than when other acids were used to resolubilize the same protein preparation. Thus it is possible that unknown chemical determinants in collagen assume 'more favored' antigenic conformations under acidic pH as a function of the acid anion. Hence highly specific differences in connective tissue proteins can be discerned immunologically, permitting evaluation of collagen molecules containing unusual amino acids produced through tissue culture[12] in autoimmune pathogenesis[13].

Zusammenfassung. Im Meerschweinchen wurde erfolgreich Antikörper gegen Ratten-Kollagenextrakt erzeugt. Dieser reagiert mit der säurelöslichen Kollagenfraktion, nicht aber mit neutralsalzlöslichen Substanzen. Die Spezifität des Antikörpers soll für die weitere Erforschung von degenerativen Autoimmun-Krankheiten benützt werden.

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Mutagenic Effect of Isopropyl Methane Sulphonate in Mouse

The mutagenic effect of sulphonates has been investigated in several biological materials. For some of them, chromosome breaking ability was demonstrated[1].

However, there is still a great need for experiments on mammals. The effects of Myleran, a difunctional sulphonate, were observed on mouse spermatogenesis[2]. A similar investigation was carried out with a monofunctional compound: methyl methane sulphonate in which we attempted to correlate the cytological effect with its genetical consequences[3]. More recently, experiments were designed to detect dominant lethal mutations induced in mouse by alkylating agents. Some mutagenic effect of the compound tested here were mentioned for the mouse[4]. This sulphonate has been known for its mutagenicity in higher plants[1,5]. Early works in mouse (unpublished data) showed that isopropyl methane sulphonate (IsoPMS) is able to induce chromosome aberrations which incited us to test its mutagenic power. The results of the first experiments, dealing with dominant lethal mutations, are reported here.

Material and methods. Male mice of C_3H (4 months old, weighing approximately 30 g) previously controlled during 4 years for spontaneous chromosome aberrations, were injected i.p. with IsoPMS. Buffered solutions were prepared immediately before use. Injected males were mated with 4 $C_{57}BL$ females of a completely unrelated strain. Vaginal plugs were checked every day and fresh females were added. They were sacrificed at 14 days' pregnancy. Dominant lethal mutations were recorded following classical procedure[6]. The percentage of dead implants is for deciduomata.

Early losses represent both deaths of zygotic origin and unfertilized eggs. 2 criteria were used to measure dominant lethality. One was the ratio live embryo/corpus luteum. The other criterion is the live embryos after treatment expressed as percentage of the control,

$$\text{Dominant lethal mutants} = 100 - \left(\frac{\text{Live embryos in treated group per } ♀}{\text{Live embryos in control group per } ♀} \times 100 \right)$$

This technique does not yield any specific information on the nature of mutations involved.

However, early deaths should have a higher probability of gross chromosome abnormalities which would not be the case of deciduomata[7]. This would help to distinguish the 2 classes of dominant lethals.

Results. Toxicity tests were first realized to select doses useful in mutagenesis. LD_{50} ranged from 60–120 mg/kg for 4-month-old animals (according to the strain).

From these data the dose of 100 ml/kg was chosen for further experiments. The total period (60 days) during which dominant lethal mutations were scored was divided in 4 subperiods: (1) mature spermatozoa from vas and epididymis; (2) post-meiotic stages from testes; (3) meiotic stages (spermatocytes); (4) pre-meiotic stages (spermatogonia). This estimate is from OAKBERG's[8] data on the duration of the different stages of spermatogenesis.

The effects on the pre-meiotic stages could not be recorded owing to the sterile period which lasted from 37 days to about 60 days after injection. Data for the 3 first periods are given in the Table. They show clearly that IsoPMS is an efficient mutagen in inducing dominant lethal mutations.

There is no significant difference between the amount of total mutations induced during the 3 periods. In the third period (spermatocytes), however, there are significantly less dead implants and more early losses as compared with the 2 first periods.

$\chi^2 = 6.05$ 2 df $P < 0.05$ for dead implants,
$\chi^2 = 10.06$ 2 df $P < 0.01$ for early losses.

Discussion. Some daily differences in the amount of induced dominant lethal mutations seem to exist but the data reported here are still too scanty to ascribe a more precise sensitivity to a specific stage. As far as we can see, the sensitivity of spermatogonia to IsoPMS was so high that it resulted in a complete sterility. The present data are in agreement with previous ones in at least 2 respects (1) for a high mutation rate induced by IsoPMS (the higher dose of 200 mg/kg resulted in 80–90% dominant lethal mutations)[4] and (2) the occurrence of a sterile period (after 50 mg/kg males were sterile from 31–56

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Effects of Iso-PMS (100 mg/kg) on different stages of mouse spermatogenesis

Stage	Days after injection	Number ♀ tested	Corpora lutea	Dead implants	Live embryos	Early losses	Ratio live embryos/ corpora lutea	% dominant lethal mutations
Spermatozoa of vas and epididymes	1	15	144	25	111	8	0.77	13.85
	2	6	46	9	35	2	0.76	32.13
	4	14	127	47	74	6	0.58	38.42
	7	5	32	9	11	12	0.34	74.39
	Total	40	349	90	231	28	0.66	32.78
Control	Total 1–7	32	305	25	275	5	0.90	0
Post-meiotic stages	8	5	44	11	33	0	0.75	22.81
	11	4	39	11	26	2	0.66	23.98
	14	6	44	16	21	7	0.47	59.06
	15	8	68	19	49	0	0.72	28.30
	16	7	50	22	28	0	0.56	53.22
	19	7	59	24	35	10	0.59	41.52
	Total	37	304	103	182	19	0.59	39.30
Control	Total 7–14	31	300	33	265	2	0.88	0
Meiotic stages	24	8	87	17	61	9	0.70	12.40
	28	10	91	22	63	6	0.69	27.67
	29	3	31	9	17	5	0.54	34.91
	33	5	44	10	30	4	0.68	31.12
	35	1	10	0	8	2	0.80	8.16
	36	6	74	8	52	14	0.71	4.6
	37	2	16	1	12	3	0.75	31.11
	Total	35	353	67	243	43	0.69	20.32
Control	24–37	31	299	27	270	2	0.90	0

days). The pattern of IsoPMS effects are very different from other alkylating agents. The significant increase in early losses observed after treatment of spermatocytic stages could be imputed to a stronger disturbance of the meiotic processes which could result in gross chromosomal abnormalities in the gametes. This is also in agreement with previous data in the literature[7]. Further experiments are in progress designed to correlate the present findings with cytological effects, and to specify the sensitivity of each stage especially spermatogonia.

Résumé. Après avoir réalisé divers tests de toxicité, nous avons injecté des souris mâles par le méthane sulfonate d'isopropyl. Une dose de 100 mg/kg induit plus de 30% de mutations. Pour les stades méïotiques, la proportion de déciduomes est plus faible et la proportion de morts avant implantation plus élevée que pour les stades post-méïotiques. La période mutagène est suivie d'une période stérile (du 37me au 60me jour après injection) qui correspond probablement au traitement de stades spermatogoniaux.

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The Chromosomes of Two Species of the Genus *Oryzomys* (Rodentia-Cricetidae)

South American cricetids constitute a group characterized by a great variety of forms; according to PATTERSON and PASCUAL[1] this group appeared no later than the Upper Pliocene. Undoubtedly we are in the presence of a group of taxa in rapid evolution, with considerable radiation and many monotypical and specialized forms. *Oryzomys* is a primitive genus that contains the largest number of species described at present; according to CABRERA[2] there are 48 South American species of this genus in 7 subgenera. Endemic to this region and the south of North America, this genus is in need of a serious systematic revision, although it is evident that it is characterized by considerable intrageneric diversity.

As in all South American cricetids, very little is known about the chromosomes of this genus. BRUN[3] studied the species *Oryzomys flavescens* from the Republic of Uruguay and found a diploid number of 60 with a majority of acrocentric chromosomes. We studied *Oryzomys albigularis* and *Oryzomys delicatus* from Venezuela, 2 species which belong to the subgenus *Oryzomys* according to CABRERA[2]. TATE[4], however, places *O. delicatus* within the subgenus *Oligoryzomys*; the status of this subgenus is questioned by some authors.

We studied 3 females of the species *O. albigularis*, probably belonging to the subspecies *O. a. caracolus*[5]. These specimens are deposited in the Museo de Biologia of the Universidad Central de Venezuela with the

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