ENVIGO

Research Models and Services

Metabolics – Mutant Mice

Obese Mouse

Obese ob/ob – B6.V-*Lep*^{ob}/OlaHsd

Reaching your goals in obesity studies can be a challenge or a success depending on the reliability of your research models. The *Lep*^{ob} mutation was discovered in 1949 in an outbred mouse stock and was subsequently transferred to a C57BL/6 background. This model has since been well characterized as a model of obesity, exhibiting commonly published metabolic symptoms including hyperinsulinemia and hyperphagia.

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

Molecular Characteristics

+ *Lep*^{ob}, autosomal recessive mutation, chromosome 6 (14, 39)
+ Leptin protein deficient (1, 4, 5, 15, 19, 30, 34, 43, 49, 50)

Metabolic Characteristics

+ Obesity (19, 20, 21, 34, 42, 43, 44, 49) at 4 weeks of age (14, 27)
+ Hyperlipemia (49)
+ Hyperinsulinemia (1, 3, 14, 21, 25, 36, 42) days after birth (18)
+ Moderate hyperglycemia (1, 14, 23, 25, 42, 44, 48) at 6 weeks of age, attenuation at 18 months due to ß-cell hyperplasia (18)
+ Insulin-resistance (1, 3, 18, 19, 20, 23, 25, 36, 37, 47) in liver (49)
+ Decreased metabolic rate (1, 3, 4, 19, 34, 43, 44)
+ Reduced body temperature (3, 14, 19, 21, 34)
+ Hyperphagia (3, 4, 14, 19, 20, 21, 36, 42, 43, 48)
+ Hyperglucagonemia (42)

Adipose Characteristics

+ Adipocyte hyperplasia (14) and hypertrophy (5)
+ Adiponectin levels (35)
+ Increased adipose 11-hydroxysteriod dehydrogenase type 1 (32)
+ Increased adipose suppressor of cytokine signaling protein 3 mRNA expression (11)

Cellular Characteristics

+ Decreased mitochondrial biogenesis (46)
+ Reduced endothelial nitric oxide synthase expression (46)
+ Increased endoplasmic reticulum associated acetyl-CoA (49)
+ Decreased insulin receptor, insulin receptor substrate-1 and insulin receptor substrate-2 gene expression (49)

Hepatic and Renal Characteristics

+ Portal endotoxemia (4)
+ Disrupted intestinal barrier function (4)
+ Inhibited development of nephrotoxic nephritis (44)
+ Increased hepatic triglyceride concentration (48, 49)
+ Increased hepatic diacylglycerol acyltrasferases (48)
+ Increased hepatic cholesteryl ester contents (49)
+ Increased hepatic expression of glucokinase, phosphofructokinase, pyruvate kinase, fatty acid translocase (CD36), plasma membrane fatty acid binding protein (49)
+ Increased hepatic *de novo* lipogenesis (49)
+ Increased hepatic stearoyl-CoA desaturase-1 enzyme (3)

Immunological Characteristics

+ Increased levels of inflammatory cytokines (4, 46)
+ Thymic atrophy (5, 30, 50)
+ Impaired cellular immunity (5, 8, 19, 29, 30, 44, 50)
+ Reduced interferon γ (26, 50)
+ Starvation induced lymphoid atrophy (19)
+ Severely delayed wound healing (21)
+ Reduced splenic weight (5, 50)
+ Resistant to experimental autoimmune encephalomyelitis (50)
+ Hypercoticosteronemia (19)
+ Increased cortisol levels (44)
+ Obesity induced inflammation (7, 8, 31, 33)
+ Stress pathways (28, 33, 38)

Additional Characteristics

+ Suppression of gonadal and thyroid axis (19)
+ Infertility (18, 20, 43), homozygous females are sterile (14, 27)
+ Enlarged islets of Langerhans (14)
+ Deficient in islet amyloid (18) and pancreatic polypeptide (14)
+ Regulation of hypothalamic malonyl-CoA (52)
+ Increased plasma apolipoprotein A-I, apolipoprotein A-II (21)

Research Use

+ Diabetes (1, 11, 18, 40, 41, 42, 49)
+ Obesity (2, 5, 7, 11, 13, 31, 33, 46)
+ Steatosis (4, 5, 48)
+ Immunology (7, 8, 11, 12, 19, 26, 29, 30, 33, 43, 46, 50, 51)
+ Nutrition (4, 21, 24, 47)
+ Leptin endocrinology (9, 30, 39, 44, 51)
+ Leptin treatment (2, 10, 19, 20, 21, 26, 28, 36, 43, 52)
+ Therapeutics (3, 6, 15, 17, 22, 23, 25, 31, 34, 35, 37, 38, 40, 41, 42, 47)
+ Neurology (9, 13, 24)
+ Muscle function (22, 25, 28, 46)
+ Imaging (5, 16, 45)

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Envigo RMS Division, 8520 Allison Pointe Blvd., Suite 400, Indianapolis, IN 46250, United States