Mean and SD for relative ADH activities of 4 T(Y:2) translocation stocks

	G 74	A 80	P 58	B 210
Females	0.256±0.068	0.238±0.047	0.209±0.045	0.227±0.047
Males	0.204±0.052	0.219±0.063	0.168±0.059	0.217±0.068
Total	0.230±0.063	0.228±0.053	0.188±0.054	0.222±0.055

N = 10. Pooling male and female data, $p \leq 0.05$ for all comparisons of stock P58 versus the other stocks.

heterochromatin is nearer to *Adh*. Fly sizes were similar in each strain, though some part of the difference in relative activities could be due to minor position effects or genetic differences affecting fly size. Whether due to amount or to the relative position of heterochromatin, however, the apparent position effect upon *Adh* is small. Thus, these experiments should be repeated with the more effective centromeric heterochromatin when appropriate stocks become available.

Finally, it is interesting to note that these observations are consistent with our growing knowledge of the control and transcription of the *Adh* locus. A presumptive control mutation affecting ADH activity has been isolated by Thompson, Ashburner and Woodruff[7] and mapped proximal to *Adh*. This is consistent with the position effect data showing decreased activity, perhaps through inactivation of a control locus, when heterochromatin is inserted proximal to *Adh*.

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Isostaining and iso-nonstaining in 5-bromodeoxyuridine-substituted *Vicia faba* chromosomes

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Summary. Isostaining and iso-nonstaining was studied by the fluorescent plus Giemsa (FPG) technique after immersion of *Vicia faba* roots in 5-bromodeoxyuridine (BrdUrd) for about 1 cell cycle (17 h) and in thymidine (19 h) for another one. Both phenomena were seldom observed, never occurred together in the same cell, and are interpreted as being due to deviations of the cell cycle duration.

Isolabelling (silver grains observed in both chromatids in certain positions of a chromosome) or iso-nonlabelling (absence of silver grains at a certain position of both chromatids of 1 chromosome) were detected by autoradiography in the course of the 2nd and 3rd mitosis after incorporation of ^{3}H-thymidine into chromosomal DNA by a number of authors[3,10]. Different interpretations of these phenomena have been given:

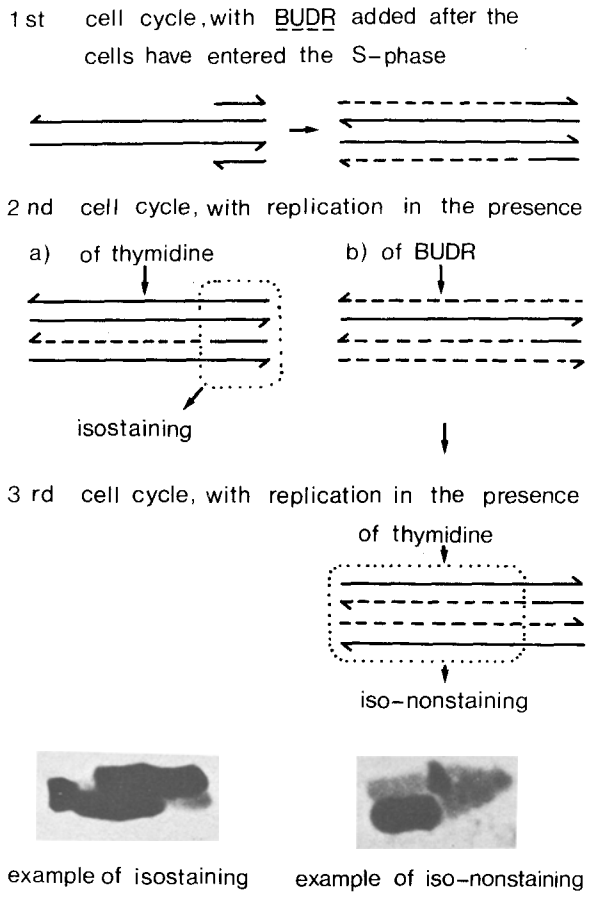
1. Sister chromatid exchanges (SCEs) on the basis of single strand DNA exchange could be responsible for these phenomena. For kinetic reasons, this seems to be an improbable explanation[3].

2. Somatic crossing-over between homologous chromosomes could also cause the phenomena. The absence of simultaneous occurrence of isolabelling and iso-nonlabelling in homologous chromosomes of the same cell[3], as well as the rather weak correlation between sites of chromatid translocations and SCEs[8], are not in accord with this hypothesis.

3. The presence of true subchromatids and the lack of semiconservative segregation of DNA could be another reason for isolabelling, or 4., as an alternative explanation to 3., isolabelling could be due to autoradiographic image spread at the sites of exchanges of very small parts of chromatin. This was indeed found by Wolff and Perry[9]. As far as we know, Luchnik and Porjadkova[5] were the first to report isostaining, which corresponds to isolabelling, after application of the FPG-technique on γ-irradiated human lymphocytes; they interpreted it as evidence for a polynemic chromosome structure, i.e., for the existence of true subchromatids in chromosomes.

During our studies of the intrachromosomal distribution pattern of SCEs[8] in *Vicia faba*, we occasionally found in the slides from some roots chromosomes with isostaining or iso-nonstaining. Using a slightly modified version of the FPG technique according to Kihlman and Kronborg[4] (for methods used, see Schubert et al.[8]), we normally did not come across these phenomena. Among 159 differentially stained metaphases from 5 different slides in which isostaining and iso-nonstaining occurred, respectively, 14 metaphases (8.8%) showed isostaining and 4 metaphases (2.5%) showed iso-nonstaining. In none of these cases, however, did the 2 complementary situations occur together in the same cell. For this reason, the first 2 interpretations mentioned above may be excluded.

Instead of assuming the existence of true subchromatids, a simple explanation for the exceptional occurrence of iso- or iso-nonstaining, at least in *Vicia faba*, would be a deviation in cell cycle duration (cell cycle data of the karyotype used[6,7]). If BrdUrd treatment for 17 h corresponds to the duration of approximately one cell cycle, and if some cells, which at the beginning of BrdUrd application already have started or just finished DNA replication, need more time (about 21–22 h) for passing a complete cell cycle, then the



Origination of isostaining and iso-nonstaining, respectively. Full line: chromatid without BrdUrd, broken line: chromatid with one BrdUrd-substituted DNA strand. *a* Possible mechanism of origination of 'isostaining' after BrdUrd incorporation; *b* possible mechanism of origination of 'iso-nonstaining' after BrdUrd incorporation.

occurrence of isostaining in these cells can be explained according to the scheme shown in the figure a. On the other hand, the phenomenon of iso-nonstaining could result from a faster cycling (e.g. 16 h) of some cells, i.e., cells that have passed the period of DNA synthesis more than once during the 17 h of BrdUrd application (figure, b). With respect to isolabelling observed autoradiographically, Wolff et al.[10] arrived at a similar interpretation. Crossen et al.[2] also reported iso-nonstaining in cells exposed to BrdUrd for more than 2 cell cycles. Additionally, it may be possible that fast cycling cells pass, prior to the last DNA-replication period in thymidine, 2 DNA-replications which are only incompletely covered by the time period of BrdUrd application. Under these circumstances, the late replicating sections of the 1st cell cycle, and the early replicating sections of the 2nd, may incorporate BrdUrd. If chromosome regions which had incorporated BrdUrd during both cell cycles overlap, isostaining or iso-nonstaining may occur after an additional cell cycle in thymidine. The differences in the frequency of appearance of isostaining and iso-nonstaining between slides from different individual roots (ranging from 0 to 24%) support our interpretation, since significant deviations of cell cycle parameters have been found to occur also between individual roots[6].

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Karyotypic variation in Chilean lizards of the genus *Liolaemus* (Iguanidae)

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Summary. Most of 12 taxa karyotypes retain 6 pairs of metacentric macrochromosomes (primitive), but show reduced numbers of microchromosomes (2n = 34, 32 and 30). Others show increased diploid numbers due to macrochromosomal fissions (up to 4 fissions, 2n = 40). One shows a fission polymorphism.

Among karyotypically well-studied lizard families, iguanids show a great range of chromosomal diversity, largely due to Robertsonian mutations[2,3]. Most iguanid genera are small and retain primitive 2n = 36 patterns (12 metacentric macrochromosomes, 24 microchromosomes)[2,3], while most of the variability is concentrated in the 3 especially large genera, *Anolis, Sceloporus,* and *Liolaemus*[3]. The first 2 genera are well-known cytologically, but *Liolaemus* is poorly documented. Karyotypes are published for only 3 species, all with 2n = 34: *L. pictus* and *L. cyanogaster* from Chile[4], and *L. lutzae* from Brazil[5]. Unpublished evidence[6] suggests that *Liolaemus* 2n's may range from 30 to 40. Since more than 60 species of *Liolaemus* are found in Chile[7], many of them endemic, a survey of their chromosomal variability should be of considerable interest. Here we summarize results for 12 species and subspecies. Details will be published elsewhere.

Table 1 lists the species[8] and localities sampled. Voucher specimens actually are deposited in the collection of the laboratory of Cytogenetics of Facultad de Ciencias, Universidad de Chile. Chromosomes were prepared from bone marrow, spleen and testis of colchicine-treated animals using the well-known air-dried cell suspension technique[9]. Slides were stained with Giemsa. For each specimen, selected metaphases were photographed with a Leitz Ortholux microscope and several karyotypes analyzed.

Table 2 summarizes our results. Interspecific, intersubspecific and intrapopulation variations in chromosome numbers are documented. 2n's in the sample range from 30 to 40, due to changes in both macrochromosomes and