



Diabetic Mouse (*db/db*)

BKS.Cg-+ *Lepr^{db}/+* *Lepr^{db}/OlaHsd*

Reaching your goals in diabetes and obesity studies can be a challenge or a success depending on the reliability of your research models. The *Lepr^{db}* mutation was discovered in 1966 in the inbred BKS mouse strain. This model has since been well characterized as a model of Type 2 diabetes mellitus, exhibiting commonly published metabolic symptoms including hyperglycemia and hyperinsulinemia.

To ensure optimal research outcomes, continue to maintain this model on Teklad Global Diet 2018 (18% Protein Rodent Diet).

Molecular Characteristics

- + *Lepr^{db}* is an autosomal recessive mutation on chromosome 4 (14, 24)
- + Leptin receptor deficient (2, 4, 23, 27, 32, 41)

Metabolic Characteristics

- + Exhibits obesity (16, 26, 35, 36) at 3-4 weeks of age (14, 24, 29)
- + Hyperinsulinemia as early as 10-14 days (14, 16, 24, 26, 29, 30, 35)
- + Depletion of islet insulin producing β -cells (14, 24)
- + Hyperglycemia (7, 16, 18, 26, 35, 40) at 4-8 weeks of age (14, 24, 29)
- + Hyperleptinemia (3, 16, 26)
- + Hyperphagia (14), polydipsia (14, 24)
- + Polyuria, proteinuria (14, 24)
- + Hyperlipidemia (17, 18, 40)
- + Hypertriglyceridemia (6)
- + Insulin resistance (9, 15, 16, 26)
- + Hyperglucagonemia (14, 35)
- + Decreased metabolic rate (3, 24, 36)

Immunological Characteristics

- + Impaired cellular immunity (2, 4, 23, 25, 27, 41)
- + Increased levels of inflammatory cytokines (3)
- + Diminished cytokine release (2)
- + Hyperglycemia targets glycocalyx permeability (40)
- + Nonautoimmune (12)

Neurological Characteristics

- + Peripheral neuropathy (14, 18, 24)
- + Degenerating cortical cells (37)
- + Defective hypothalamus (14)
- + Poor performance in spatial memory tasks (37)

Cardiovascular Characteristics

- + Reduced insulin stimulated glucose uptake in cardiomyocytes (7)
- + Cardiac contractile dysfunction (1, 7, 26)
- + Decreased cardiac glucose oxidation (1, 16, 26)
- + Increased cardiac fatty acid oxidation (1, 15, 16, 26)
- + Reduced cardiac efficiency (15, 17)
- + Increased susceptibility to ischemia (15, 18, 26)

Hepatic and Renal Characteristics

- + Reduced procollagen, keratin associated protein and keratin complexes gene expression (29)
- + Decreased expression of growth hormone (31)
- + Increased kidney weight due to hyperfiltration, albuminuria and glomerular hypertrophy (31)
- + Thickening of glomerular basement membrane (14)
- + Portal endotoxemia (3)
- + Hyperphagia (3, 24, 35, 36)
- + Disrupted intestinal barrier function (3)
- + Decreased levels of forkhead box O1 in kidneys (31)
- + Increased nephric and hepatic insulin-like growth factor binding protein 1 mRNA (31)
- + Nephropathy (18)
- + Enhanced intestinal monoacylglycerol acyltransferase 2 activity (6)
- + Pancreatitis (18)
- + Increased immunoglobulin and complement in mesangium (14, 24)

Additional Characteristics

- + Infertility (14, 24)
- + Diminished growth factor release (2, 29)
- + Decreased levels of insulin-like growth factor-1 (2, 31)
- + Increased minor glycosylated hemoglobin (14)

Research Use

- + Diabetes mellitus type II (2, 5, 9, 16, 18, 21, 29, 31, 34, 35, 40)
- + Obesity (6, 19)
- + Tissue repair (29)
- + Steatosis (3)
- + Leptin endocrinology (4, 8, 27, 28, 31, 36, 37)
- + Leptin treatment (10, 11, 36)
- + Therapeutics (1, 2, 5, 7, 9, 13, 19, 20, 21, 22, 30, 33, 34, 35, 38, 39)

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