129

129S2/SvHsd

Developed by Dunn at Columbia University in 1928 from a cross of coat color stocks and a chinchilla (Tyr<sup>−/−</sup>) stock from Castle. Strain 129 has a common origin with strain 101. In 1945, this strain was passed to Russell at the Jackson Laboratory, Bar Harbor. This stock was maintained segregating at the Tyr locus, such that the coat color of the mice were either albino or light chinchilla. In 1947, to Hunt at Michigan State and in 1948 again introduced at the Jackson Laboratory (129/ReJ) after a forest fire.

In 1953, to LC Stevens at the Jackson Laboratory. Stevens initially studied the genetic basis of testicular teratomas in mice of the 129 parental strain. To determine the cellular origin of teratomas, he performed outcrosses to introduce onto 129 background mutations that affect gonads or germ cells. This led to the "Steel" and "Ter" substrains. The Steel substrains originated from an outcross to C3H-MgfSl-J, followed by 12-14 generations of backcrossing to 129/Sv. The resulting mice are pigmented white-bellied agouti. The steel-J mutation increased the teratoma incidence to 10%. From Glaxo-Welcome to Harlan Laboratories. Harlan became Envigo in 2015, then Envigo was acquired by Inotiv in 2021.

NOMENCLATURE

There is substantial genetic variation among substrains of strain 129 (Simpson et al, 1997; Threadgill et al, 1997). Therefore, the Committee on Standardized Genetic Nomenclature for Mice has approved a new nomenclature for strain 129 (Festing et al, 1999). The new nomenclature is based on the substrains identified and defined in terms of microsatellite markers by Simpson et al (1997). A letter and a number have been introduced in front of the slash that will identify each of the substrains. The letter is either P, S, T or X indicating whether it is a 'Parental', 'Steel', 'Ter' (susceptible to teratomas) or genetically-contaminated "X" substrain, respectively.

The major parental lineages include:
- 129P - derived from the original parent strain
- 129S - derived from a congenic strain made by outcrossing the steel mutation
- 129T - derived from the 129 congenic that originally carries the teratoma mutation
- 129X - derived from a genetically-contaminated "X" substrain

Therefore the 129/OlaHsd strain is renamed into 129P2/OlaHsd and 129/SvHsd is renamed into 129S2/SvHsd. The choice of a particular substrain may be of critical importance for a particular project.

RESEARCH APPLICATIONS

Transgenesis, testicular teratomas.

CHARACTERISTICS

Strain 129 is useful for ovary transplant and ova transfer studies. It is best known for the high incidence of testicular teratomas, but more recently it has been the most widely-used strain in the production of targeted mutations due to the availability of several lines of embryonic stem cells.

Anatomy


Behavior

Drugs

Infection
Carries no detectable endogenous ecotropic MuLV DNA sequences (Jenkins et al., 1982). Intermediate sensitive to Yersinia enterocolitica, while C57BL/6 is resistant and BALB/c is sensitive (Bohn et al., 1998).

Life-span and spontaneous disease
Low overall tumor incidence (7% in males, 21% in females), including lymphoma 2% in males and 7% in females, soft tissue sarcomas 2% in males and 1% in females and benign tumors 2% in males and 3% in females (Smith et al., 1973). Lung tumors 4-46% (Festing and Blackmore, 1971). Testicular teratomas about 1% in most substrains, but 30% in the terSv strain (Stevens, 1973). Incidence of teratomas increased in p53-deficient mice (Harvey et al., 1993). The Ter gene has been mapped to chromosome 18 (Asada et al., 1994). High incidence of urinary calculi (Russell and Meier, 1966). A review of the life span of aging mice has been described by Myers, (1978). Median life-span 22.9 months in 129P3/J males and 21.6 months in 129P3/J females (Storer, 1966). Median life-span 27.3 months in 129P3/J males and 24.3 months in 129P3/J females (Smith et al., 1973). Median life-span 23.3 months in 129/RdLac males and 22.3 months in 129/RdLac females (Festing and Blackmore, 1971).

Immunology
High lymphocyte phytohemagglutinin response (Heiniger et al., 1975). Responder to synthetic polypeptide (Glut3, Lys38, Ala3) (Pinchuck and Maurer, 1965). Erythrocytes have a high agglutinin ability (Rubinstein et al., 1974). High responder to Dextran (Blomberg et al., 1972). Experimental systemic lupus erythematosus including severe ocular changes and blepharitis can be induced by injection of human monoclonal anti-DNA antibodies (Chan et al., 1995).

Genetics
Coat color genes
- Aw, C, P, white-bellied agouti. Substrain 129P2/OlaHsd differs from 129S2/SvHsd at many loci, particularly those on chromosome seven, which has the albino and pink-eyed dilute loci. This strain carries the Mus musculus Y-chromosome, while others have the M. m. domesticus type (Nishioka, 1987).

Miscellaneous
Recommended host for transplantable tumor hemangiendothelioma BW6473 (Kaliss, 1972). The E14 clone of embryonic stem cells was derived from mice of 129P2 substrain. (Hooper et al., 1987; Papaioanou and Johnson, 1993). Substrain 129S2 is widely used in gene targeting experiments because most of the available embryonic stem cell lines have been developed from strain 129S2. The D3 clone of embryonic stem cells was derived from mice of this substrain (Doetschman et al., 1985; Papaioanou and Johnson, 1993). Characteristics of the 129 strain have been described by Festing (1997) and Lyon (1996).

Production
Poor breeding performance, colony output 0.8 young/female/wk, litter size at weaning 4.5 (Festing, 1976).
REFERENCES


42. Weisbrod RS (1973) Inheritance of plasma cholesterol levels in mice. Genetics 73, 331-332.

