Cytogenetic Study of the Endemic Malagasy Lemurs Subfamily Cheirogaleinae Gregory 1915

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ABSTRACT Karyotypes were determined on 27 lemurs from six species of what has been called the "subfamily" of Cheirogaleinae: *Microcebus murinus murinus* (2), *M. murinus rufus* (2), *M. coquereli* (5), *Phaner furcifer* (6), *Cheirogaleus medius* (9), and *C. major* (3). The cytogenetic study of these animals reveals that this "subfamily" contains in fact two groups, (a) — *Microcebus* and *Cheirogaleus*, and (b) — *Phaner*. The karyotype of the first two genera has a fundamental number (FN) equal to 66 and the karyotype of the third genus has an FN equal to 62. This result and the fact that *Phaner* has a particular scent-marking gland, knuckle pads, and finger prints markedly different from those of other genera agree with the view that this animal belongs to a special subfamily, Phanerinae, while the two other genera constitute the subfamily of Cheirogaleinae. These two subfamilies constitute the family of Cheirogaleidae.

According to the classical taxonomy, the subfamily of Cheirogaleinae includes three genera: *Cheirogaleus, Microcebus* and *Phaner*. Only the chromosomal complement of *M. murinus* has already been described by Chu and Swomley ('61). We decided to determine the karyotype of the other genera to evaluate the chromosomic homogeneity of that subfamily.

MATERIALS AND METHODS

Karotypes were determined on the 25 lemurs *listed below by* using the same procedure described in a previous paper (Rumpler and Albignac, '69):

- — Two *M. murinus murinus* (J. F. Miller, 1777); males captured in the vicinity of Tamatave (East side of Madagascar)
- — Two *M. murinus rufus* (J. F. Miller, 1777); one male and one female captured near Amboasary (South)
- — Five *M. coquereli* (Grandidier, 1867); four males and one female captured near the town of Ambanja (North-West)
- — Six *P. furcifer* (Blainville, 1839); two males and two females captured near Morondava (West) and one male and one female captured near Diego-Suarez (North)
- — Three *C. major* Geoffroy, 1812; two males and one female captured near Maroantsetra (North-West)
- — Nine *C. medius* Geoffroy, 1812; three males and six females captured near Maroantsetra

RESULTS

The diploid chromosome number and the morphology of the chromosomes for all specimens reported in this paper are plotted in table 1. The diploid number from *M. murinus murinus, M. murinus rufus, M. coquereli, C. major* and *C. medius* is 66 (64 autosomes and two sex chromosomes). All of the autosomes are acrocentric. The morphology of the sex chromosomes is constant; the X is a large metacentric chromosome, and the Y is probably minute (fig. 1). The fundamental number is equal to 66.

The diploid number from *P. furcifer* is 46 (44 autosomes and two sex chromosomes). Among the autosomes there are two pairs of metacentric chromosomes, six pairs of submetacentric chromosomes, and 14 pairs of acrocentric chromosomes. In the gonosomes the X is metacentric and the Y is probably little and acrocentric (fig. 2). The fundamental number is equal to 62.

[1] With the technical collaboration of Madame Rumpler-Randriamonta.

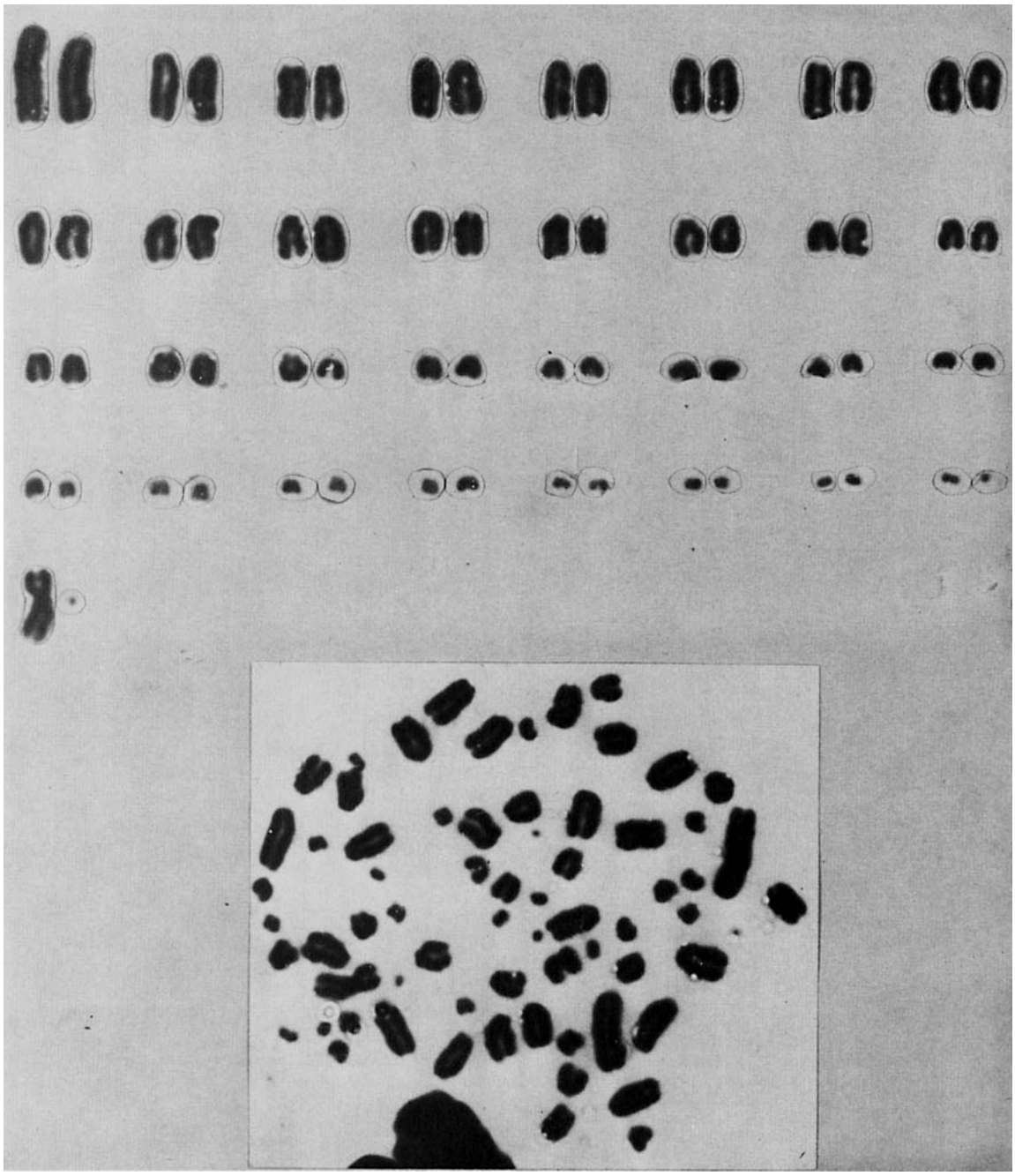

Fig. 1 Metaphase spread and karyotype of a leukocyte from a male *Cheirogaleus major*.

DISCUSSION

Our results confirm those of Chu and Swomley for *M. murinus*, but we can describe precisely the morphology of the X chromosome. Surprisingly, *M. coquereli* and the two species of *Cheirogaleus* have the same karyotype as *M. murinus*, although *Cheirogaleus* and *Microcebus* ap-

TABLE 1

Genus and species	Number of animals examined		Chromosomes						Authority
	Male	Female	2N	M	S	A	X	Y	
Microcebus murinus	0	1	66	—	2	64	—	—	Chu and Swomley '61
Microcebus murinus murinus	2	0	66	—	—	64	M	A	This paper
Microcebus murinus rufus	1	0	66	—	—	64	M	A	This paper
Microcebus coquereli	4	1	66	—	—	64	M	A	This paper
Cheirogaleus major	2	1	66	—	—	64	M	A	This paper
Cheirogaleus medius	3	6	66	—	—	64	M	A	This paper
Phaner furcifer	3	3	46	4	12	28	M	A	This paper

Chromosome number and types in the Cheirogaleinae; 2N, diploid number; M, metacentric; S, submetacentric; A, acrocentric.

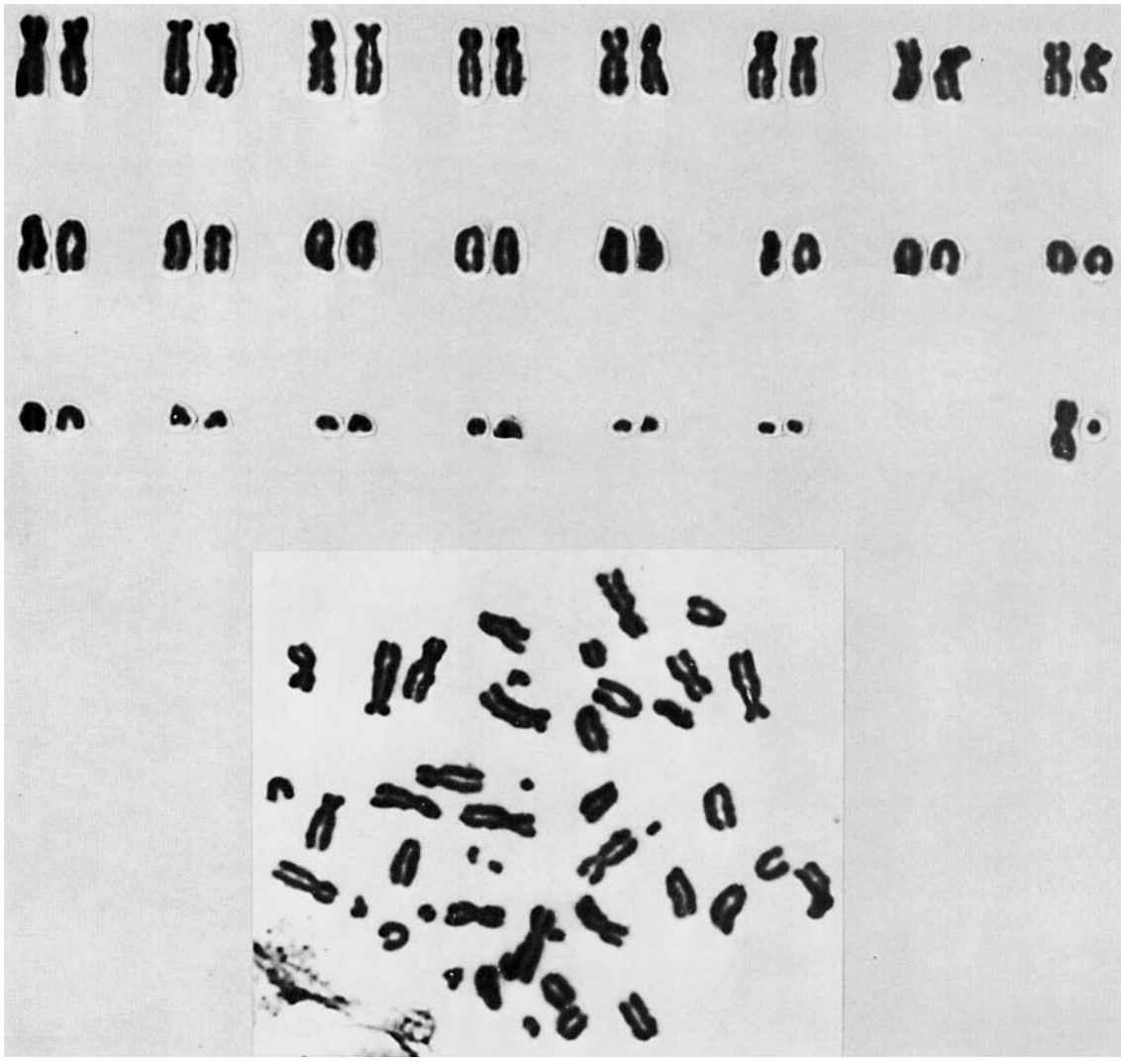

Fig. 2 Metaphase spread and karyotype of a leukocyte from a male *Phaner furcifer*.

pear morphologically as two very different genera. The particular karyotype of *P. furcifer* allows us to recognize two groups in the subfamily of Cheirogaleinae; the first comprises *Cheirogaleus* and *Microcebus*, and the second only *Phaner*. Among the malagasy lemurs most of the genera and species differ from each other in their karyotypes. For instance, within the lemurinae subfamily, except for *L. fulvus* and *L. mongoz mongoz*, each species exhibits a peculiar karyotype; but all the animals show the same fundamental number: FN = 64 (Rumpler and Albignac, '69). Since the *P. furcifer* karyotype differs greatly from those of *Microcebus* and *Cheirogaleus* and has a smaller FN, it cannot derive from those of *Microcebus* or *Cheirogaleus* (the most primitive chromosomal complement) by a simple mechanism.

On the other hand, new gross morphological characteristics allow us to distinguish *Phaner* from the two other genera:

a. *Phaner* is the only one to possess a voluminous scent-marking gland on the anterior wall of the neck (Rumpler and Andriamiandra, '71).

b. The finger-prints of *Phaner* differ conspicuously from those of *Microcebus* and *Cheirogaleus* (Rumpler and Rakotosamimanana, '71). All these differences agree with the view that the *Phaner* is a part of a special subfamily, Phanerinae; whereas *Microcebus* and *Cheirogaleus* are included within the Cheirogaleinae subfamily.

CONCLUSION

The cytogenetic study of the ancient Cheirogaleinae subfamily reveals that it contains two groups, a–*Microcebus* and *Cheirogaleus*, and b–*Phaner*. The two first genera have a FN equal to 66, and the third genus has a FN equal to 62. This result and the fact that *Phaner* has a particular scent-marking gland, and also knuckle pads and finger prints quite different from those of other genera, agree with the view that this genus constitutes a special subfamily, Phanerinae, genus type *P. furcifer* Blainville, 1839; while the genera *Microcebus* and *Cheirogaleus* constitute the subfamily of Cheirogaleinae.

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