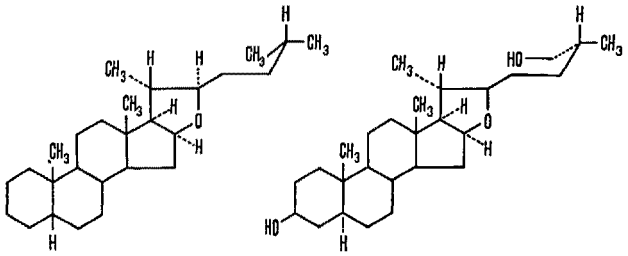
tertiary carbon atoms (CH_3 at carbons 10 and 13, H at carbons 5, 8, 9, 14, 16 and 17), and that of the skeletal carbon-to-carbon bond external to the ring system at secondary and quaternary carbon atoms (CH_3 at carbon 20, and C_{23} at carbon 22). New substituents are located only by carbon number if no skeletal inversions have occurred, but their configurations must be noted if their presence creates new asymmetric centers or inverts the parent skeleton at any center. Carbons 23, 24, 25 and 26 require use of the R- and S-convention. Each of these considerations is illustrated in naming the hypothetical example (IV), 9-fluoro-12α-hydroxy-14β-methoxy-23-chloro-5β, 10α, 16β, 20β, 22α-spirostan (23S, 25S).

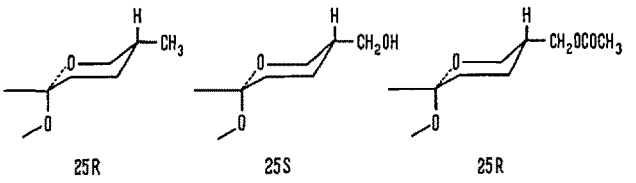
Derivatives of the sapogenins, the pseudosapogenins, dihydropseudosapogenins and congeners may be named from the parents, 5α- and 5β-furostan (V). One observes V to be nothing more than 16β, 22-epoxy-5β-cholestane (22R), but its frequent occurrence in sapogenin chemistry warrants making it a prototype, and its pentacyclic skeleton requires application of the foregoing conventions.



V VI

In practice one of the terminal carbon atoms usually bears an oxygen atom or other substituent, and configurational assignment at position 25 is therefore necessary. Dihydrotigogenin (VI) is formally 5α-furostan-3β, 26-diol (25R), and dihydropseudotigogenin 5α, 20β-furostan-3β, 26-diol (25R).

A precautionary word regarding the use of R and S is warranted where modification of substituents at or near position 25 may effect reversal of the configurational assignment, governed by the sequence rule[8], where indeed no inversion has occurred. The difficulty is illustrated by the following partial formulas:



25R 25S 25R

This apparent conflict is not a shortcoming of the system, for the correct stereochemistry will always ensue if the rules are followed. It does, however, present a barrier to the casual use of R- and S-assignments. For informal writing, discussion, and construction of models and formulas, we favour the use of the *D*- and *L*-convention with its convenient right and left hand mnemonic[9]. These symbols represent absolute configurations of the sapogenins and are compatible with the present proposal in that D and R represent the same configuration in the parent sapogenins.

Finally, it should be emphasized that this presentation of nomenclature is being made for the sole purpose of suggesting definitive rules. It is not intended to displace the trivial, semi-systematic and other names[10] in use. Instead it is an attempt to provide the primary standards for use in formal writing and indexing.

Zusammenfassung. Es werden Einzelheiten für den Gebrauch von Spirostan und Furostan, wenn nötig durch die Präfixe 5α, 5β, 25R und 25S modifiziert, für die Benennung der Steroid-Sapogenine bekanntgegeben. Diese Vorschläge sollen als formale Grundlage zur Nomenklatur gelten.

G. P. MUELLER and G. R. PETTIT

Research Division, Marine Colloids, Inc., Rockland and Department of Chemistry, University of Maine, Orono (Maine, U.S.A.), May 9, 1962.

[8] G. P. MUELLER, Exper., *18*, 253 (1962).
[10] IUPAC Commission on the Nomenclature of Organic Chemistry, J. Amer. chem. Soc. *82*, 5545 (1960).

Some New Data on the Chromosomes of *Catarrhina*

Recent developments in cytology are providing considerable insight into the mechanisms of evolution as related to chromosome variation in mammals. In this respect, some recent work on Primate's chromosomes[1-3], seems very promising.

In the Table are reported the chromosomes numbers of the species of *Catarrhina* that I have studied recently, together with the data obtained by other workers for the same species[4].

The chromosome numbers of these groups of animals show a good deal of variation. All the species of the genus *Macaca, Papio* and *Theropithecus* have a diploid chromosome number of 42. Different species differ in some morphological characteristic in their chromosomes.

All the species I have investigated in the genus *Hylobates, Presbytis* and *Colobus* have 44 chromosomes, and they differ among each other for the morphology of some chromosomes.

The karyological situation in the genera *Cercocebus, Erythrocebus* and *Cercopithecus*, which are closely related from a systematic point of view, shows some peculiarities. All the species of the genus *Cercocebus* have 42 chromosomes. The genus *Erythrocebus* has a diploid number of

[1] M. A. BENDER and L. E. METTLER, Science *128*, 186 (1958).
[2] E. H. Y. CHU and M. A. BENDER, Science *133*, 1399 (1961).
[3] E. H. Y. CHU and N. H. GILES, Amer. Nat. *91*, 273 (1957).
[4] Sub-cutaneous tissue was obtained by biopsy and cultured one week *in vitro*. The culture method, hypotonic treatment, fixation and staining procedures used in the work have been described elsewhere (B. CHIARELLI, Caryologia *15*, 1 (1962)).

Chromosome numbers in *Catarrhina*

Taxa	Personal data Number of animals studied ♂	♀	2n	Literature data Number of animals studied ♂	♀	2n	References
CERCOPITHECIDAE							
Cercopithecinae							
Macaca sylvana	3	1	42				
M. speciosa	1		42				
M. fuscata	1	1	42				
M. mulatta	3	1	42	8	3	42	3, 6–8
M. assamensis	1	1	42				
M. silenus	1	2	42				
M. nemestrina	1	1	42	1		42	6
M. radiata	2		42				
M. sinica		1	42				
M. irus	3	1	42	1		42	2
M. maura	1		42				
M. niger (*Cynopithecus niger*)	1		42				
Papio sphinx	1	2	42	1		42	3
P. leucophaeus	1	2	42				
P. comatus	2		42				
P. cynocephalus	2		42				
P. doguera	2		42	2		42	3
P. papio	2		42	1	1	42	6
P. hamadryas	1	3	42				
Theropithecus gelada	2	1	42				
Cercocebus albigena	1		42	1		42	9
C. aterrimus	1	1	42				
C. galeritus	2		42	1		42	9
C. torquatus	2	1	42	3		42	1,3
Cercopithecus aethiops	3	2	60	3	1	60	3
C. cephus	2		54				
C. talapoin	1		54				
C. diana	3	3	60				
C. l'hoesti	1		60		1	72	2
C. mitis	4	1	72				
C. mona	2	1	66		3	66	3
C. neglectus		2	60	1		60	9
C. nictitans	2	1	66		3	66	3
C. nigroviridis	2	1	60				
Erythrocebus patas	3		54	1	3	54	3,9
Colobinae							
Presbytis obscurus	1	1	44				
Colobus polykomos		1	44				
PONGIDAE							
Hylobatinae							
Hylobates lar	4		44				
H. agilis	1	1	44				
H. moloch	1		44				
H. hooloch					1	44	2
Ponginae							
Pongo pygmaeus	2	1	48				
Pan troglodytes	2	2	48	8	7	48	10
Pan paniscus	1		48				

chromosomes of 54. In the genus *Cercopithecus*, different species have a modal number of 54, 60, 66, 72 chromosomes. It is noteworthy that all these numbers are multiples of 6.

While these data cannot be interpreted at the moment, they indicate that some evolutionary mechanism has been at work in changing the number of the centromeres. Some preliminary data made us think that the Robertsonian mechanism of centric fusion had played an important role in such a variation.

The difference between the data of CHU et al.[2] and my own concerning *Cercopithecus l'hoesti* may be due to misclassification or to racial variation. Taxonomic criteria which can be used to distinguish *C. l'hoesti* from *C. mitis* are not clear cut[5]. The difference in numbers (60 vs. 72) could thus be due either to uncertainty in attributing the animals used to the said species, or to chromosome variation within a species.

In addition to the chromosome numbers it is of considerable importance to examine the comparative morphology and size of chromosomes of the various species. This is the immediate purpose of the work I shall continue in the near future.

Chromosome counts are a necessary preliminary step in comparative karyology, but are not sufficient. The shape and size of chromosomes also needs to be taken into account. I propose to continue my investigations on this material along these lines[11].

Riassunto. L'autore sta conducendo uno studio comparativo sui cromosomi dei Primati. Nella presente nota riferisce sulle variazioni numeriche riscontrate nelle Scimmie Catarrine.

B. CHIARELLI[12]

Istituto di Genetica, Università di Pavia (Italy), March 8, 1962.

[5] N. TAPPEN, Cur. Anth. *1*, 91 (1960).
[6] C. D. DARLINGTON and A. HAQUE, Nature *175*, 32 (1955).
[7] K. H. ROTHFELS and L. SIMINOWITCH, Chromosoma *9*, 163 (1959).
[8] P. I. SHIWAGO, Boll. Biol. Med. exp. U.R.S.S. *8*, 3 (1939).
[9] N. TAPPEN, Quoted in CHU and BENDER (1961).
[10] W. J. YOUNG, T. MERTZ, M. A. FERGUSSON-SMITH, and M. A. JOHNSTON, Science *131*, 1672 (1960).
[11] *Acknowledgments.* I am indebted to the Director of the Zoos of Turin, Rome, Naples, Hannover, Gelsenkirchen, Amsterdam, Rotterdam, Paignton, Chessington, and Chester, for having put the animals at my disposal for the biopsis and to Prof. C. P. KOLLER of London and Prof. F. TWIESSELMANN of Bruxelles for their kind hospitality in their laboratories during the preparation of the cultures.
[12] Present address: Istituto di Antropologia, Università di Torino (Italy).

Electron Microscope Observations on the Action of Vitamin E on the Uterine Smooth Muscle Cells

It is well known that the action of vitamin E on the uterine structures is similar to that of folliculine. Such action, which is evident in ovariectomized animals, is particularly important at the level of the circulatory system and the muscular wall of the uterus[1]. The development of the muscular layer may be due to either an indirect action through an increase of the blood supply and hence to better nutritional conditions, or a direct action on the metabolism of the muscle cells. It is known that vitamin E plays a significant role in glucose utilization by the muscle cells through increased oxidative

[1] G. TUSINI and I. VANDELLI, Arch. int. Pharmacodyn Thérap. *86*, 16 (1951).