ENVIGO

Research Models and Services

Inbred Mice

NZW (New Zealand White)

Origin

Outbred mice from Imperial Cancer Research Fund, London, to University of Otago Medical School in 1930. Inbred by Bielschowsky in 1948. A number of other strains, including NZO, NZC, NZX and NZY, were developed from the same stock (Bielschowski and Goodall, 1970). Strain NZW was derived from the same outbred stock, but was inbred independently by Hall (Hall and Simpson, 1975).

NZW/OlaHsd

Hall, Otago University, New Zealand to Laboratory Animals Centre, Carshalton in 1964. To OLAC (now Envigo) in 1979.

Research applications

Autoimmunity

Characteristics

Strain widely used as the NZB x NZW F1 hybrid, giving a model of systemic lupus erythematosus. Syndrome includes typical lupus erythematosus cells, antinuclear antibody, hemolytic anemia, proteinuria with casts and terminal nephrosis with renal failure before 8 months (Milich and Gershwin, 1981). Incidence and severity of the disease is greater in females than males (Dubois *et al*, 1966).

Anatomy

High incidence of exencephaly reported by Vogelweid *et al* (1993). NZW mice are an additional model for studying the pathogenesis of neural tube defects (Vogelweid *et al*, 1993). High retinal ganglion cell number (Williams *et al*, 1996). The comparative study of the thymus in autoimmune and normal strains, revealed that important changes of the large medullary epithelial cells, involved in the formation of Hassall's corpuscles, occur in NZB, NZW and (NZB x NZW)F1 mice (De Vries and Hijmans, 1967).

Behavior

High within-strain aggression. Litter mate males housed together often fight severely by six-eight weeks (original observation). This strain is very aggressive in the different aggressivity tests, compared with seven other strains (Jones *et al*, 1987). High balsa-wood gnawing activity (Fawdington and Festing, 1980).

Drugs

Short sleeping time under hexobarbital anesthetic (Lovell, 1976), short sleeping time under pentobarbitone anesthetic, Lovell (1986). Phenobarbital i.p. induces hepatic epoxide hydrase (Oesch *et al*, 1973).

Genetics

Coat color genes	- *A, b, c, p* : albino.
Histocompatibility	- *H-2*^{z}.
Biochemical markers	- *Apoa-1*^{a}, *Es-1*^{b}, *Es-2*^{b}, *Gpi-1*^{a}, *Hbb*^{d}, *Pep-3*^{b}, *Pgm-1*^{b}.

This strain carries the *Mus musculus musculus* Y-chromosome, while others have the *M. m. domesticus type* (Nishioka, 1987).

Immunology

Serum antinuclear factor found in 12% of animals (Barnes and Tuffrey, 1967). The TCR beta-chain locus of NZW mice carries an 8.8-kb deletion which encompasses the C beta 1, D beta 2, and all six J beta 2 gene segments Studies suggest that D beta 2 and J beta 2 gene segments are required to maintain a diverse T cell repertoire and that their deletion from the genome may confer a significant selective disadvantage in the wild (Woodland *et al*, 1990). Resistant to immunosuppression of contact hypersensitivity by ultraviolet B light (Noonan and Hoffman, 1994).

Infection

The NZW strain is intermediate sensitive to infection by *Leishmania tropica* (Nacy *et al*, 1983)

Life-span and spontaneous disease

Median life-span 26.7 months in NZW males and 24.4 months in NZW females. Lung tumors 2-24%, lymphatic leukemia 3-29% and heart defects 2-24% (Festing and Blackmore, 1971).

Miscellaneous

Characteristics of the NZW strain have been described by Festing (1997) and Lyon *et al*, (1996).

Physiology and biochemistry

Deficient in eosinophil peroxidase, one of the enzymes in the eosinophil-specific granules, resembling the similar condition in humans (Ohmori *et al*, 1996).

Reproduction

Intermediate breeding performance, colony output 1.00 young/female/ week, litter size at weaning 4.1 (Festing 1976). Poor breeding performance (Hansen *et al*, 1973).

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