Diabetic Mouse (db/db)

BKS.Cg-+ Lepr\textsuperscript{db}+/+ Lepr\textsuperscript{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\textsuperscript{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\textsuperscript{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 nephrin 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)
REFERENCES


11. Leptin inhibits directly glucocorticoid secretion by the rat adrenal gland. Endocrinology, 139, 4264-4268.

