

**Table S1** Organ Weights of Fathers and Adult Offspring at euthanasia

	HF/S	HF/S+M	p-value
<b>Fathers</b>			
Body Weight (g)	651.6±21.2	614.7±21.9	0.20
Organ weight (% BW)			
Heart	0.27±0.01	0.28±0.01	0.38
Liver	3.00±0.08	2.99±0.08	0.75
Kidney	0.29±0.01	0.29±0.01	0.26
Cecum	0.09±0.003	0.10±0.004	0.70
Colon	0.21±0.01	0.22±0.01	0.78
Testes	0.29±0.01	0.29±0.01	0.86
<b>Male Offspring</b>			
Body Weight (g)	666.9±6.2	672±22.7	0.20
Organ weight (% BW)			
Heart	0.28±0.01	0.27±0.01	0.30
Liver	2.70±0.07	2.67±0.04	0.90
Kidney	0.252±0.005	0.251±0.008	0.07
Cecum	0.09±0.003	0.11±0.004	0.09
Colon	0.17±0.01	0.19±0.004	0.91
Testes	0.30±0.01	0.28±0.01	0.58
<b>Female Offspring</b>			
Body Weight (g)	405.2±21.2	388.8±14.3	0.40
Organ weight (% BW)			
Heart	0.30±0.01	0.30±0.01	0.29
Liver	2.59±0.05	2.79±0.12	0.07
Kidney	0.26±0.01	0.26±0.01	0.47
Cecum	0.12±0.01	0.11±0.01	0.75
Colon	0.20±0.01	0.13±0.01	0.41

Values are means ± SEM, *n* = 8-13. Male offspring heart and female kidney were log transformed for statistical analysis.

**Table S2** Alpha Diversity at 3 Weeks of Age

	HF/S	HF/S+M	p-value
<b>Paternal</b>			
Chao1	269.77±11.47	257.04±13.85	0.49
Shannon	3.96±0.07	3.85±0.12	0.46
Simpson	0.95±0.004	0.94±0.01	0.47
<b>Male Offspring</b>			
Chao1	123.75±9.16	150.53±19.24	0.25
Shannon	3.77±0.05	3.83±0.08	0.50
Simpson	0.96±0.003	0.96±0.004	0.86
<b>Female Offspring</b>			
Chao1	179.27±20.31	173.33±11.55	0.80
Shannon	3.78±0.06	3.72±0.06	0.56
Simpson	0.95±0.003	0.95±0.004	0.29

Values are means ± SEM,  $n = 8-13$ .

**Table S3** Alpha Diversity- Week 12 for Fathers and Week 15 for offspring

	HF/S	HF/S+M	p-value
<b>Paternal</b>			
Chao1	191.48±23.52	153.09±21.42	0.24
Shannon	4.00±0.1	3.77±0.11	0.14
Simpson	0.96±0.003	0.95±0.004	0.11
<b>Male Offspring</b>			
Chao1	140.53±8.79	153.39±16.61	0.52
Shannon	3.89±0.09	3.73±0.14	0.36
Simpson	0.96±0.004	0.94±0.01	0.20
<b>Female Offspring</b>			
Chao1	148.47±23.18	154.35±16.67	0.86
Shannon	3.64±0.13	3.64±0.17	0.98
Simpson	0.95±0.01	0.94±0.01	0.55

Values are means ± SEM,  $n = 8-13$ .

**Table S4:** Experimental diet composition from weeks 3-9 and 10-16

	HF/S	HF/S+M	HF/S	HF/S+M
<b>g/kg</b>	<b>Weeks 3-9</b>		<b>Weeks 10-16</b>	
<b>Casein</b>	240	237.5	200	197.9
<b>Sucrose</b>	459.5	454.7	499.5	494.3
<b>Soybean Oil</b>	100	99	100	99
<b>Lard</b>	100	99	100	99
<b>Alphacel</b>	50	49.5	50	49.5
<b>AIN-93M Mineral Mix</b>	35	34.6	35	34.6
<b>AIN-93 VX Vitamin Mix</b>	10	9.9	10	9.9
<b>DL-Methionine</b>	3	2.97	3	2.97
<b>Choline-Bitartrate</b>	2.5	2.47	2.5	2.47
<b>Betaine</b>	0	5	0	5
<b>Choline (CDP choline)</b>	0	5.37	0	5.37
<b>Folic Acid</b>	0	0.0055	0	0.0055
<b>Vitamin B12</b>	0	0.0005	0	0.0005
<b>Energy density (kJ/g)</b>	19.3	19.1	19.3	19.1
<b>Carbohydrate (% of kcal)</b>	49.8	49.3	49.8	49.3
<b>Protein (% of kcal)</b>	11.1	11.0	11.1	11.0
<b>Fat (% of kcal)</b>	39.1	38.7	39.1	38.7

The digestible energy of high fat/ sucrose diets was 4.58 kcal/g and 4.6 kcal/g for the 3-9 and 10-16 week formulations respectively. Diets were purchased from Dyets, Inc. (Bethlehem, PA, USA). Methyl donors (Betaine, Choline, Folic Acid and Vitamin B12) were purchased from Sigma Aldrich (Oakville, ON, Canada).

**Table S5** Amplicon Context Sequence for DNMTs in adipose tissue

Gene	Amplicon Context Sequence
<b>Adipose Tissue</b>	
DNMT1	ATCGTCCTTAGCGTCGTCGTAACCTTTCTACCTGGCTCACCA CAAACCTGGGCATGGCGTAGGAGGGAGTCCTCGGTGAACCGG TTCACATTGATGGCAGAAGAGGAA CAGTGGTCTCGATCTTA TTGATCAAG
DNMT3a	GAATGATAAGCTGGAGTTGCAAGAGTGTCTGGAACACGGC AGAATAGCCAGTTCAGCAAAGTGAGGACCATTACCACCAG GTCAAACCTCCATA
DNMT3b	TTCAGGCAGTAGGAACTTAGAAGCCAGGAGACGCGAGAACA AAAGTCGAGAC GCACAACCATTGACTTTGCCGCTTCTGAGTA CTCCACACCCC
18S	<b>Forward (5'→3')</b> TGACTCAACACGGGAAACC <b>Reverse (3'→5')</b> TCGCTCCACCAACTAAGAAC

18S was used as the housekeeping gene.

**Table S6** Universal primer sequences for microRNA in liver tissue

microRNA	Universal Primer
<b>Liver</b>	
Rn_miR-21_2	CTAGCTTATCAGACTGATGTTG
Rn_miR-24_1	TGGCTCAGTTCAGCAGGAAC
Rn_miR-33_2	GTGCATTGTAGTTGCATTGCA
Rn_miR-34a_1	TGGCAGTGTCTTAGCTGGTTG
Rn_miR-103_2	AGCAGCATTGTACAGGGCTATG
Rn_miR-107_2	AGCAGCATTGTACAGGGCTATC
Rn_miR-122a_1	TGGAGTGTGACAATGGTGTTT
Rn_miR-130a_1	CAGTGCAATGTTAAAAGGGC
Rn_miR-143_1	TGAGATGAAGCACTGTAGCT
<b>Hs_SNORD68_11</b>	<b>TTTGAACCCTTTTCCATCTG</b>
<b>Hs_SNORD96A_11</b>	<b>GACATGTCCTGCAATTCTGAA</b>

Hs\_SNORD68\_11 and Hs\_SNORD96A\_11 were used as controls.