as disease progresses, ultimately causing renal failure in childhood.

Methods

CD1-pcy/pcy (pcy) mice (n=64) with adolescent nephronophthisis, were randomly assigned to diet groups in a 2 (UPF or whole food diets) × 2 (animal- or plant-based diets) × 2 (male or female) design. Diet ingredients were sourced from local grocery stores. An additional group (n=8/sex) received the standard AIN93G laboratory rodent diet, which contains highly processed animal diet ingredients. At termination, disease progression was assessed by measuring kidney size and cyst volume.

Results

Mice provided UPF exhibited significantly larger kidneys (by 20%) and cyst volumes (by 78%) compared to those on whole food diets. Additionally, mice provided the AIN93G diet showed even greater increases in these disease indicators (by 65 and 258%, respectively). There were no significant effects of sex or food source on disease progression.

Conclusion

Compared to whole food diets, UPF diets derived from human foods as well as standard rodent diets with UPF ingredients worsen disease in the pcy model of adolescent nephronophthisis, whereas sex or animal- vs plant-based food effects did not differ. This may suggest that increased consumption of whole foods should be recommended in pediatric kidney diseases and that the AIN93G diet formulation for rodent nutrition studies may need to be re-evaluated.

Do you have a table/figure to upload?

Yes

Authors

Name	Email	Role	Profession
Leila Tavakoli	tavakoll@myumanitoba.ca	Presenting Author	Graduate
Tanja Winter	tania.winter@umanitoba.ca	Co Author	Graduate
Lucien Cayer	cayerl3@myumanitoba.ca	Co Author	Graduate
Navdeep Tangri	ntangri@sogh.mb.ca	Co Author	Full Professor
Dylan Mackay	dylan.mackay@umanitoba.ca	Co Author	Assistant Professor
Rebecca Mollard	rmollard@sogh.mb.ca	Co Author	Graduate
Harold Aukema	harold.aukema@umanitoba.ca	Co Author	Full Professor

	Whole food	UPF	AIN93G
Kidney weight (g/100g LBW)	2.27 ± 1.07	2.73 ± 1.54**	3.74 ± 0.38**
Cyst volume (mL/100g LBW)	0.36 ± 0.05	0.64 ± 0.10*	1.29 ± 0.34**

LBW: Lean Body Weight. *P<0.05, **P<0.01, ***P<0.001, compared to the whole food diets