

About control strains for RCS/Kyo

The genotype of RCS/Kyo is “*rdy/rdy, p/p*” (RCS/Kyo rat has both *rdy* and *p* mutation).

We only maintain RCS homozygous rats (*rdy/rdy, p/p*) and don't keep “congenic strains of RCS rat”.

There is no exact control strain for RCS/Kyo rat. Please check previous articles about RCS strain and select control strains by yourself according to your experiment's purpose. For example, rat strains as below have been used;

(1) albino rat: inbred albino rat [3], SD rat [11]

(2) Lewis rat [8]

(3) congenic strains of RCS rat produced by crossing an inbred RCS (*rdy/rdy*) and cesarian-derived Fischer (+/+) rat [4, 6, 15] (We don't keep “congenic strains of RCS rat.”)

- pink-eyed rats that are wild-type (+/+) at the retinal dystrophy locus (*rdy* locus; the strain is designated as RCS-*rdy*⁺) and serve as control animals for the pink-eyed dystrophic, inbred RCS strain;
- pigmented (black-hooded) dystrophic rats (the strain is designated as RCS-*p*⁺);
- pigmented, non-dystrophic rats for use as normal controls for the pigmented dystrophic rat (the strain is designated as RCS-*rdy*⁺ *p*⁺).

【References】

1. Bourne MC, Campbell DA, Pyke M. Cataract associated with an hereditary retinal lesion in rats. Br J Ophthalmol. 1938 Oct;22(10):608-613.
2. Bourne MC, Campbell DA, Tansley K. Hereditary degeneration of the rat retina. Br J Ophthalmol. 1938 Oct;22(10):613-623.
3. Dowling JE, Sidman RL. Inherited retinal dystrophy in the rat. J Cell Biol. 1962 Jul;14:73-109.
4. LaVail MM, Sidman RL, Gerhardt CO. Congenic strains of RCS rats with inherited retinal dystrophy. J Hered. 1975 Jul-Aug;66(4):242-244.
5. Edwards RB, Szamier RB. Defective phagocytosis of isolated rod outer segments by RCS rat retinal pigment epithelium in culture. Science. 1977 Sep 2;197(4307):1001-1003.
6. LaVail MM. Photoreceptor characteristics in congenic strains of RCS rats. Invest Ophthalmol Vis Sci. 1981 May;20(5):671-675.
7. Faktorovich EG, Steinberg RH, Yasumura D, Matthes MT, LaVail MM. Photoreceptor degeneration in inherited retinal dystrophy delayed by basic fibroblast growth factor. Nature. 1990 Sep

6;347(6288):83-86.

8. Tso MO, Zhang C, Ablner AS, Chang CJ, Wong F, Chang GQ, Lam TT. Apoptosis leads to photoreceptor degeneration in inherited retinal dystrophy of RCS rats. *Invest Ophthalmol Vis Sci*. 1994 May;35(6):2693-9.

9. D'Cruz PM, Yasumura D, Weir J, Matthes MT, Abderrahim H, LaVail MM, Vollrath D. Linkage Mutation of the receptor tyrosine kinase gene *Mertk* in the retinal dystrophic RCS rat. *Hum Mol Genet*. 2000 Mar 1;9(4):645-651.

10. Kuramoto T, Gohma H, Kimura K, Wedekind D, Hedrich HJ, Serikawa T. The rat pink-eyed dilution (p) mutation: an identical intragenic deletion in pink-eye dilute-coat strains and several Wistar-derived albino strains. *Mamm Genome*. 2005 Sep;16(9):712-719.

11. Zhang M, Mo X, Fang Y, Guo W, Wu J, Zhang S, Huang Q. Rescue of photoreceptors by BDNF gene transfer using in vivo electroporation in the RCS rat of retinitis pigmentosa. *Curr Eye Res*. 2009 Sep;34(9):791-799.

12. Thumann G, Salz AK, Walter P, Johnen S. Preservation of photoreceptors in dystrophic RCS rats following allo- and xenotransplantation of IPE cells. *Graefes Arch Clin Exp Ophthalmol*. 2009 Mar;247(3):363-9.

13. Lu B, Wang S, Girman S, McGill T, Ragaglia V, Lund R. Human adult bone marrow-derived somatic cells rescue vision in a rodent model of retinal degeneration. *Exp Eye Res*. 2010 Sep;91(3):449-455.

14. Tsuji N, Ozaki K, Narama I, Matsuura T. Inferior ectopic pupil and typical ocular coloboma in RCS rats. *Comp Med*. 2011 Aug;61(4):378-384.

15. Liu K, Wang Y, Yin Z, Weng C, Zeng Y. Changes in glutamate homeostasis cause retinal degeneration in Royal College of Surgeons rats. *Int J Mol Med*. 2013 May;31(5):1075-1080.

16. Leow SN, Luu CD, Hairul Nizam MH, Mok PL, Ruhaslizan R, Wong HS, Wan Abdul Halim WH, Ng MH, Ruszymah BH, Chowdhury SR, Bastion ML, Then KY. Safety and Efficacy of Human Wharton's Jelly-Derived Mesenchymal Stem Cells Therapy for Retinal Degeneration. *PLoS One*. 2015 Jun 24;10(6):e0128973

17. Terayama Y, Matsuura T, Ozaki K. Malignant mast cell tumor of the thymus in a Royal College of Surgeons (RCS) rat. *J Toxicol Pathol*. Article ID: 2016-0044