ACI (August Copenhagen Irish)

ACI/SegHsd

Developed in 1926 by Curtis and Dunning, Columbia University Institute for Cancer Research, after accidental mating between an August male with an Irish coat and a COP (Copenhagen 2331) female (Russell-Lindsay, 1979). To Heston in 1945, then to National Institute of Health, Bethesda, USA, in 1951 at F41 (Hansen et al, 1981). Derived from a nucleus colony obtained from Dr. A. Segaloff's colony at the Ochsner Medical Center, Jefferson, Louisiana, USA.

RESEARCH APPLICATIONS

Hepatitis, P-450, locomotor activity, alcohol, spontaneous tumors of endocrine glands, congenital malformations, stomach tumors.

CHARACTERISTICS

Animal model

The ACI rat is an animal model for congenital genitourinary anomalies (Marshall and Beisel, 1978). A diet deficient in choline and methionine has been used to develop a rat model of fatty liver transplantation (Teramoto et al, 1993). Will grow Morris hepatomas 3924A, which can be used as a model for the treatment of liver cancer (Yang et al, 1995).

Anatomy

Uterus of type "uterus bipertitus" (Yosida et al, 1985).

Behavior

The ACI rat is docile. Long latency to emerge into familiar and novel environment (Harrington 1971). Strong 24-hr rhythm in wheel running activity when compared with LEW (Siebert and Wollnik, 1991). Intermediate response to an acoustic stimulus (Glowa and Hansen, 1994). Differences exist in the coupling of the multiple circadian oscillators that generate the overall pattern of wheel running activity (Wollnik, 1991). The mean area of arginine-vasopressin-immunoreactive (AVP-ir) fibres was significantly larger in strain LEW than in strains ACI and BH (Wollnik and Bihler, 1996).

Drugs

Genetics

Coat color genes
- A, B, H: black agouti with white belly and feet.

Histocompatibility
- RT1\(^{as}\).

Biochemical markers
- Acon-1, Acp-2, Ahd-2, Akp-1, Alb, Amyl-1, Cryg-1, Es-1, Es-2, Es-3, Es-4, Es-6, Es-7, Es-8, Es-9, Es-10, Es-14, Es-15, Es-16, Es-18, Fh-1, Ge, Glo-1, Gox-1, Hbb, Igk-1, Lap-1, Mgd-1, Mup-1, Pep-3, Pgd.

Immunology


Infection

More resistant to the tumorigenic effect of human polyomavirus BK (BKV) because of RT1\(^{as}\) (Noss and Stauch, 1984). Does not develop chronic progressive myeloneuropathy induced by HTLV-1, in contrast with WKAH (Yoshiki, 1995).

Life-span and spontaneous disease

Mean survival time 26.1 months for males, 24.9 months for females. (Maekawa and Odashima, 1975). Mean survival time 31.5 months for males (Cameron et al, 1982). Urogenital abnormalities in 22-28% of males and 18-20% of females.

The most common neoplastic lesions in males were: testis 46%, adrenal medulla 16%, pituitary 5%, skin and ear duct 6%. In females: pituitary 21%, uterus 13%, mammary gland 11% and adrenal medulla 6% (Maekawa and Odashima, 1975). Spontaneous adenocarcinomas of ventral prostate (Shain et al, 1975; Ward et al, 1980; Isaacs, 1984). This is substantially increased by a high fat diet (Kondo et al, 1978). High survival to 2 years of age at 74% in males and 70% in females. However, a high incidence of relatively mild chronic renal disease and a high incidence of hydronephrosis and the congenital renal agenesis may make the strain unsuitable for long-term toxicological studies (Solleveld and Boorman, 1986). Four spontaneous kidney and five bladder tumors found among a cohort of 300 rats maintained for 30 months (Vanmoorselaar et al, 1993). Aplasia of one kidney almost always associated with aplasia of ipsilateral genital tract. (Marshall and Beisel, 1978; Marshall et al, 1978). Transmission of these defects is polygenic (Cramer and Gill, 1975). Hydronephrosis (4-6%) in both sexes may be due to a mesonephric duct deformity (Fujita et al, 1979).

Effects of retinoids on tumors of the skin, prostate and endocrine pancreas studied by Ohshima et al (1985). Urolithiasis seen at an average age of 144 days (Kunstyr et al, 1982).

Miscellaneous

Will grow Morris hepatomas 3294A, which may be used as a model for the treatment of liver cancer (Yang et al, 1995). Characteristics of the ACI strain have been described by Festing (1979) and Greenhouse et al (1990).

Physiology and biochemistry

Low serum thyroxine (Esber et al, 1974). Low systolic blood pressure (Hansen et al, 1973). Low blood pressure, reaching 124 mmHg at ten weeks of age (Tanase et al, 1982). Almost free of spike-wave discharges associate with absence epilepsy seen in strain WAG/Rij, while BN/Rij was intermediate (Inoue et al, 1990). Copper deficiency results in pigmented patterns similar to that of mottled mouse, a model for Menkes’ kinky hair syndrome (Miranda et al, 1992). Liver gangliosides are of the a-type (cf LEA, LEW and BUF) (Kasai et al, 1993).

Reproduction

Poor reproductive performance and low litter size (Hansen et al, 1973). High (11%) early prenatal mortality and high (10%) incidence of congenital malformations (Shoji 1977). High in-utero embryo mortality, which depends on maternal genotype (Cramer and Gill 1975).
REFERENCES


