

Dietary Pattern Appears Not to Affect C-Reactive Protein and White Blood Cell Count In Obese Hispanic Women

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Introduction

- Obesity is associated with elevated pro-inflammatory mediator C-reactive protein (CRP) and elevated white blood cell (WBC) counts, but reduced protective compounds such as the enterolignans enterodiols and enterolactone (Fig. 1).^{1,2}
- Adhering to a plant-based diet may help mitigate the effects of inflammation in chronic disease, including obesity.³
- Less is known about the differential effects of diet on inflammation levels in women of color compared to white women.

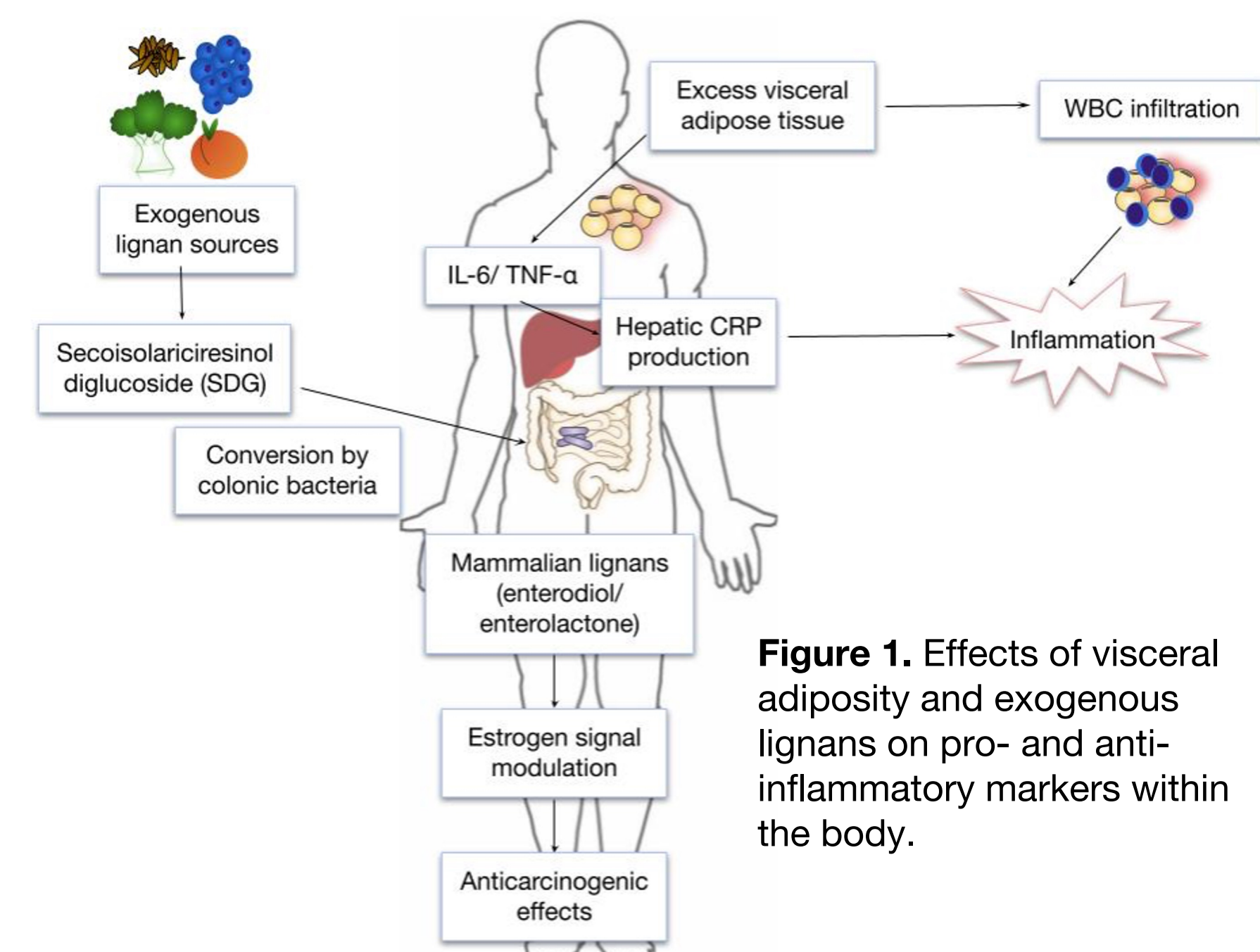


Figure 1. Effects of visceral adiposity and exogenous lignans on pro- and anti-inflammatory markers within the body.

Aims and Objectives

The goal of this study is to investigate the role of adherence to a majority healthy plant-based dietary pattern on inflammation levels in obese and non-obese Hispanic women compared to obese and non-obese non-Hispanic white women.

Methods

- National Health and Nutrition Examination Survey (NHANES) data related to CRP, WBC count and the enterolignans enterodiols and enterolactone were collected from years 1999-2010 for non-obese/obese Hispanic women and non-obese/obese non-Hispanic white women.
- Adherence to healthy plant-based, less healthy plant-based, and animal diet types was determined with two 24-hour recall interviews according to Table 1. Participants were sorted based on majority (>51%) diet adherence and BMI.
- Two-way ANOVA with post-hoc comparisons using Tukey adjustments was run using SAS v 9.4. All analyses were run taking into account NHANES survey sampling design.

Table 1. Examples of food items and food group assignments.⁴

	Food Group Examples
Healthy	Whole grains (breakfast cereals, oatmeal, brown rice), fruits, vegetables, tomato sauce, nuts/ nut butter, vegetable oils
Less healthy	Fruit juices, refined grains (white bread, muffins, pasta, pancakes), potatoes, sugar sweetened beverages, desserts, sugary cereals, cereal bars
Animal Foods	Butter, lard, dairy, eggs, fish, poultry, processed meats, red meats (beef, pork, lamb), miscellaneous (pizza, cream soups, mayonnaise)

Assignments were adapted from Satija et. al, 2017.

Results

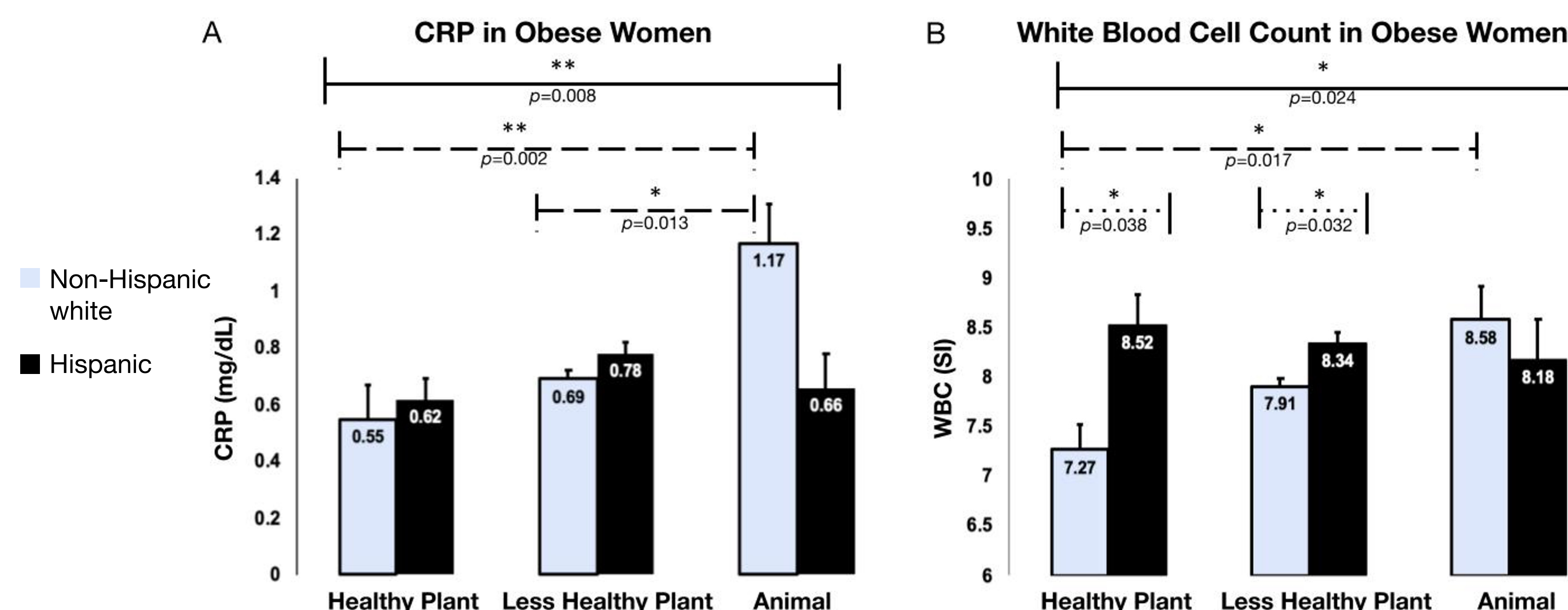


Figure 2. Diet influences inflammatory marker expression in obese non-Hispanic white women differently than in obese Hispanic women. CRP and WBC increase significantly in obese non-Hispanic white women as diet moves from healthy plant-based to animal-based. In obese Hispanic women, diet does not significantly alter CRP and WBC expression. Solid lines indicate a 2-way ANOVA between six independent diet and ethnicity groups. Dashed lines indicate an independent samples t-test between diet types within the same ethnicity group. Dotted lines indicate an independent samples t-test between ethnicity groups within the same diet type. *= $p < 0.5$, **= $p < .01$, ***= $p < .001$

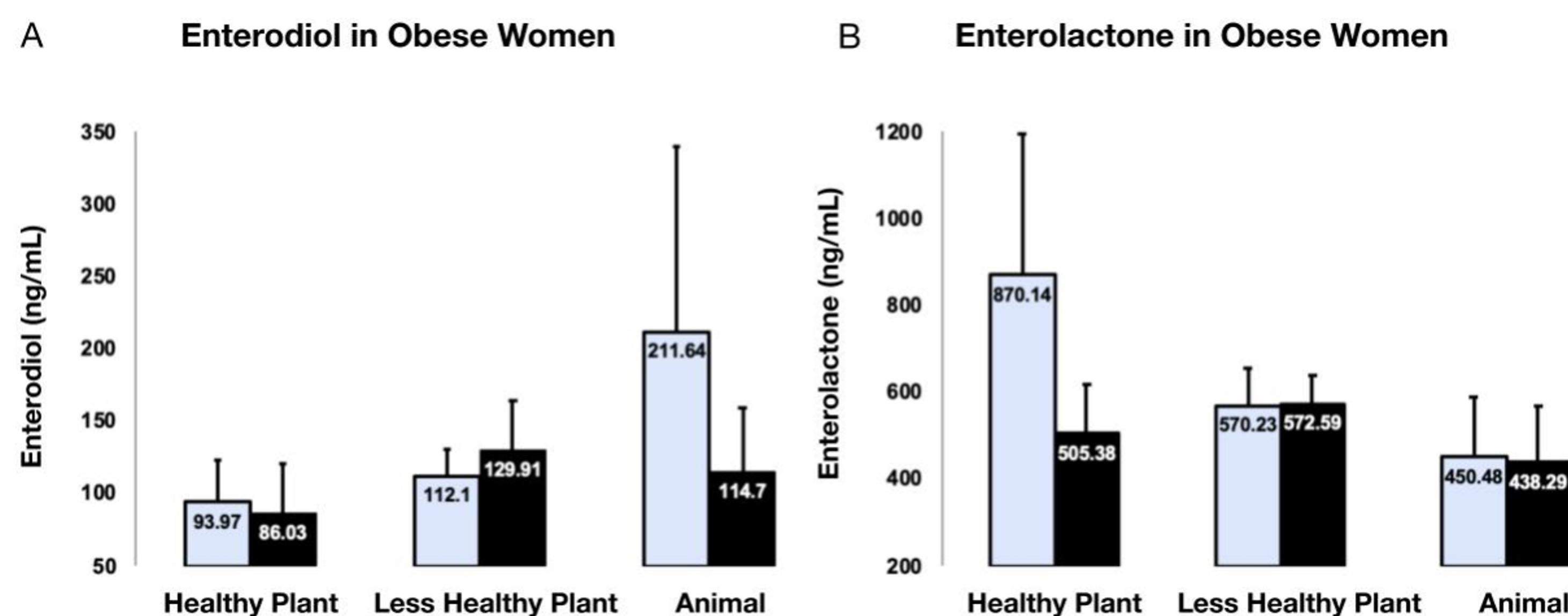


Figure 3. Urinary lignan expression does not significantly differ in obese non-Hispanic white women and obese Hispanic women adhering to healthy plant-based, less healthy plant-based, and animal-based diets. *= $p < 0.5$, **= $p < .01$, ***= $p < .001$

Tables 2.1-2.3. Results of independent samples t-tests comparing CRP and WBC expression between obese and non-obese women by ethnicity.

2.1 Healthy plant-based diet				2.2 Less healthy plant-based diet				2.3 Animal-based diet			
	Obese mean (SE)	Non-obese mean (SE)	p-value		Obese mean (SE)	Non-obese mean (SE)	p-value		Obese mean (SE)	Non-obese mean (SE)	p-value
Non-Hispanic white											
WBC*	7.27 (0.26)	6.60 (0.13)	0.0231	WBC***	7.91 (0.07)	7.22 (0.06)	<.0001	WBC*	8.58 (0.34)	7.78 (0.19)	0.0298
CRP	0.55 (0.12)	0.34 (0.13)	0.2185	CRP***	0.69 (0.03)	0.32 (0.01)	<.0001	CRP***	1.17 (0.14)	0.39 (0.08)	<.0001
Hispanic											
WBC***	8.52 (0.32)	6.77 (0.19)	<.0001	WBC***	8.34 (0.11)	7.48 (0.07)	<.0001	WBC*	8.18 (0.41)	6.94 (0.26)	0.0150
CRP***	0.62 (0.07)	0.25 (0.03)	<.0001	CRP***	0.78 (0.04)	0.33 (0.02)	<.0001	CRP**	0.66 (0.12)	0.25 (0.05)	0.0027

Individuals performed two 24-hour diet recall interviews spanning 2003-2010 and their dietary pattern for each recall was assessed according to table 1. Data from both interviews was combined to determine majority diet adherence. *= $p < 0.5$, **= $p < .01$, ***= $p < .001$

Table 3. Average age of obese and non-obese participants at time of screening by ethnicity and diet type.

Average age at screening			
	Healthy plant	Less healthy plant	Animal
Non-Hispanic white			
Obese	54.35	50.32	46.30
Non-obese	51.77	47.19	44.28
Hispanic			
Obese	44.46	41.14	41.55
Non-obese	48.20	38.16	35.31

Conclusions

- While CRP and WBC increase as diet moves from healthy plant-based to animal-based in obese non-Hispanic white women, obese Hispanic women experience similar levels of CRP and WBC count regardless of diet type.
- Enterodiols and enterolactone expression does not significantly differ between diet types in either ethnicity group regardless of obesity status. However, this analysis was affected by low N. Further studies should repeat this analysis with more robust data sets.
- In agreement with current literature, obese women demonstrate significantly higher levels of CRP and WBC count compared to their non-obese counterparts when matching for dietary pattern regardless of ethnicity.⁵
- In summary, the results of this study suggest that diet type impacts inflammation levels in obese Hispanic women differently than in obese non-Hispanic white women.
- Further studies should explore the reasons behind such differences and evaluate optimal diet type for obese women based on ethnicity as a "one diet fits all" approach to healthy weight loss may not be appropriate.

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