75. Cytogenetical Studies on the Japanese Raccoon Dog. III

A New Robertsonian Fission of the No. 6 Chromosome found in a Specimen collected from Aichi-ken, with special regard to the Bimodal Distribution of B-Chromosomes

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The Japanese raccoon dog (*Nyctereutes procyonoides viverrinus*) was an interesting species, because the karyotypes of these animals were characterized by having the Robertsonian fission and B-chromosomes. Among three individuals collected in Shizuoka-ken, one did not have any Robertsonian fission, but the other two were remarkable in having the fission of the no. 8 chromosome. They were also characterized by having B-chromosomes showing some types of the somatic variation (Yosida *et al.* 1983, 1984). In one specimen collected from Aichi-ken, Japan, we found a new Robertsonian fission occurring in the no. 6 chromosome. This individual also showed a bimodal distribution in two and three B-chromosomes in the somatic cells. In the present paper the details of the karyotypes in this raccoon dog will be reported.

Material and method. A female Japanese raccoon dog (*Nyctereutes procyonoides viverrinus*) numbered RD-8409 was obtained from the Toyohashi Municipal Zoo. This animal was originally collected in Nukata-gun, Aichi-ken, Japan, and then it was protected and maintained at that Zoo for about one year. The chromosomes of this specimen were observed in cultured cells from the skin biopsy. The conventional Giemsa, G- and C-banding stainings were applied by our routine procedures (Yosida 1980).

Results and discussion. 1) Robertsonian fission of the no. 6 chromosome. As already described the basic karyotype of the Japanese raccoon dog was formulized as $2n=38$, having 13 meta- or submetacentric autosome pairs (nos. 1 to 13), 5 acrocentric autosome pairs (no. 14 to 18) and a median sized metacentric X and a small Y like a dot (Yosida *et al.* 1983). So far as we examined three Japanese raccoon dogs, all specimens had B-chromosomes. Among

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these three, two had the same Robertsonian fission in the pair no. 8; namely, one of the metacentric no. 8 chromosomes was separated at the centromeric region to make the two new acrocentrics. In the remaining one individual such a fission was not observed. In the present material (RD-8409), however, the Robertsonian fission was not found in the pair no. 8, but found in one of the pair no. 6 chromosomes. The fission of the pair no. 6 was clearly demonstrated by G-banding technique (Fig. 1). As seen in the figure one partner of the pair no. 6 was normal submetacentric, but the other one was broken at the centromeric region and two new acrocentrics were formed. The no. 8 chromosomes of this individual were normal metacentrics.

Fig. 1. G-banding karyotype of a female Japanese raccoon dog (RD-8409) collected from Aichi-ken. Two acrocentrics increase but one metacentric decreases from the basic karyotype ($2n=38$) by the Robertsonian fission in one of pair no. 6 chromosomes. Two B-chromosomes are denoted as B. Scale of the figures corresponds to $10\ \mu$.

It is interesting that the two acrocentric chromosomes formed by the Robertsonian fission of the no. 6 had clear C-bands like the other normal metacentrics (Fig. 2). A similar phenomenon has been observed in the Mauritius black rats in which the chromosome numbers increased by the Robertsonian fission of two metacentric pairs. In that case the acrocentrics formed by the fission had always a large C-band like the other metacentrics (Yosida *et al.* 1979). On the increase of the C-band in the acrocentrics developed by the Robertsonian fission, the present author (Yosida 1983) suggested that a repetitive increase of DNA sequences in the heterochromatic region

Fig. 2. C-banding karyotype. The same cell as Fig. 1. Note two acrocentrics formed by the Robertsonian fission with a clear C-band at the centromeric region.

might have occurred and then the chromosome got to a stable condition.

2) B-chromosomes. In the present specimen (RD-8409) two and three B-chromosomes were observed in the most cells (Table I). Among 122 cells counted, 64 (52.4%) cells had two B-chromosomes (Figs. 1 and 2), 56 (45.9%) cells had three B's, and only the remaining two cells had one B. The chromosome numbers of these three type cells were 41 (39+2B's), 42 (39+3B's) and 40 (39+1B), respectively. Thus, the specimen RD-8409 was mosaic in the somatic cells due to the different number of B's. In the numerical variation of B's in the somatic cells of Japanese raccoon dogs, we classified into three types; (1) one modal distribution of the numerical variation, (2) bimodal distribution and (3) wide distribution (Yosida *et al.* 1984). The present material with two modes in two and three B's should belong to the second type as above.

Table I. Somatic variation of B-chromosomes in the Japanese raccoon dog (RD-8409) collected from Aichi-ken

Chrom. no.	40	41	42	Total no. of cells observed
No. of B's	1	2	3	
No. of cells observed (%)	2 (1.7)	64 (52.4)	56 (45.9)	122 (100.0)

Summary. One specimen of the Japanese raccoon dog (*Nyctereutes procyonoides viverrinus*) collected from Aichi-ken, Japan, has a new Robertsonian fission of the no. 6 chromosome. By the fission the basic chromosome number of this specimen is $2n=39$. This specimen is also characterized by having one, two and three B-chromosomes in the somatic cells. Most of cells have two (52.4%) and three B's (45.9%). By the Robertsonian fission and B-chromosomes, this specimen is mosaic due to mainly two cell types with 41 ($39+2Bs'$) and 42 chromosomes ($39+3B's$).

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Note. The following two papers published previously are arranged as I and II of the series of the present study.

Cytogenetical studies on the Japanese raccoon dog. I: Proc. Japan Acad., vol. 59, ser. B, no. 8, pp. 267-270 (1983).

Ibid. II: Proc. Japan Acad., vol. 60, ser. B, no. 2, pp. 17-20 (1984).

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