ENVIGO

Research Models and Services

Inbred Mice

DBA/1

Origin

Developed in 1909 by CC Little from mice used in color experiments and this strain is the oldest of all inbred strains of mice. The DBA is the oldest of all inbred strains of mice.

In 1929-30, crosses were made between sub-lines, and several new lines established; two of these were called 12 (now DBA/1) and 212 (now DBA/2). In 1955, from the Jackson Laboratory, to Laboratory Animals Centre, Carshalton, UK.

DBA/1OlaHsd

In 1979, from Laboratory Animals Centre to OLAC (now Envigo).

Research applications

Coat color, behavior, immunology, type II collagen-induced arthritis, etc.

Characteristics

Anatomy

Low brain weight (Storer, 1967). High erythrocyte count, low mean corpuscular volume (Russell *et al*, 1951). Large number of Peyer's patches (Hummel *et al*, 1966).

Behavior

High food drive and high open-field activity (Thompson, 1953). Low open-field activity (Bruell, 1964). Good performance in food-seeking task (Henderson, 1970). Low preference for sweet tasting substances (saccharin, sucrose, dulcin and acesulfame, averaged) (Lush 1988). Bad performance in shuttle box test compared to DBA/2 (Yanovsky *et al*, 1995).

Drugs

Resistant to skin ulceration by DMBA (Thomas *et al*, 1973). Resistant to induction of subcutaneous tumors by 3-methylcholanthrene (Kouri *et al*, 1973; Whitmire *et al*, 1971). Sensitive to X-irradiation (Roderick, 1963). Males have a long sleeping time under hexobarbital (Lovell, 1976), long sleeping time under pentobarbitone anesthetic (Lovell, 1986). Insensitive (eosinophil response) to cortisone acetate (Wragg and Speirs, 1952). Sensitive to teratogenic effect (cleft palate) by cortisone acetate (Kalter 1981). Sensitive to seizures induced by nicotine (Marks *et al*, 1989). Clonidene induces a strong aggressive behavioral response (Nikulina and Klimek, 1993).

Genetics

Coat color genes dilute brown.	- *a, b, C, d* : non-agouti,
Histocompatibility	- *H-1^{a}, H-2^{q}, H-3^{b}, Thy-1^{b}.*
Biochemical markers	- *Apoa-1^{b}, Car-2^{a}, Es-1^{b}, Es-2^{b}, Es-3^{c}, Gpd-1^{a}, Gpi-1^{a}, Hbb^{d}, Idh-1^{b}, Ldr-1^{a}, Mod-1^{a}, Pep-3^{b}, Pgm-1^{b}, Trf^{b}.*

Although the DBA/1 and DBA/2 are substrains of the DBA there are differences between these strains, probably due to a substantial residual heterozygosity following the crosses between the substrains. DBA/1 and DBA/2 differ at least at the following loci: *Car-2, Ce-2, Hc, H-2, If-1, Lsh, Tla*, and *Qa-3*. With such large differences, they should probably be regarded as different strains rather than substrains of the same strain.

Immunology

Low lymphocyte phytohemagglutinin response (Heiniger *et al*, 1975). Poor immune response to ovomucoid, but good response to ovalbumin (Vaz *et al*, 197l). Good primary immune response to bovine serum albumin (James and Milne, 1972). Good

primary immune response to sheep erythrocytes (Ghaffar and James, 1973). Non-discriminator between `H' and `L' sheep erythrocytes (McCarthy and Dutton, 1975). Poor immune response to $(Pro\text{-}Gly\text{-}Pro)_n$ (Fuchs *et al*, 1974). High susceptibility to IgG_1-mediated but low susceptibility to IgE-mediated passive cutaneous anaphylaxis (De Souza *et al*, 1974). Good immune response to *Salmonella strasbourg* lipopolysaccharide (Di Pauli, 1972). Erythrocytes have a high agglutinability (Rubinstein *et al*, 1974). The DBA/1 was found to be useful on type II collagen-induced arthritis (Courtenay *et al*, 1980; Watson *et al*, 1985). Oral administration of Lactobacillus casei has a suppressive effect on type II collagen-induced arthritis in DBA/1 mice (Kato, 1998). *Staphylococcal enterotoxin* B induces arthritis in female DBA/1 mice but fails to induce activation of type II collagen-reactive lymphocytes (Omata *et al*, 1997). Study of the production of different cytokines during the development of collagen-induced arthritis (Mussener *et al*, 1997).

Infection

Susceptible to *Mycoplasma fermentens* (Gabridge *et al*, 1972). Resistant to *Plasmodium berghei* infection (Most *et al*, 1966). High mortality in a natural epizootic of ectromelia (Briody, 1966). Rapid immunological expulsion of *Trichinella spiralis worms* (Wakelin and Donachie 1980). Susceptible to *Leishmania* infection (Bradley, 1977). Resistant to Cryptococcus neoformans due to Hc^1 allele (Rhodes *et al*, 1980). Susceptible to the development of chronic Chagas' cardiomyopathy in postacute *Trypanosoma cruzi* infection (Rowland *et al*, 1992). Infection with larval *Echinococcus multilocularis* by transportal injection of hyatid homogenate results in a multivesiculation form of hyatid development. Protoscoleces are well developed (Nakaya *et al*, 1997). Sensitive to WA1 (Babesia-like piroplasm) (Moro *et al*, 1998). Sensitive to cytomegalovirus (Price *et al*, 1990).

Life-span and spontaneous disease

Median life-span 14.4 months in DBA/1 males and 25.0 months in DBA/1 females (Storer, 1966). Median life-span 16.2 months in DBA/1 males and 24.0 months in DBA/1 females (Festing and Blackmore, 1971).

Primary lung tumors 3% in males, 1% in breeding females and zero in virgin females; lymphatic leukemia less than 1%. Mammary adenocarcinomas zero in males, 90% in breeding females and 61% in virgin females in unfostered substrain (Hoag, 1963).

A high proportion of the mammary tumors are of the acinar type (Tengbergen, 1970). Lung tumors 2-27% (Festing and Blackmore, 1971). Low gross tumor incidence in males (Storer, 1966). Mammary changes in female DBA/1 mice have been described by Orellana *et al* (2000).

Miscellaneous

DBA/1 mice are resistant to most of the DBA/2 tumors; lymphatic leukemia P1534 grows in 50% of DBA/1 mice, melanoma S91 grows in both strains (Staats, 1985). Recommended host for the following transplantable tumors: anaplastic carcinoma dbrB, mammary adenocarcinomas CaDl and T1703, melanoma S91 and pleomorphic sarcoma S37 (which is not host-specific) (Kaliss, 1972). An embryonic stem cell line has been developed by Roach *et al* (1995). High incidence of spontaneous `deviants' (possible mutations) (Schlager and Dickie, 1967). Characteristics of the DBA/2 strain have been described by Festing (1997) and Lyon *et al*, (1996).

Physiology and biochemistry

High serum ceruloplasmin levels (Meier and MacPike, 1968). High plasma cholinesterase activity in females (males not measured) (Angel *et al*, 1967). Low liver tyrosine aminotransferase in fasted mice (Blake, 1970). Low cell turnover as estimated by slow clearance of DNA-bound radioactivity (Heiniger *et al*, 1972). Low venous and arterial blood pH (Bernstein, 1966). A comparative study of the *in vitro* development of embryos (Suzuki *et al*, 1996)

Reproduction

Poor breeding performance, colony output 0.77 young/female/week, litter size 4.4 weaned (Festing, 1976).

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