

ZDF RAT

Nomenclature ZDF/Gmi-fa/fa

Strain Origin

The mutation occurred in a colony of outbred Zucker rats in the laboratory of Dr. Walter Shaw at Eli Lilly Research Laboratories in Indianapolis, IN 1974-1975. Part of this colony containing the mutation was moved to Indiana University Medical School (IUMS) to the laboratory of Dr. Julia Clark in 1977. Several groups of animals with diabetic lineage were identified and rederived beginning in 1981. Inbreeding of selected pairs from this rederivation was done in the laboratory of Dr. Richard Peterson at IUMS. The inbred line of ZDF rat was established in 1985. To Genetic Models in 1991. To Charles River in 2001.

Strain characteristics

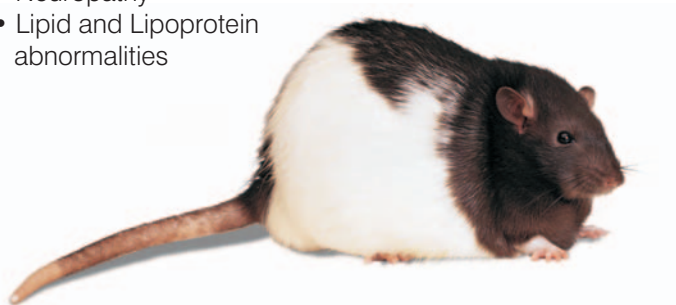
- Phenotype - Black hooded with a black stripe down the length of the back
- Common name is ZDF

Production Information

- Breed method-pedigree foundation colony, polygamous production colony
- Litter size 8-12
- Gestation period 21-24 days
- Weaning age 21 days

Applications

- Type 2 diabetes
- Wound healing
- Neuropathy
- Lipid and Lipoprotein abnormalities



References

1. Clark, J., Palmer, C.J. and Shaw, W.N., (1983) The diabetic Zucker fatty rat. Proc. Soc. Exp. Biol. Med., 173, 68-75.
2. Peterson, R.G., Shaw, W.N., Neel, M.A., Little, L.A. and Eichberg, J. (1990b) Zucker diabetic fatty rat as a model for non-insulin-dependent diabetes mellitus. ILAR News, 32, 16-19.
3. Peterson, R.G., Neel, M.A., Little, L.A., Kincaid, J.C. and Eichberg, J. (1990a) Neuropathic complications in the Zucker diabetic fatty rat (ZDF/Drt-fa). In Frontiers in Diabetes Research. Lessons from Animal Diabetes III, edited by E. Shafir, pp. 456-458. London: Smith-Gordon.
4. Vrabec, J.T. (1998) Tympanic membrane perforations in the diabetic rat: a model of impaired wound healing. Otolaryngol. Head Neck Surg., 118, 304-308.
5. Sparks, J.D., Phung, T.L., Bolognino, M., Cianci, J., Khurana, R., Peterson, R.G., et al. (1998) Lipoprotein alterations in 10- and 20-week old Zucker diabetic fatty rats: hyperinsulinemic versus insulinopenic hyperglycemia. Metabolism, 47, 1315-1324.

KOLETSKY RAT

Nomenclature KOLETSKY/SHROB/KolGmi-fa^k

Strain Origin

The mutation for this obese spontaneously hypertensive rat occurred in the laboratory of Dr. Simon Koletsky in 1969 at Case Western Reserve University School of Medicine. It was developed from a cross between a hypertensive female rat and a normotensive male Sprague-Dawley rat. The colony was maintained as brother-sister matings in a closed colony at Case Western Reserve University School of Medicine since 1971. Breeding pairs were transferred to Genetic Models, Inc. in 2000 where they were rederived. To Charles River in 2001.

Strain characteristics

- Phenotype - Albino

Production Information

- Breed method - pedigree foundation colony, polygamous production colony
- Litter size 4-8
- Gestation period 23 days on average
- Weaning age 21 days

Applications

- Syndrome X
- Hypertension
- Insulin resistance
- Obesity



References

1. Koletsky, S., (1972) New Type of Spontaneously Hypertensive rats with Hyperlipemia and endocrine gland defects. In Spontaneous Hypertension: Its Pathogenesis and Complications, edited by K. Okamoto, pp.194-197. Tokyo: Igaku Shoin Ltd.
2. Koletsky, S. (1975) Animal Model Obese Hypertensive rat. Am. J. Pathol., 81, 463-466.
3. Koletsky, R.J., Friedman, J.E. and Ernsberger, P., (2001), The Obese Spontaneously Hypertensive Rat (SHROB, Koletsky Rat): A Model of Metabolic Syndrome X. In Animal Models of Diabetes A Primer, edited by A.A.F. Sima and E. Shafir, pp.143-158. The Netherlands: Harwood Academic Publishers.



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SHHF RAT

Nomenclature SHHF/MccGmi-fa^K

Strain Origin

The breeding stock for this colony was transferred to Dr. Sylvia McCune at University of Chicago Medical School in 1983, from the laboratory of J.E. Miller at G.D. Searle and Company. The animals were developed by backcrossing a Koletsky obese rat to an SHR/N. Dr. McCune obtained the colony after the seventh backcross and continued to inbreed past 20 generations to fix the congestive heart failure trait. The inbred line was transferred to Genetic Models, Inc. in 1994 and was rederived in 2000. To Charles River in 2001.

Strain characteristics

- Phenotype - Albino
- All genotypes, male and female, develop Congestive Heart Failure (CHF) - Obese males at 10-14 months, obese females and lean males at 14-18 months, and lean females at 20⁺ months

Production Information

- Breed method-pedigree foundation colony, polygamous production colony
- Litter size 4-8
- Gestation period 23 days on average
- Weaning age 21 days

Applications

- Congestive Heart Failure
- NIDDM in the obese male
- Hypertension
- Obesity
- Abnormal glucose tolerance



References

1. McCune, S.A., Baker, P.B. and Stills, H.F., (1990) SHHF/Mcc-cp Rat: Model of Obesity, Non-insulin-dependent Diabetes, and Congestive Heart Failure. *ILAR News*, 32, 23-27.
2. Onodera, T., Tamura, T., Said, S., McCune, S.A. and Gerdes, A. Martin, (1998), Maladaptive Remodeling of Cardiac Myocyte Shape Begins Long Before Failure in Hypertension, *Hypertension*, 32, 753-757.
3. Tamura, T., Said, S., Harris, J., Lu, W. and Gerdes, A. Martin, (2000), Reverse Remodeling of Cardiac Myocyte Hypertrophy in Hypertension and Failure by Targeting of the Renin-Angiotensin System, *Circulation*, 102, 253-259.
4. Carraway, J.W. Park, S. and McCune, S.A., (1999), Comparison of Irbesartan with Captopril Effects on Cardiac Hypertrophy and Gene Expression in Heart Failure-Prone Male SHHF/Mcc-fa^K rats, *J. Cardiovascular Pharmacology*, 33, 1-11.

ZSF₁ RAT

Nomenclature ZSF₁(OB)Gmi

Strain Origin

This hybrid rat is a cross between a ZDF female and an SHHF male. This model was developed at Genetic Models, Inc. in Indianapolis, IN. To Charles River in 2001.

Strain characteristics

- Phenotype - Black hooded with black stripe down the length of the back
- Common name is ZSF₁

Applications

- Lipid dysfunction
- Chronic renal failure
- Obesity
- NIDDM
- Hypertension



References

1. Tofovic, S.P., Kusaka, H., Kost, C.K. and Bastacky, S., (2000), Renal Function and Structure in Diabetic, Hypertensive, Obese ZDFxSHHF-Hybrid Rats. *Renal Failure*, 22, 387-406.


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