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OBJECTIVE: Offspring born to mothers with obesity have a lifetime risk of developing obesity. The mechanisms involved in the programming of obesity remain unknown. The hypothalamus, a major regulator of metabolism, is a potential link between maternal and offspring obesity. Using an established mouse model of maternal obesity, the objective of this study is to investigate the relationship between maternal obesity and early life offspring energy homeostasis.

STUDY DESIGN: Female C57BL/6 dams (n=4-6/group) were fed control or high-fat/high-sugar (OB) diets. Serial weights were recorded. Body composition was determined by qMRI. A glucose tolerance test was performed at PN21 in dams and PN28 in offspring. All other markers of energy homeostasis were measured at 6 weeks. Energy intake was measured by meal pattern analysis. Energy expenditure was determined by indirect calorimetry and activity analysis. Hypothalamic appetite signaling was measured by Lepr, Insr, Nr3c1, Npy, Pomc, and Mc4r expression using RT-qPCR. Results were analyzed by unpaired t-test with alpha $p< 0.05$. Males and females were studied separately.

RESULTS: OB dams were heavier (+25%, $p< 0.0001$) but glucose tolerant. Male (OB-M) and female (OB-F) offspring born to OB dams did not differ in weight or body composition. OB-M trended towards impaired glucose tolerance (+19%, p=0.08), increased meal number (+25%, p=0.06), and increased food consumption (+23%, p=0.09). Offspring did not differ in ambulation events but showed increased energy expenditure (+5% $p< 0.01$). OB-M had decreased expression of hypothalamic insulin receptor expression (- >10-fold, p=0.009). No other differences between groups were found in indices studied.

CONCLUSION: Exposure to maternal OB diet is associated with increased energy expenditure in both sexes and decreased hypothalamic insulin receptor expression in males despite normal weights in young offspring. We speculate these early changes reflect sex-specific compensatory metabolic mechanisms contributing to hypothalamic programming, thereby aberrant energy homeostasis, during critical windows of development.

854 Comparison of gestational diabetes mellitus (GDM) diagnostic criteria after applying stringent preanalytical laboratory sample standards

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OBJECTIVE: Internationally, there is no consensus about the optimum diagnostic criteria for gestational diabetes mellitus (GDM). This prospective study compared the characteristics and pregnancy outcomes of those diagnosed with GDM using the International Association of the Diabetes and Pregnancy Study Groups (IADPSG) criteria with those diagnosed according to the less sensitive Canadian and NICE (UK) criteria.

STUDY DESIGN: Women were selectively screened based on maternal risk factors with a 75g Oral Glucose Tolerance Test at 26-28 weeks gestation. Clinical and sociodemographic details were recorded at the first prenatal visit and Body Mass Index was calculated. Laboratory standards were strictly implemented to avoid false negative results due to preanalytical glycolysis. Women who fulfilled the IADPSG criteria for the diagnosis of GDM were referred to the multidisciplinary service for management, including pharmacological management.

RESULTS: Of the 202 women, 53.5% had GDM diagnosed based on the IADPSG criteria compared with 35.1% and 17.8% with the IADPSG, Canadian and NICE criteria respectively ($p< 0.001$). The characteristics of the study population and their outcomes analysed by OGTT result are shown in Table 1. Women treated based on the IADPSG criteria did not have a higher rate of primary caesarean section or Large-for-Gestational-Age (LGA) compared with normal women. Women with more than one risk factor and obese women were more likely to have GDM diagnosed irrespective of the criteria used. Women who met the Canadian or NICE criteria had a higher CS rate compared with normal women due to an increase in elective CS (majority due to previous CS).

CONCLUSION: With application of strict laboratory standards, the pregnancy outcomes of women treated with for GDM diagnosed according to IADPSG criteria did not differ to those women without GDM. The reduction in the LGA rate failed to reach statistical significance (p=0.056). The rate of primary CS did not differ significantly amongst any of the three diagnostic criteria groups compared to normal women.

Table 1. Comparison of maternal characteristics and delivery outcomes according to whether they fulfilled different diagnostic criteria for gestational diabetes mellitus (GDM).

	IADPSG negative (n=94)*	IAPDSG positive (n=108)	Canadian positive (n=71)	NICE positive (n=36)**
Age (years, mean, SD)	31.3 (5.3)	31.6 (5.3)	32.6 (5.1)	32.7 (5.6)
BMI (kg/m2, mean, SD)	28.9 (6.2)	32.0 (5.6)	32.2 (5.0)	34.6 (3.7)
Irish nativity (%,n)	85.1% (80)	75.9% (82)	71.8% (51)	72.2% (26)
Nullipara (%,n)	37.2% (35)	36.1% (39)	26.8% (19)	25.0% (9)
1 RF for GDM (%,n)	77.7% (73)	61.1% (66)[1a]	54.9% (39)[1b]	55.6% (20)[1a]
>/=2 RF for GDM (%,n)	22.3% (21)	38.9% (42)[1a]	45.1% (32)[1b]	44.4% (16)[1a]
Obese (%,n)	42.6% (40)	68.5% (74)[1d]	67.6% (48)[1b]	63.9% (23)[1a]
Type of GDM treatment:				
-Diet (%,n)	3.2% (3)~	50.0% (54)	39.4% (28)	45.5% (15)
-Metformin (%,n)	-	33.3% (36)	38.0% (27)	21.2% (7)
-Insulin (%,n)	-	16.7% (18)	22.6% (16)	33.3% (11)
Gestational age at delivery (weeks, mean, SD)	39.5 (1.8)	38.9 (1.5)	38.8 (1.5)	38.6 (1.6)
Birth weight (grams, mean, SD)	3425 (546)	3295 (553)	3297 (588)	3284 (574)
BW ≥ 4kg (%,n)	16.0% (15)	7.4% (8)	8.5% (6)	5.6% (2)
BW ≥ 90%ile (%,n)	7.5% (7)	3.7% (4)	5.6% (4)	2.8% (1)
CS delivery (%,n)	30.2%(28)	41.7% (45)	47.9% (34)[1a]	50.0% (18)[1a]
CS elective (%,n)	19.4%~ (18)	27.8%[§] (30)	36.6%* (26)[1a]	36.1%~ (13)[1a]
Elective CS - mean BMI	30.6 (8.4)	31.8 (4.5)	31.4 (4.7)	34.6 (4.9)
CS emergency (%,n)	10.8% (10)	13.9% (15)	11.3% (8)	13.9% (5)
Emergency CS - mean BMI	26.5 (5.1)	32.3 (8.0)	33.9 (6.6)	33.8 (7.8)
Primary CS^ (%,n)	21.5% (17)	25.0% (20)	26.5% (13)	30.0% (6)

BMI - body mass index, RF - risk factor, GDM - gestational diabetes mellitus, BW - birth weight, SD - standard deviation, CS - caesarean section, IADPSG - International Association of the Diabetes and Pregnancy Study Groups , NICE - National Institute for Health and Care Excellence (United Kingdom).
*delivery outcomes available for 93
~ diagnosed with GDM later in the third trimester at a retest
**Note for the NICE criteria, 3 women would test positive based on the 2 hour value (>/= 7.8), who did not meet the criteria for IADPSG (2 HOUR >/= 8.5), thus they did not receive treatment for GDM.
Significance is shown as follows:
Reference group: [1] IADPSG negative
P value: [a] <0.05, [b] <0.005, [c] <0.01, [d] <0.001
^Primary CS - all CS performed in women with no prior CS.