Origin:
The SJL mouse is a Swiss mouse, inbred by James Lambert in 1955 from Swiss-Webster stock from three different sources that were brought to the Jackson Laboratory between 1938 and 1943. Pen-bred until 1955, when sib-mating was started.

- **SJL/JCrHsd**
  From Harlan Sprague Dawley, Inc., to Harlan Nederland in 1998.

- **SJL/JHanTmHsd**
  To Central Institute for Laboratory Animal Breeding, Hannover, Germany in 1981 at F93. In 1994, to Harlan UK through acquisition.

- **SJL/JOlaHsd**
  Obtained by the Clinical Research Centre, Harrow from the Jackson Laboratory, Bar Harbor in 1975, to OLAC, now Harlan UK, in 1977.

Research Applications
Hodgkin disease, aggression, reticulum cell sarcomas, amyloidosis, immunology.

Characteristics:
Although the strain has been developed relatively recently, it has rapidly become widely used owing to the high incidence of reticulum cell sarcomas resembling Hodgkin's disease.

- **Animal Model**
The SJL mouse is an animal model for Hodgkin’s disease (Kumar, 1983).

- **Anatomy**
  Low brain weight (Storer, 1967). Low brain weight, small spinal cord (Roderick et al., 1973). Cerebellum has no intraculminate fissure between vermian lobule IV and vermian lobule V (the ventral and dorsal lobules of the culmen) (contrast DBA/2) (Cooper et al., 1991). Low percent carcass lipid on a high-fat diet (West et al., 1992). Low retinal ganglion cell number (Williams et al., 1996). High bone density of femur (Beamer et al., 1996). Correlation between the organisation of the hippocampus and behaviour in nine strains and three F1 hybrids (Roullet et al., 1990).

- **Behaviour**
  High spontaneous fighting (Page and Glenner, 1972). Severe fighting among males housed together, beginning at about 8 weeks. Most males will be killed by 4-5 months unless caged separately (Crispens, 1973). Very sensitive to the induction of ataxy by diazepam. A comparative study of the sensitivity to different effects by diazepam (Crabbe et al., 1998).

- **Drugs**
  Resistant to skin ulceration by DMBA (Thomas et al., 1973). Resistant to induction of subcutaneous tumours by 3-methylcholanthrene (Kouri et al., 1973; Whitmire et al., 1971).
Urethra only slightly leukemogenic, but 7, 12-dimethylbenzanthrene increased lymphocytic neoplasms from 2% to 83% in young mice (East, 1970; Harangohe et al., 1967). Resistant to X-irradiation (Roderick, 1963). Poor ovulatory response to 3 I.U. and 7 I.U of PMS, but response facilitated by exposure to males at latter dose rate only (Zarrow et al., 1971). Resistant to hyperbaric oxygen (Hill et al., 1968) Short survival in 90% oxygen (Lieberman and Kellog, 1967). Resistant to X-irradiation as judged by the LD₃₀ (Yuhas and Storer, 1969). Susceptible to induction of splenic amyloidosis by injection of casein (Clerici, 1972). Susceptible to induction of lymphoid and myeloid leukaemia by DMBA (Crispens, 1973). Resistant to biliary tract injury following oral dosing with 500 micrograms of the fungal toxin sporidesmin (Bhathal et al., 1990). Airways hyporeactive to acetylcholine (Zhang et al., 1995). Susceptible to ozone-induced decreases of tracheal potential (Takahashi et al., 1995). Low voluntary consumption of morphine in two-bottle choice situation (Belknap et al., 1993). Susceptible to weight loss induced by cocaine, but this is attenuated by anisomycin (cf C3H, CBA) (Shimosato et al., 1994).

- **Genetics**
  Coat colour genes – A, B, c, D, p : albino.
  Histocompatibility – H-2ₐ.
  Biochemical markers – Apoa-1ᵇ, Car-2ᵇ, Es-1ᵇ, Es-2ᵇ, Gpi-1ᵃ, Hbbᵇ, Pep-3ᵇ, Pgm-1ᵇ, Pgm-2ᵇ, Trfᵇ.
  Carries the pink-eyed dilution gene, p, which is derived from Asian mice of the *Mus musculus* type (Brilliant et al., 1994). This strain carries the *Mus musculus domesticus* Y-chromosome, while others have the *M. m. musculus* type (Nishioka, 1987).

- **Growth Chart**

  ![](chart.png)

  **SJL/JCrHsd** – Harlan Nederland

- **Immunology**

Immune response to type-III pneumococcal polysaccharide declines by 42 weeks, in contrast to BALB/c and C3H (Smith, 1976). Susceptible to induction of experimental autoimmune thyroiditis (Vladutiu and Rose, 1971). Thymocytes exhibit a periodicity (5-9 days) in their response to hormonal stimulation with isoproterenol. This is expressed in large changes in the intensity of the response (peak levels of intracellular cAMP which vary approximately 6-fold), and in the response pattern, i.e., in the occurrence or non-occurrence of an immediate hormone-induced desensitisation. In contrast, C57BL/6 thymocytes have a homogeneous response pattern (Riven-Kreitman et al, 1990). Resistant to immunosuppression of contact hypersensitivity by ultraviolet B light (Noonan and Hoffman, 1994). Low natural killer cell response to the immunostimulent 7-allyl-8-oxoguanosine (Pope et al, 1994). Has defective T cell receptor-induced interleukin-4 production and absence of T-cells with the NK1.1 antigen. However, natural-killer-like T-cells develop normally in spite of these defects (Beutner et al, 1997). Mast cells grow faster in culture and have more than twice the amount of histamine and TNF-alpha in their granules than BALB/c (Bebo et al, 1996). High level of serum complement C5 (Lynch and Kay, 1995). In SJL, NK1.1$^+$ T cells, a specialized set of T cells that recognize CD1, accumulate in the liver at ageing. (Murakami et al, 1998). Sensitive to the induction of lupus autoimmunity by peptide immunisation in contrast with other strains (James and Harley, 1998).

**Infection**

Develop flaccid paralysis and survivors develop a distinct neurological disorder associated with marked mononuclear cell infiltration and active demyelination in spinal cord after intracerebral inoculation with Theiler's encephalomyelitis virus. Incubation period may be 2-3 months (Lipton and Dal Canto, 1976). Resistant to street rabies virus (SRV) injected via the intraperitoneal route (Perry and Lodmell 1991). Develops herpes simplex encephalitis (HSE) resembling the human condition, following intranasal infection with a neurovirulent clinical isolate of herpes simplex virus type 1 (contrast 9 other strains) (Hudson et al, 1991). Resistant to carditis on infection with Lyme borreliosis (Borrelia burgdorferi) (contrast C3H, SWR, BALB/c) (Barthold et al, 1990). High eosinophilia on infection with the helminth Mesocestoides corti and highly susceptible to infection with the parasite. Larval burdens at 21 days after infection with 100 tetrathyridia being considerably higher (greater than 1000) than all other strains except NIH, which was comparable. (Lammis et al, 1990). Susceptible to infection by Helicobacter felis with moderate to severe chronic active gastritis in the body of the stomach, which increased over time (Sakagami et al, 1996).

Life-span and Spontaneous Disease

Short life-span in conventional conditions (8/22 = 472 days in males, 3/22 = 395 days in females). High gross tumour incidence (Storer, 1966). Reticulum cell sarcomas appear in about 90% of animals at an average age of about 13 months (Murphy, 1963; Crispens, 1973; Fujinaga et al, 1970). These first appear in the Peyer's patches and mesenteric lymph nodes and later in the spleen, liver, thymus and other lymph nodes (Crispens, 1973). Most of the tumours are pleomorphic or mixed-cell types commonly called type-B reticulum cell neoplasms by Dunn, but a few are type-A histiocytomas. The unusual feature of the SJL reticulum cell tumours is their regular and early appearance, with the preneoplastic lesion detectable as early as 22 days (Potter, 1972). Tumour development as well as autoimmunity may result from an effective amplification of the immune response (Owens and Bonavida, 1976). Leukaemia 83% (Myers et al, 1970). High incidence of spontaneous amyloidosis, possibly associated with fighting (Page and Glenner, 1972). Develops gamma-1 and gamma-2 paraproteinaemia (Wanebo et al, 1966).

Hyperplastic neuroretinopathy and disorders of pigment epithelial cells with a high incidence of subretinal tumour is present at 9 days (Caffe et al, 1993). Disease patterns and life-span in ageing mice have been described by Myers (1978).

Physiology and Biochemistry

Resistant to the development of atherosclerosis on a semi-synthetic high fat diet (Nishina et al, 1993). High intrinsic myogenicity of muscle cells both in-vivo and in-vitro (Maley et al, 1994; Mitchell et al, 1995). Genetic study to compare the reaction of SJL and eight other strains to high-fat and high-cholesterol diets (Paigen, 1995)

- **Miscellaneous**
  General biological data on the strain have been reviewed by Crispens (1973). The relationship of genotype, sex, body weight, and growth parameters to lifespan in inbred and hybrid mice is described by Ingram et al (1982). Characteristics of the SJL strain have been described by Festing (1997) and Lyon et al, (1996).

- **Reproduction**
  When females were mated to BALB/cBm males to determine the role of the maternal genome in the sex reversing non-disjunction of the Y chromosome, SJL/J females produced 39.5-41.5% males and 2.4-2.8% hermaphrodites (Whitten et al, 1991).

References:


