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SHORT COMMUNICATION

A new karyotype for the genus *Cavia* from a southern island of Brazil (Rodentia - Caviidae)

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ABSTRACT

Intraspecific karyotype variation in mammal species is very common and often caused by centromeric fusion of acrocentric chromosomes. We describe here a new karyotype 2n = 62 (FN = 112) for the genus *Cavia* from the Moleques do Sul Islands, of the southern coast of Brazil. We analyzed two male and four female karyotypes that had twenty-four biarmed pairs and six pairs of acrocentric chromosomes. The sexual pair consisted of a metacentric X-chromosome and a large acrocentric Y. C-bands were found in the centromeric and pericentromeric regions of almost all chromosomes, except for some small biarmed and acrocentric ones. Nucleolus organizer regions appeared in two biarmed chromosomes, and G-banding patterns were also seen.

INTRODUCTION

Moleques do Sul archipelago is formed by three islands of granitic origin which are 620 m by 200 m, 100 m by 120 m, and 80 m by 80 m in size. Mammals (*Cavia*) were found only on the largest island.

The genus *Cavia* Pallas, 1766, has eight species (Nowak, 1991*): C. aperea, C. fulgida, C. nana, C. anolaimae, C. guianae, C. tschudii, C. magna* and *C. porcellus.* Some authors consider the domesticated cavy as *C. porcellus* (Weir, 1974), and others consider it a subspecies of *C. aperea* (Hückinghaus, 1962). Three inhabit Brazil: *C. aperea, C. fulgida*, and *C. magna* (Ximenez, 1980).

Previous studies have reported a very constant diploid number in different species: *C. porcellus* with 2n = 64 (Ohno *et al*., 1961; Manna and Talukdar, 1964) and FN = 96 (Awa *et al*. 1959), *C. aperea* with 2n = 64, FN = 128 (George *et al*., 1972), and *C. a. aperea* from Pernambuco State, Brazil, with 2n = 64, FN = 116 (Maia, 1984). *C. magna* from Rio Grande do Sul State, *C. aperea pamparum* and *C. fulgida*, both from Paraná and Rio de Janeiro States, Brazil, and *C. porcellus* all have 2n = 64 and FN = 128 (Pantaleão, 1978).

The present report describes a new karyotype for a population with an uncertain taxonomic status, *C. aff. magna*, from the Moleques do Sul Islands, close to the Santa Catarina State coast, Brazil (Olimpio and Cimardi, 1991) (Figure 1).

Figure 1 - Location of the Moleques do Sul Islands on the Brazilian coast.

MATERIAL AND METHODS

Six specimens (two males and four females) of *C. aff. magna* from Moleques do Sul Islands (27°51S; 48°26W) were studied using the technique of Ford and Hamerton (1956) for bone marrow chromosome preparations. G-bands were induced following Seabright (1971), while C-band patterns were obtained using the technique of Sumner (1972). Ag-Nor staining was obtained by the method of Howell and Black (1980).

RESULTS

Cavia aff. magna from Moleques Islands showed 2n = 62 and FN = 112 (Figure 2a): 24 pairs were biarmed chromosomes and six were acrocentric. Submetacentric pair one was the largest of the complement. The sexual pair consisted of a large metacentric X-chromosome which was second in size. Y was one of the largest acrocentric cromosomes. G-bands are shown in Figure 2b. The nucleolus organizer regions were located in two biarmed chromosomes. One is in the telomeric region of the

long arms of a submetacentric and the other in the short arms of a medium metacentric chromosome (Figure 3a). The constitutive heterochromatin in this population, as revealed by C- banding, was present in pericentromeric chromosome regions. The smaller chromosomes did not exhibit heterochromatin. The X-chromosome displayed positive C-bands in the telomeric and centromeric regions, while the Y-chromosome was almost completely heterochromatic (Figure 3b).

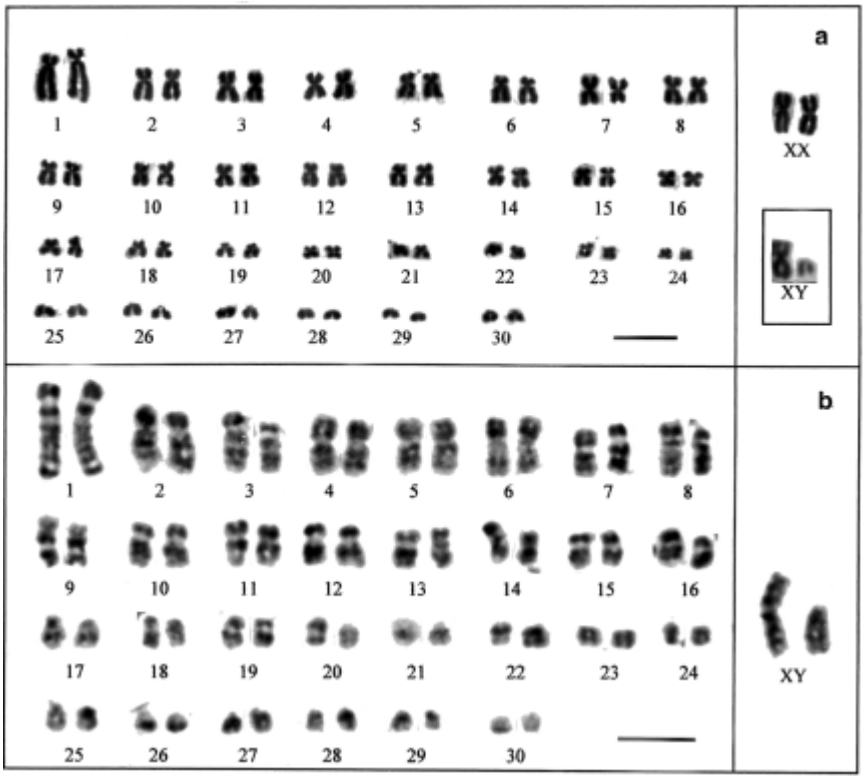

Figure 2 - a) Chromosomes of *Cavia aff. magna* from a bone marrow Giemsa-stained karyotype; b) G-bands. The bar is 10 m.

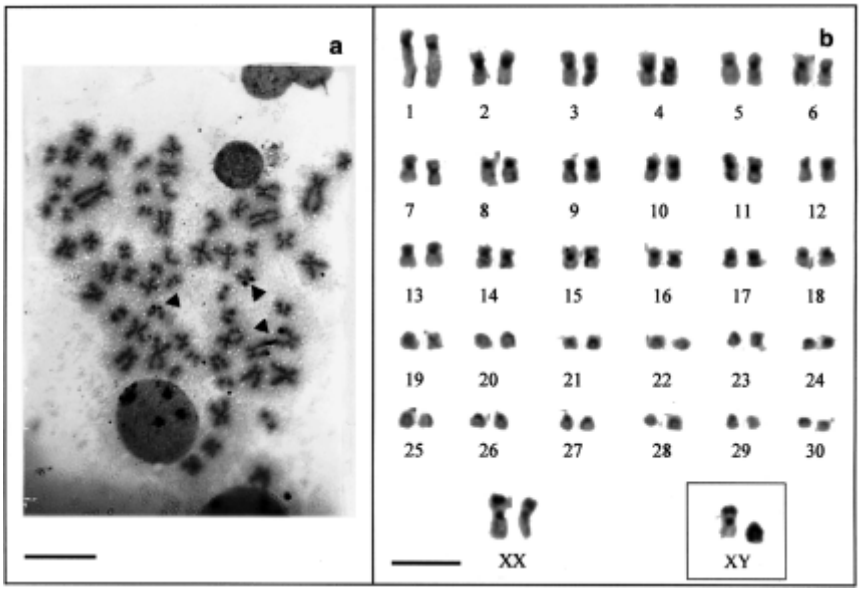

Figure 3 - Chromosomes of *Cavia aff. magna*. a) G-Nor identification; b) C-bands. The bar is 10 m.

DISCUSSION

Only five species of the genus *Cavia* have been cytogenetically studied. They all have a diploid number of 2n = 64.

This is the first example of chromosomal variation reported for the genus. The sole accounted karyotype for *Cavia magna* species is from the type locality, Tramandai beach, with 2n = 64 (Pantaleão, 1978). It did not present G- and C-banding or Ag-Nor staining, but the reduction in diploid number found in the Moleques do Sul Islands population could be the result of fusion of two acrocentric chromosomes.

The species *C. a. aperea*, *C. porcellus*, *C. a. pamparum* and *C. fulgida* have a large amount of constitutive heterochromatin in the genome (Pantaleão, 1978; Maia, 1984). C-banding showed large blocks of constitutive heterochromatin forming the short arms of several chromosomes and all the centromeric regions of *C. a. aperea* (Maia, 1984). *C. aff. magna* from Moleques do Sul Islands had no such blocks in their short chromosome arms, although it did present a positive C-band in the centromeric regions of almost all chromosomes.

In addition to the difference in diploid number and constitutive heterochromatin quantity, there was a different distribution of constitutive heterochromatin in the X chromosome of *C. aff. magna* compared to other species. The X chromosomes of the specimens studied by Pantaleão (1978) and Maia (1984) exhibited a positive C-band block spanning from the centromere to the middle of the short arm. The *C. aff. magna* X-chromosome, however, had two blocks, one at the telomeres of the short arms and the other at the centromeric regions. Thus, this difference could be the result of a paracentric invertion rearrangement.

These results are compatible with the observation that rodents isolated on islands often show particular characteristics, when compared to mainland populations (Adler and Levins, 1994). The Moleques do Sul Islands are 12 km and 8.25 km away from the continent and southeastern coast of Santa Catarina Island, respectively. As the maximum local sea depth is approximately 32 m, it is likely the archipelago was separated from the continent about 8,000 years ago (Bigarella, 1965; Corrêa *et al*., 1992). It is probable that the Moleques do Sul population has been isolated from the mainland populations since that time.

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RESUMO

A variação cariotípica nas espécies de mamíferos é bastante comum e geralmente causada pela fusão de cromossomos acrocêntricos. Foi descrito neste trabalho um novo cariótipo, com 2n = 62 e FN = 112, para o gênero *Cavia* proveniente das ilhas Moleques do Sul, da costa sul do Brasil. Foram analisados os cariótipos de dois machos e quatro fêmeas que possuiam 24 pares de cromossomos com dois braços e seis pares de acrocêntricos. O par sexual era constituído por um cromossomo X metacêntrico grande e um Y acrocêntrico. As bandas C estavam localizadas nas regiões centroméricas e pericentroméricas da maioria dos cromossomos, com exceção de alguns acrocêntricos e os cromossomos de dois braços menores. As regiões organizadoras de nucléolo ocorreram em dois cromossomos com dois braços e o padrão de bandamento G foi também apresentado.

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