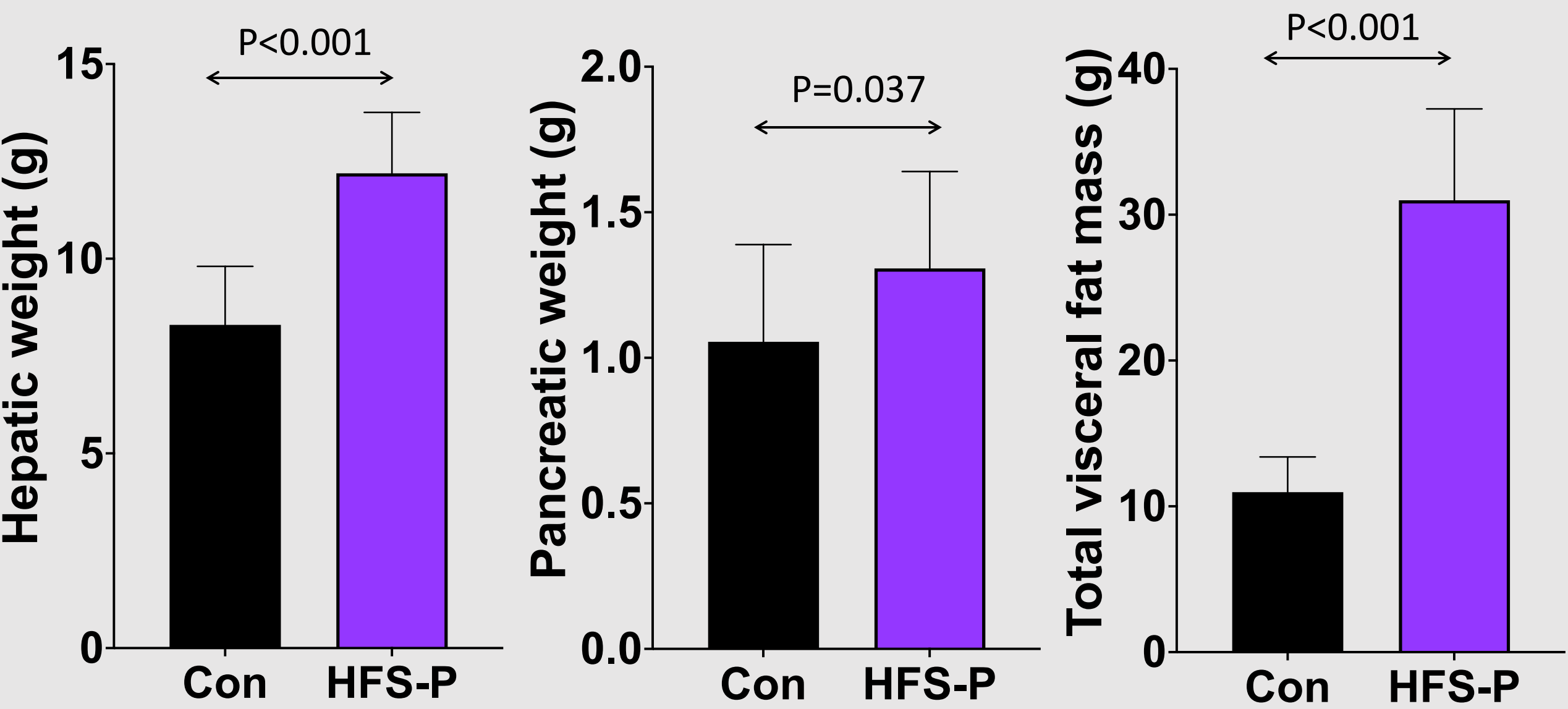


BACKGROUND

- We previously found that pregnant rats exposed to a high fat, high sucrose (HFS) diet for ≥6 weeks pre-conception (and throughout gestation) exhibited increased adiposity and pancreatic/hepatic weight compared with non-obese, non-pregnant controls (Coggin-Carr et al. *Reprod Sci* 2021)
- However, the relative contributions of the HFS diet versus the pregnant state *per se* could not be separated by design



- Objective:** To compare the effects of HFS diet and pregnancy (± potential interactions) on body composition in female rats

METHODS

- Design:** Secondary analysis of 2 unpublished animal studies
- Subjects:** 70 female Wistar rats (81d old) weighing 228±3g
- Dietary allocation:** Con (n=27) versus HFS (n=43) diet; latter received TestDiet 58V8 (consisting of 20% sucrose, providing 45% energy from fat) for 48±2d prior to mating 1:3 w/ males
- Pregnancy diagnosis:** palpation/ultrasound in mid-gestation
- Study groups:**
 - Con diet, non-pregnant (Con group, n=14)
 - Con diet, pregnant (Con-P group, n=13)
 - HFS diet, non-pregnant (HFS, n=9)
 - HFS diet, pregnant (HFS-P, n=34)
- Outcomes:** Major organ and fat depot weights at necropsy on E17-20 (or at equivalent age for non-pregnant animals)
- Statistical analysis:** Two-way ANOVA with diet (Con/HFS) and pregnancy (+/-) as fixed factors

RESULTS

Parameters impacted by diet (HFS vs. Con)

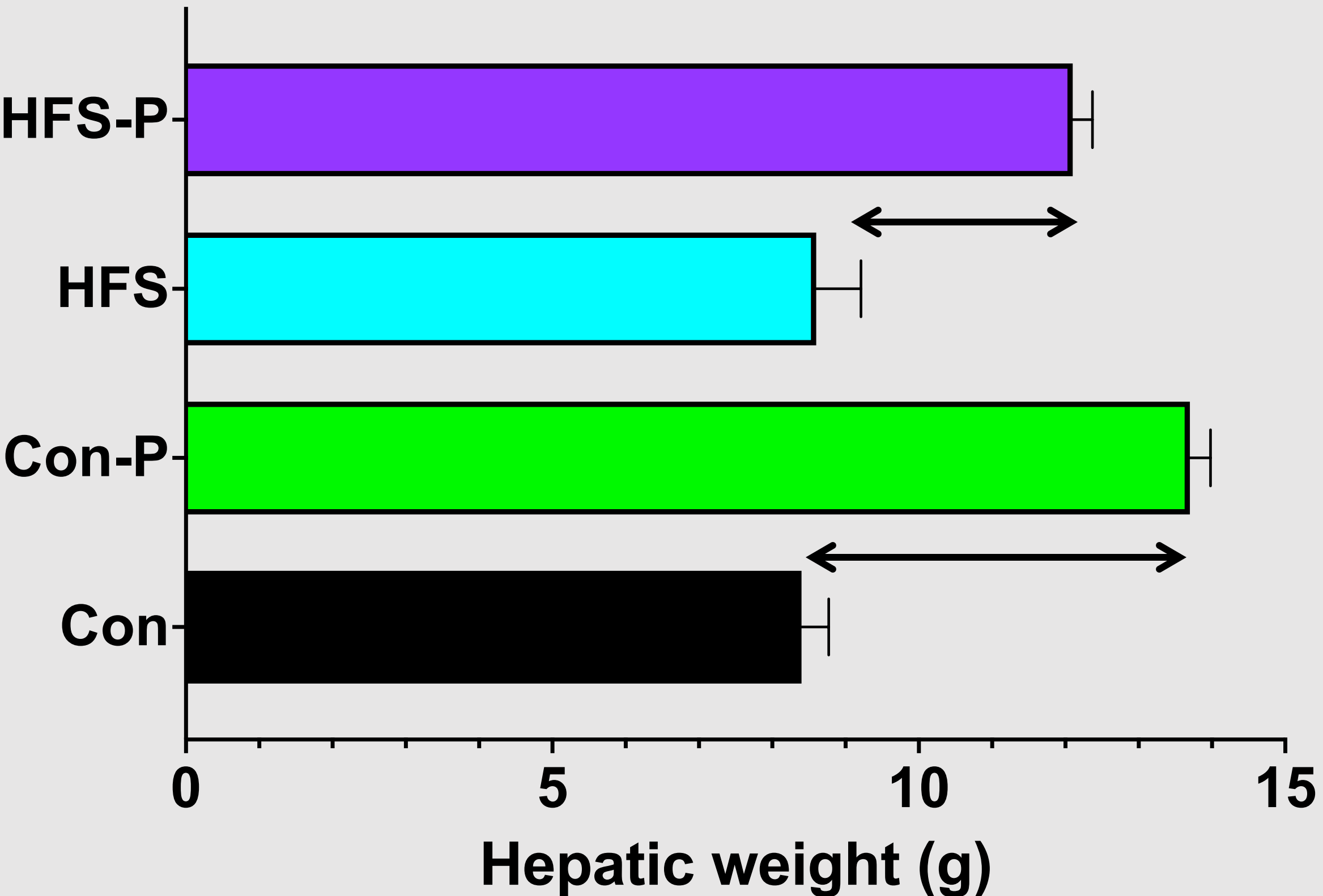
- ⬆ bodyweight at mating (327 ± 5.0 vs. 278 ± 9.1 g, $p<0.001$)
- ⬆ bodyweight at necropsy (370 ± 7.9 vs. 325 ± 7.7 g, $p<0.001$)
- ⬆ mesenteric fat mass (6.6 ± 0.47 vs. 3.7 ± 0.47 g, $p<0.001$)
- ⬆ parametrial fat mass (10.7 ± 0.60 vs. 6.2 ± 0.59 g, $p<0.001$)
- ⬆ retroperitoneal fat mass (12.5 ± 0.61 vs. 5.8 ± 0.60 g, $p<0.001$)
- ⬆ total visceral fat mass (29.8 ± 1.41 vs. 15.6 ± 1.41 g, $p<0.001$)

Parameters impacted by pregnancy (gravid vs. non-gravid)

- ⬆ bodyweight at necropsy (383 ± 6.6 vs. 278 ± 9.1 g, $p<0.001$)
- ⬆ parametrial fat mass (9.4 ± 0.49 vs. 7.3 ± 0.68 g, $p=0.015$)
- ⬆ total visceral fat mass (24.7 ± 1.17 vs. 20.7 ± 1.61 g, $p=0.046$)
- ⬆ renal weight (0.80 ± 0.019 vs. 0.64 ± 0.027 g, $p=0.001$)
- ⬆ splenic weight (1.10 ± 0.026 vs. 0.96 ± 0.036 g, $p<0.001$)
- ⬆ pancreatic weight (1.21 ± 0.04 vs. 1.08 ± 0.06 g, $p=0.09$)

Diet*pregnancy interactions

- Hepatic weight ($p=0.034$) – increased by pregnancy to a significantly lesser degree in HFS-fed dams (12.1 ± 0.27 g vs. 8.6 ± 0.61 g, $p<0.001$) as compared with Con-fed dams (13.7 ± 0.28 vs. 8.4 ± 0.37 g, $p<0.001$)



Weight (g)	Group				P Values (2-way ANOVA)		
	Con	Con-P	HFS	HFS-P	Diet	P	Diet*P
Bodyweight at mating	282 ± 5.6	273 ± 10.6	335 ± 6.9	320 ± 5.7	<0.001	0.292	0.806
Bodyweight at necropsy	278 ± 4.0	371 ± 10.8	345 ± 8.7	395 ± 8.5	<0.001	<0.001	0.058
Mesenteric fat mass	3.1 ± 0.27	4.3 ± 0.53	6.6 ± 0.51	6.6 ± 0.51	<0.001	0.365	0.334
Parametrial fat mass	4.6 ± 0.52	7.7 ± 0.64	10.2 ± 0.96	11.2 ± 0.62	<0.001	0.015	0.208
Retroperitoneal fat mass	4.6 ± 0.35	7.12 ± 0.56	12.5 ± 1.21	12.6 ± 0.64	<0.001	0.122	0.159
Total visceral fat mass	12.2 ± 1.01	19.1 ± 1.58	29.2 ± 1.86	30.3 ± 1.51	<0.001	0.046	0.170
Hepatic weight	8.4 ± 0.37	13.7 ± 0.28	8.6 ± 0.61	12.1 ± 0.27	0.089	<0.001	0.034
Pancreatic weight	1.13 ± 0.087	1.14 ± 0.067	1.03 ± 0.072	1.27 ± 0.047	0.874	0.090	0.123
Renal weight	1.00 ± 0.026	1.12 ± 0.034	0.91 ± 0.131	1.09 ± 0.018	0.191	0.001	0.434
Splenic weight	0.61 ± 0.019	0.80 ± 0.030	0.68 ± 0.033	0.80 ± 0.023	0.285	<0.001	0.245

LIMITATIONS

- Unbalanced “n” across groups due to differences in design of primary studies
- Potential confounding by fertility – mated females not conceiving may not be comparable to unmated females
- Variations in individual dietary intake unknown due to group housing (3/cage)

CONCLUSIONS

- HFS diet and pregnancy independently increased internal adiposity, although the impact of the latter was only significant for parametrial/total visceral fat
- Pregnancy impacted renal/splenic/pancreatic/hepatic weights but only its effect on the liver appeared to be additionally influenced by HFS diet exposure