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## PPODS: Pregnancy and Postpartum Observational Dietary Study

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# ***PPODS***

## ***Pregnancy & Postpartum Observational Dietary Study***

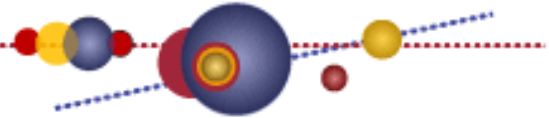
**Tiffany A. Moore Simas, MD, MPH, MEd**

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Director, Ob/Gyn Research Division



*UMassMemorial*



- **Principal Investigators:**

- Milagros Rosal, PhD – Preventive & Behavioral Med
- Tiffany A. Moore Simas, MD, MPH, MEd –Ob/Gyn
- Silvia Corvera, MD – Molecular Medicine

- **Co-Investigators:**

- Mary Lee, MD – Pediatrics
- Bruce Barton, PhD – Quantitative Health Sciences
- Sarwat Hussain, MD – Radiology
- Barbara Olendzki, RD, MPH – Prev & Behavioral Med

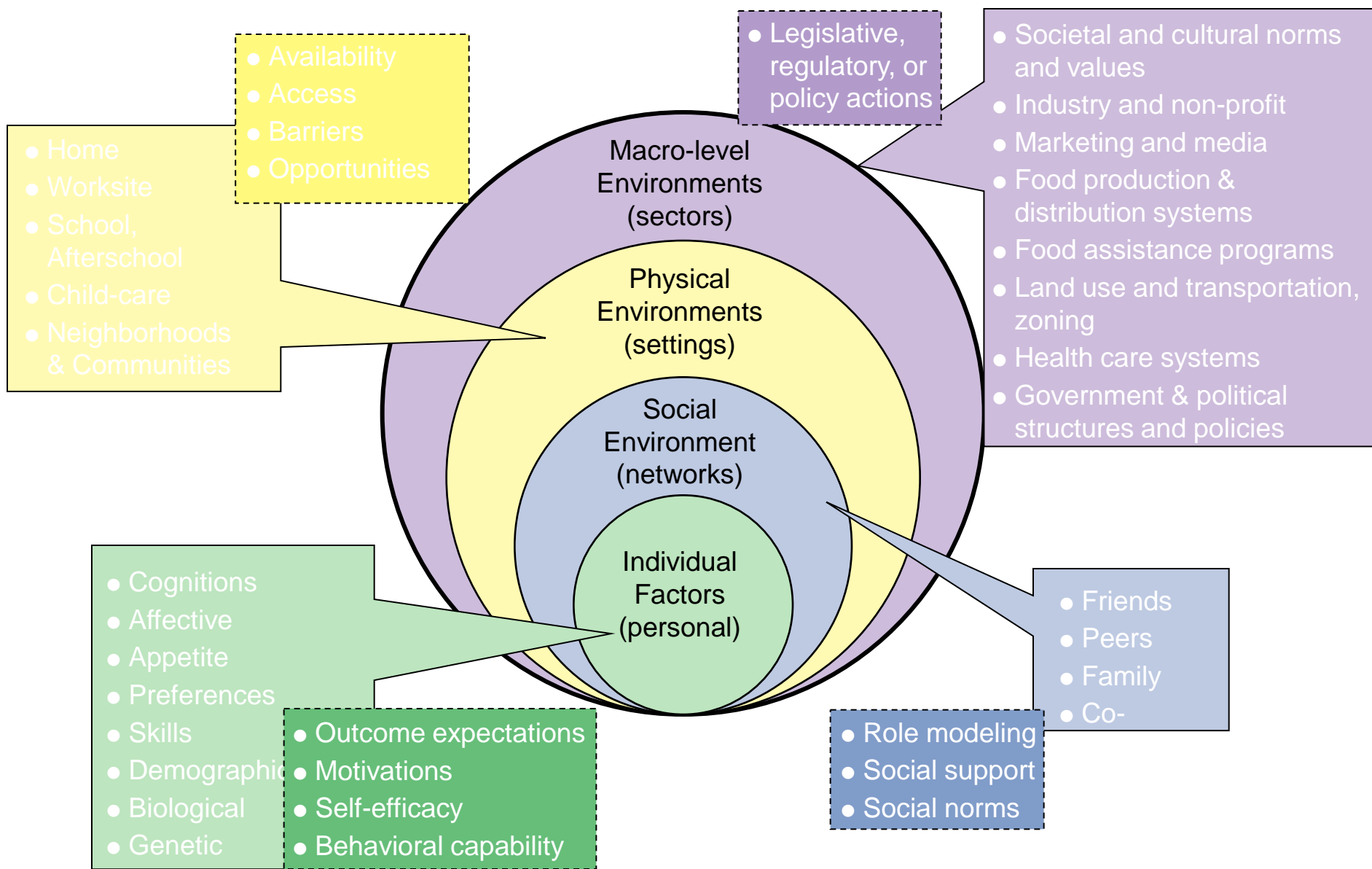
- **Funding:**

- UMCCTS PPP

# **DISCLOSURE**

**I have no actual or potential conflict of interest in relation to this program or presentation.**

# An Ecological Framework : Multiple Influences on Physical Activity and Eating Behaviors



# Background

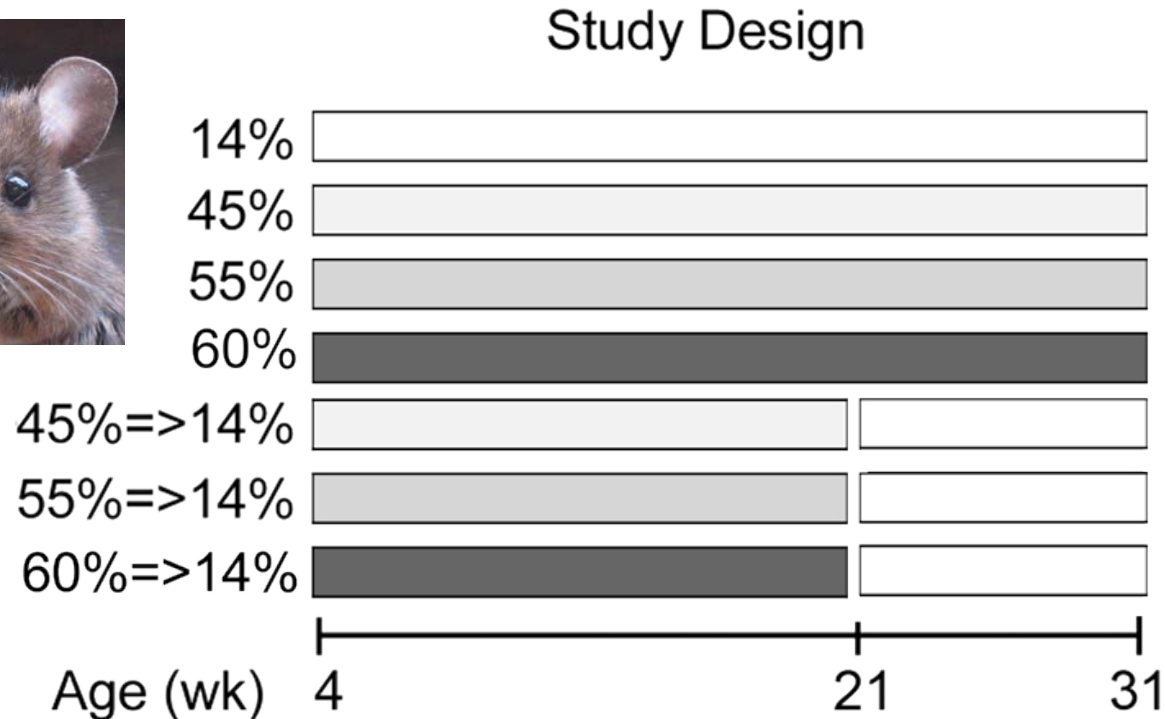
- Weight gain in young adults ↑s risks for cardio-metabolic & other health conditions thru adulthood, and weight loss ↓s these risks.
- Gestational weight gain (GWG) and Post-Partum Weight Retention (PPWR) contribute to ↑ BMI among women of childbearing age.
  - On average, women retain ~3 kg/preg @ 10 years
  - Failure to lose pregnancy weight within 6mos pp predicts long-term obesity
  - Thus, Post-Partum Weight Loss (PPWL) is key to women's long-term health.

# Background

- Interventions to promote PPWL have been minimally effective.
- An underlying assumption in these studies is that excess adipose tissue responds to weight loss strategies independent of the manner in which the weight was accrued.
  - Recent studies from our group (Corvera laboratory) question this assumption.

# Dr. Corvera Lab - Design

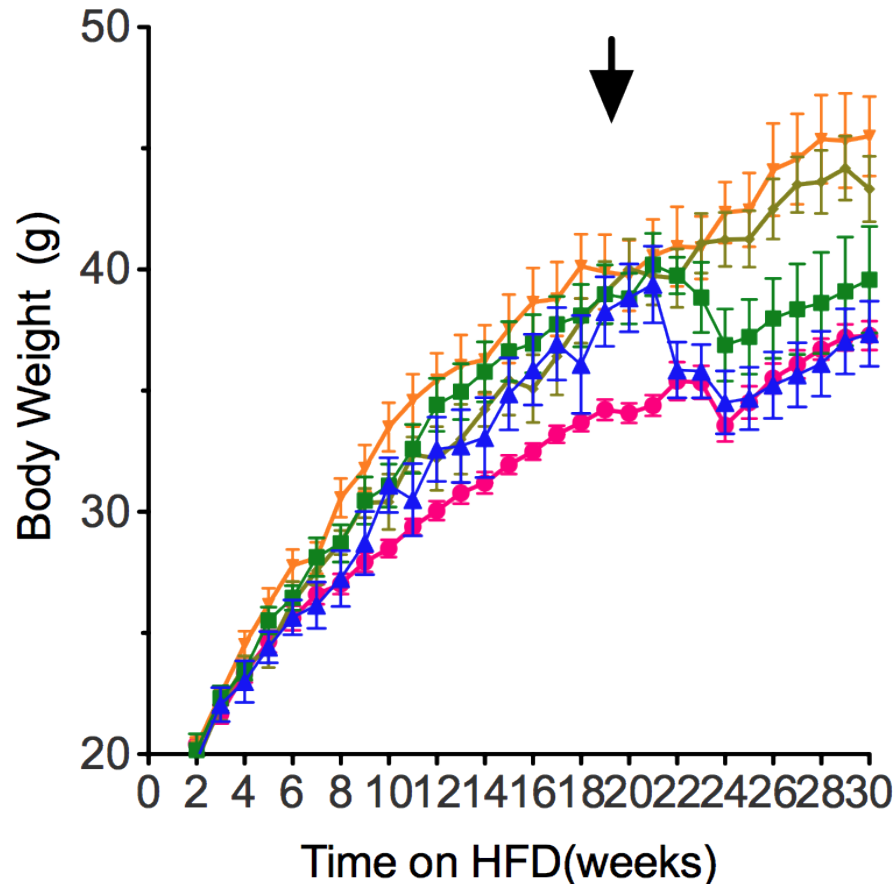
- C57BL/6J mice placed on frequently used high fat diets with normal chow comparison group



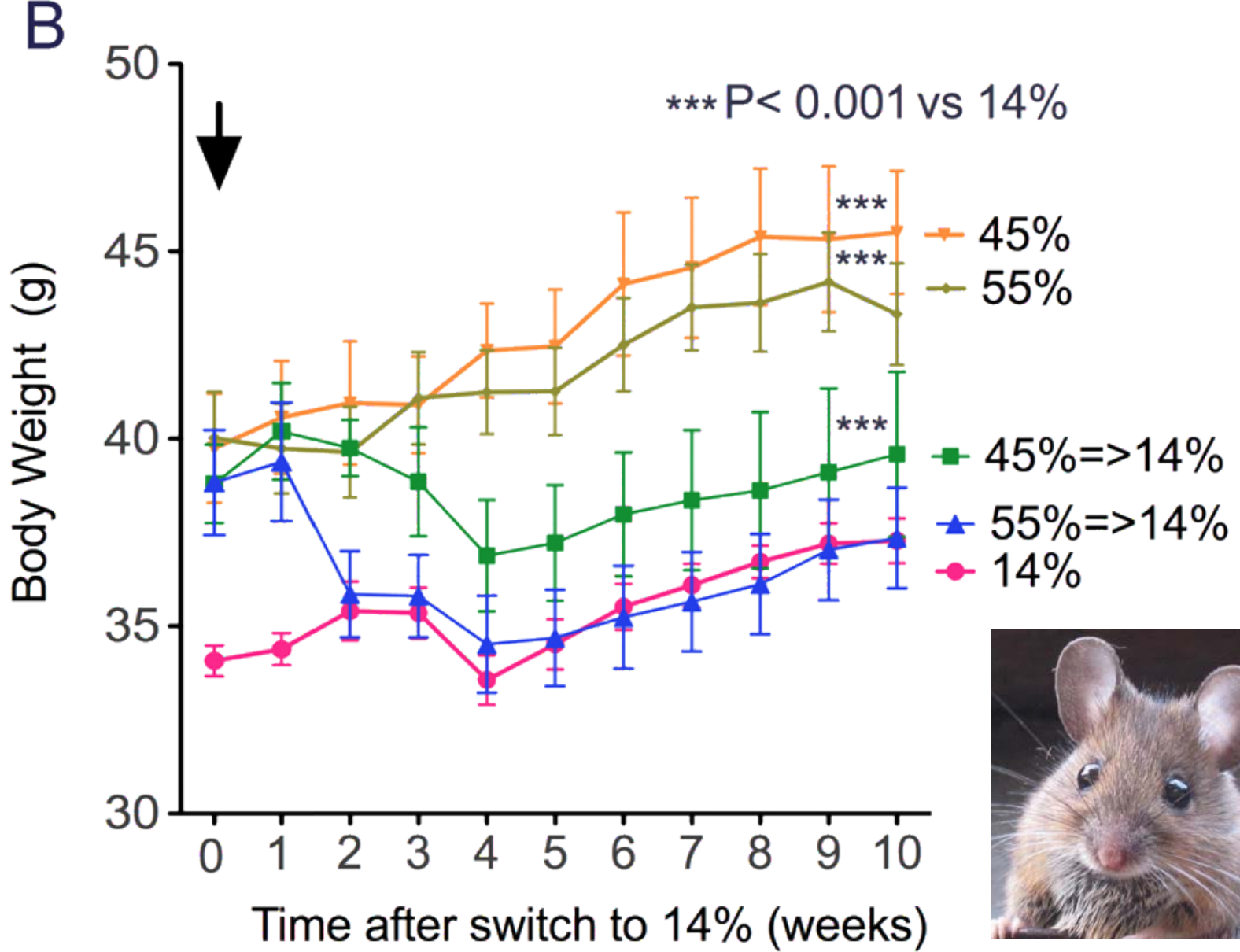
% refers to calories derived from total fat. Diets varied in with relation to specific dietary components (e.g. saturated fat). Diets were isocaloric. Mice fed *ad libitum*.



# Dr. Corvera Lab - Results



Different obesogenic diets induced very similar degrees of weight accumulation in mice, the rate and extent of weight loss varied significantly following transition to normal (non-obesogenic) rodent diet.



When mice placed on standard chow after 21 wks of HFD, those rendered obese with 55% fat diet returned to weight of age-matched controls within 10 weeks, but animals on 45% and 60% HFD did not.

# Dr. Corvera Lab - Results

- Differences in where fat deposited
  - 55% more epididymal deposition
  - 45% and 60% more SQ deposition
- Upon withdrawal of obesogenic diets, differences correlated with. . .
  - Differences in energy expenditure
  - Differences in adipocytokine profiles

# Dr. Corvera Lab - Results

- Results show that the composition of the diet that led to the accumulation of excess adipose tissue has an important effect on subsequent weight loss.
- While the diets used in these studies varied in several parameters, only the **percent saturated fat** correlated with the preferential increase in SQ adiposity, decreased energy expenditure and persistence of fat mass/weight.

# Overall Goal of PPODS



- Evaluate whether associations among consumption of saturated fat, fat deposition and weight loss observed in mice can be observed in human subjects during pregnancy and the postpartum period.



# Sp Aims PPODS - Maternal

- Investigate whether dietary composition during pregnancy, specifically percent saturated fat content, is associated with:
  1. Early (i.e., 6 mos) PPWL.
  2. Differential SQ:visceral fat deposition during GWG.
  3. Hypertrophic vs hyperplastic SQ & visceral adipose tissue growth and alterations in vascular architecture.

# Sp Aims PPODS – Maternal & Neonatal

- Investigate whether dietary composition during pregnancy, specifically percent saturated fat content, and GWG, is associated with:
  - differences in epigenetic profiles of metabolic pathway genes in neonatal and maternal tissues.

# PPODS Methods



- Observational Study
- 100 subjects recruited in pregnancy
- 80 subjects w/ complete data @ 6mos pp





# Inclusion Criteria

- English-speaking
- Singleton gestations
- Age 20-39
- Negative routine GDM screen
  - performed ~28 weeks with 50g glucola
- PNC from faculty/resident practice

# Exclusion Criteria

- (1) Age <20 or ≥ 40 years
- (2) Multiple gestations
- (3) Non-English speaking
- (4) DM1, DM2 or GDM
- (5) E/o PSA
  - tob (w/I 1 yr)
  - ETOH and/or illicit drugs
- (6) Prescriptions in preg for meds affecting weight
  - anti-hypertensives
  - hypoglycemics
  - steroids
  - anti-depressants
  - second-generation anti-psychotics
  - nicotine replacement products
  - anti-epileptics
  - thyroid-related pharmaceuticals
- (7) HIV
- (8) Hepatitis
- (9) Autoimmune disease
  - Lupus
  - Sjorgen's
  - Rheumatoid arthritis
- (10) Gastric bypass history
- (11) Eating d/o hx
- (12) initiated prenatal care after 13 wks GA

# Table of Measurements/Outcomes

	Screening/ Baseline (~28 wks) (outpt)	Delivery (inpt)	Postpartum				
			0-4d (inpt)	6 wks (outpt)	3 mos (outpt)	6 mos (outpt)	1 year (outpt)
Sign Informed Consent	X						
Interview	X		X	X	X	X	
Best Estimate of Gest. Age	X						
Confirm Inclusion/Exclusion	X						
Subject No. Assigned	X						
Demographics & Pertinent Medical History	X						
Psychosocial surveys (Mailed & completed before appoint. or given at appoint. if not brought in)**	X		X	X	X	X	
Weight measurement	X (& Height)		X	X	X	X	
Blood pressure	X		X	X	X	X	
Skin fold thickness	X		X	X	X	X	
Blood Sample	X		X	X	X	X	
Mouthwash Buccal DNA sample	X						
Placenta, umbilical cord, & umbilical cord blood		X					
24h diet & exercise recall 3 phone calls at each time point	X				X		
Breastfeeding survey			X	X	X	X	
SQ & Visceral adipose tissue biopsy (n=30, who undergo Cesarean section for obstetric indications)		X					
MRI Performed on subset of subjects only (n=30)			X*				
Evaluation or Admission Data		X					
Labor & Delivery info		X					
Neonatal & Maternal Outcomes		X					
Baby weight and length		X			X	X	X
Compensation	\$40	--	\$20 (*\$20)	\$20	\$40	\$50	

# PPODS Results

- Primary Exposure → Primary Outcome  
Diet in Preg                      PPWL
- Regression models that control for potential confounders will be used to evaluate each of the study aims

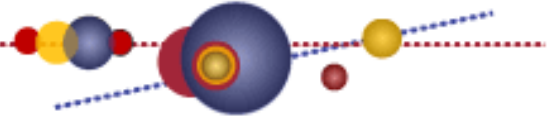
# Innovation & Significance

- **Test the hypothesis that, controlling for total number calories consumed and energy expenditure, dietary composition during pregnancy will significantly influence weight loss postpartum.**
- **Intervening for PPWL in pregnancy would take advantage of pregnancy as a unique window of opportunity when women are highly motivated to engage in behavioral change for promotion of healthy lifestyle habits, to benefit themselves and their unborn children.**

# Future

Should the study hypotheses be confirmed, findings will warrant:

- (1) return to animal models for elucidation of underlying mechanisms
- (2) development of human clinical interventions to optimize dietary intake, GWG & metabolic outcomes of pregnancy that will likely benefit mother and offspring.



# Thank you

- **Funding:**
  - UMCCTS PPP Grant