divisions were not observed except for telophase figures in the 50-µg/ml treatment. Among the treated cells, many had faintly staining nuclei or were lacking a nucleus altogether.

Discussion. The effects of vinblastine on meristematic cells vary with the concentration of the drug. With treatments of 20–100 µg/ml over 2–18 h, frequent abnormalities of increasing severity were observed. Among these, we note especially: a) accumulation of mitotic cells at prophase and metaphase; b) chromosome contraction and C-metaphases; c) appearance of sticky bridges at anaphase; d) multipolar divisions at anaphase and telophase; e) micronucleus formation at telophase; f) faint staining reaction of nuclei or chromosomes at all stages; g) surviving cytoplasts without a nucleus; and h) degenerative breakdown of nuclei and chromosomes at all stages. Among these aberrations, C-metaphases and multipolar divisions have already been reported[2]. If it is admitted that vinblastine chiefly inhibits the function of the spindle poles, we nevertheless believe that we have shown that other lethal effects, not directly connected with the spindle poles, are mediated by this compound.

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Remarks on the karyotype of the Polypteriformes. The chromosomes of *Polypterus delhezi, P. endlicheri congicus* and *P. palmas*

S. Cataudella, Luciana Sola and E. Capanna

Istituto di Anatomia Comparata, Università di Roma, via Borelli 50, I-00161 Roma (Italy), 19 December 1977

Summary. The chromosomes of 3 species of bikirs (*Polypterus delhezi, P. endlicheri congicus* and *P. palmas*) were studied in somatic metaphases. The diploid number was found to be 2 n = 36 in all the species and a basic morphological identity of the karyotype emerges from karyogram comparison not only in the 3 species described herein, but also in the other Polypteriformes already studied.

Two papers in Experientia, by Denton and Howell[1] and from our group[2], presented the karyotype of 2 Polypteriformes (*Polypterus palmas* and *Calamoichthys calabaricus*), a group of bony fishes for which no karyological information had previously been available. Both papers stressed the fact that as regards chromosome number, shape and size, the Polypterine karyotype was closer to that of the Dipnoans and Amphibians than to that of the primitive Actinopterygians (Chondrostei) with which the Polypteriformes are normally associated[3,4]. The karyological evidence thus supports the view of those workers[5–8] who have given the Polypteriformes a quite peculiar place in the phylogenesis of the bony fishes, occasionally assigning them to a separate subclass (Brachiopterygia), acknowledging that they are closer to the radiation of the Sarcopterygia (Coelacanthidae)[9]. Schaeffer's position is very interesting in this regard[10]; he hypothesizes 'a close relationship between the Polypterids and the generalized Devonian Paleonisciforms. Such a hypothesis implies a separate lineage extending back into the Paleozoic, for the Polypterids'. All these considerations have led to a more thorough analysis being made of Polypterid karyology with a view to giving, through the study of the karyotype of other species, a general value to evidence based on 2 species alone.

During an expedition on the Zaire river, the opportunity presented itself of examining 10 bikirs belonging to 3 different species, i.e. *Polypterus palmas* Ayres (4 immatures and 1 female from Mbandaka), *Polypterus endlicheri congicus* Boulanger (1 immature, 1 male and 1 female from Mbandaka) and *Polypterus delhezi* Boulanger (1 immature and 1 female from Kinkole, Kinshasa). The material utilized for this paper has been deposited with in the National Museum La Specola in Florence (Italy). Normal air-drying technique[11] was used for the somatic metaphases, although owing to the difficulties involved in on-the-spot preparation, the quality of the slides is not the best. Nevertheless the interest presented by the species examined warrants a brief description of them. In any case, it has been possible to examine at least 20 good quality metaphases for each specimen.

In all species examined (figure 1) the diploid number was found to be 2 n = 36. No morphological differences were observed in *P. endlicheri* in comparisons made between karyotypes of individuals of both sexes. For the purpose of karyotype characterization, the chromosomes were divided into 3 size groups, as was done in our previous paper[2], i.e. a) large chromosomes with an average length of > 4 µm; b) medium size chromosomes with an average length between 3.5 and 2.5 µm; c) small chromosomes with a length of < 2.5 µm.

In the case of the large and medium size chromosomes, in which centromeric index evaluation did not involve serious

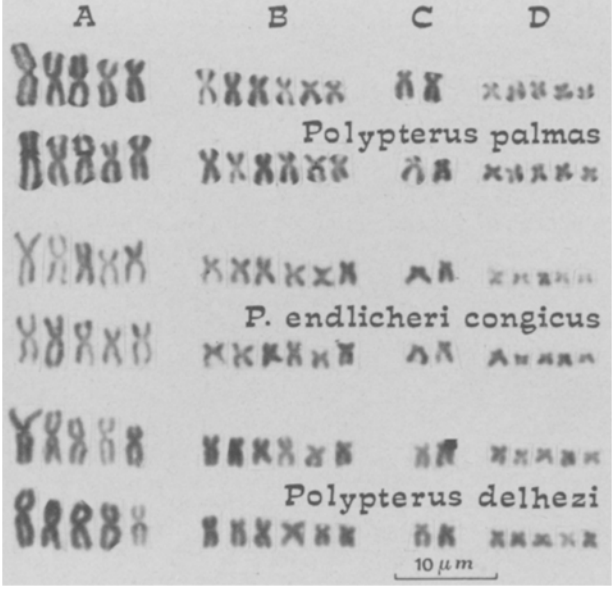

Fig. 1. Karyotypes of the 3 species of bikirs analyzed in the present paper. *A* Large metacentric chromosomes, *B* medium size metacentrics, *C* medium size submetacentrics, and *D* small chromosomes.

measurement errors, a distinction was made according to the criteria suggested by Levan at al.[12], also between metacentrics and submetacentrics. It was thus possible to divide the chromosomes of the bikirs investigated into 4 groups: A) large metacentric chromosomes; B) medium size metacentric chromosomes; C) medium size submetacentrics; D) small chromosomes. From this it can be seen that in all 3 species analyzed in this report, as well as in *Calamoichthys calabaricus*[2], the karyotype is basically the same and comprises the same number of chromosome pairs in each group, i.e. 5 in the group A, 6 in B, 2 in C and 5 in D (figure 2). Also comparison with the figures of the karyogram of the bikirs given by Denton and Howell[1] conforms to the basic similarity existing between all the polypterines whose karyotype is now known. In fact, the differences pointed out[1] mainly concern the position of the centromere in small chromosomes, in which centromeric calculation is found to be debatable, together with slight differences in arm ratio in the medium size chromosomes, as revealed by a karyometric method. Considering the high degree of variability in the material presented, as the authors themselves point out in their table II, these differences are not particularly significant.

In the light of these considerations, the cytological evidence for a separation between primitive Actinopterygia and Polypteriformes (Brachipterygia) can be said no longer to depend on an exceptional find in 2 species, but it is supported by evidence of an uniform and presumably stable and ancient karyotype found in 4 species belonging to 2 living genera, that is in all the living genera and one third of the living species comprising this group.

We do not claim that these observations will put an end to the longstanding dispute over Polypterine relationships, but we can be said to have added to the 'confusing mass of embryological, morphological physiological and chemical data'[10] cytotaxonomic evidence whose significance in any phyletic reconstruction, although open to criticism[13], may be considerable.

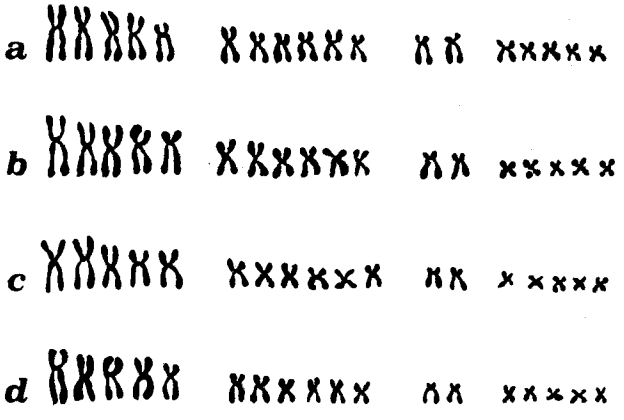

Fig. 2. Comparison among the karyotypes of 4 Polypterine fishes: *a Calamoichthys calabaricus, b Polypterus palmas, c Polypterus endlicheri congicus, d Polypterus delhezi.*

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Progressive resistance against the male recombination factor 31.1 MRF acquired by *Drosophila melanogaster*

G. Yannopoulos[1]

Department of Genetics, University of Patras, Patras (Greece), 29 December 1977

Summary. A genetically abnormal but structurally normal second chromosome (31.1 MRF) which induces recombination in the male sex, was introduced by outcrossing into the cytoplasm of a normal strain. In this new combination, male recombination frequency induced by females dropped from 3.81% to 0.17% whithin 10 generations, indicating a gradual acquisition of resistance against the activities of the 31.1 MRF.

In Dipterans, meiotic recombination is normally absent in the male sex. Various mutant types have been found especially in *Drosophila*, where this restriction is removed to some extent. Nearly all male recombination systems examined in *Drosophila melanogaster* since 1971[2] have shown a reciprocal-cross effect with respect to male recombination frequencies, as well as to sterility, lethal and visible mutations, segregation distortion and chromosomal abnormalities at male meiosis[3-11]. However, neither chromosomal abnormalities[10,11] nor sterility (unpublished data) have been observed in our inbred stock showing male recombination.

A 2nd chromosome (symbol 31.1 MRF) was isolated, by means of the Cy L^4/Pm method, from a large natural population from Southern Greece (Peloponnesus) during autumn 1971. The chromosome was found to be inversion free and kept balanced with an In(2L)Cy + In(2R)Cy, Cy L^4 sp^2 chromosome designated below as Cy L^4, for it is lethal in homozygotes. This 31.1 MRF chromosome was found to induce male recombination, both in the II- and III-chromosomes. Moreover, we have observed that male recombination was always associated with chromosomal abnormalities at male meiosis. It is also worthwhile mentioning that the phenomenon was temperature-sensitive in larval stages and that the 31.1 MRF expresses its effect independently of sex. Our previous data favour the assumption that the reciprocal-cross effect is due to a cytoplasmic factor[9,11].

The aim of the present investigation was to study whether the ability of suppressing male recombination and chromosomal abnormalities at male meiosis could be acquired by