Females exposed to the transplacental action of DHS and DES were sterile throughout life. They never became pregnant, even if kept together with males for a month or more. After sigetin most rats reproduced normally even after 1 year, in agreement with the observations of Kosheleva [2].

Testosterone propionate caused masculinization in 47 females. In six males unilateral cryptorchidism was observed, and in five atrophy of the testes. DHS and DES caused atrophy of the testes, their appendages, and the prostate in many males, and in two males they caused additional development of a vagina.

These investigations thus showed that administration of synthetic sex hormones (except sigetin), capable of passing through the placental barrier, to rats on the last 3 days of pregnancy led to frequent disturbance of the course of pregnancy, parturition, and lactation. The sex hormones had a masculinizing and sterilizing action on the progeny of the rats. Sigetin had no significant effect on embryogenesis and the progeny retained their normal ability to conceive.

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CHARACTERISTICS OF STAGES OF THE PREIMPLANTATION PERIOD OF LABORATORY MOUSE EMBRYOS

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KEY WORDS: duration of cleavage stages; hybrid mice.

Definite differences have been found in the times of cleavage of mouse embryos of different strains [3, 6]. However, there have been few studies of this problem.

The object of the present investigation was to make a more detailed study of the duration of each cleavage division in mouse embryos.

EXPERIMENTAL METHOD

Experiments were carried out on (CBA × C57BL)F_1 hybrid mice from the Rappolovo Nursery. Exact dating of the beginning of pregnancy [4], and synchronization of ovulation and fertilization of the ova in animals of each group were used. The embryos were studied throughout the cleavage period every 2 h starting from the time of insemination of the female. Blastomeres were counted either on total preparations or on air-dried films [5]. The duration of the individual stages of development was determined by calculating the ratio between the number of embryos at particular stages of cleavage and the total number of embryos studied at that time.

EXPERIMENTAL RESULTS

Zygote. Penetration of the spermatozoon into the cytoplasm of the ovum took place 4-5 h after insemination, and after 19-20 h (Table 1) the majority of embryos had completed the 1st cleavage division. It can therefore be concluded that the unicellular stage lasts about 14-16 h.

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TABLE 1. Distribution of (CBA × C57BL)F_1 Hybrid Mouse Embryos (in %) by Stages of Cleavage

Time of investigation after insemination, h	Number of females	Number of ova	Preimplantation stages of development									
			metaphase	zygote	number of blastomeres							blastocyst
					2	3	4	5—7	8	9—16	17—32	
2	3	15	100									
4	5	32	84,4	15,5								
6	23	145	12,4	87,6								
8	11	70		100,0								
10	5	33		100,0								
12	4	27		100,0								
14	5	35		100,0								
16	24	148		95,9	4,1							
18	15	101		82,1	17,9							
20	12	86		16,3	83,7							
22	7	30			100,0							
24	3	15			100,0							
26	7	41			100,0							
28	4	31			100,0							
30	4	23			100,0							
32	4	23			100,0							
36	4	26										
40	5	33			18,2	27,3	54,5					
42	2	14					100,0					
44	9	65					96,9	3,1				
46	5	34					64,7	35,3				
48	6	40					17,5	52,5	30,0			
50	5	40					12,5	20,0	67,5			
53	4	22							86,4	13,6		
55	3	20							15,0	85,0		
57	3	19								100,0		
64	3	18								100,0		
66	5	35								48,6	51,4	
68	5	31								29,0	71,0	
70	4	25									100,0	
72	4	22									45,5	54,5
74	3	17									11,8	88,2
80	2	11										100,0
82	4	—										

Stage of 2 Blastomeres (1st cleavage division). The first appearance of bicellular embryos occurred 18-20 h after copulation, but after 40 h no bicellular embryos could be found (Table 1). Consequently the stage of 2 blastomeres lasts 20 h.

Stage of 4 Blastomeres (2nd cleavage division). The 2nd cleavage division may occur simultaneously in both blastomeres or in only one of them, as shown by the presence of a stage of 3 blastomeres. Embryos at the 3-4 blastomere stage appeared 40 h after insemination. The number of embryos at this stage reached a maximum after 42-44 h and fell sharply until 50 h. The duration of the stage of 4 blastomeres is thus 8-10 h.

Stage of 4-8 Blastomeres (3rd cleavage division). The 3rd cleavage division, leading to the formation of an 8-blastomere embryo, occurred 44 h after copulation and ended by 53 h. Desynchronization of divisions of individual blastomeres led to the appearance of intermediate stages [1, 2], when the embryos consisted of 5-6 or 7 blastomeres. The transition from 4 to 8 blastomeres was completed by the embryos in the course of 9-11 h.

Stage of 9-16 Blastomeres (4th cleavage division). Early morulas, consisting of more than nine cells, appeared by 53 h and completed their transition to the 16-blastomere stage in the course of 12-13 h.

Stage of 17-32 Blastomeres (5th cleavage division). In this stage the morula is converted into a blastocyst, i.e., the embryoblast and trophoblast are differentiated, fluid accumulates, and the blastocyst cavity is formed. More than half of all the embryos studied, which were taking part in these processes, were found 72 h after insemination. Migration of the blastocysts from the uterine cavity into the implantation crypts takes place after 80-82 h, for at that time no embryos could be flushed out of the uterus. This is evidence that the preimplantation period of the embryos evidently lasts about 80-82 h.

A characteristic feature of the preimplantation period of development of (CBA × C57BL)F_1 hybrid mouse embryos is thus lengthening of the first two stages, namely the stages of zygote and 2 blastomeres, which take 15-16 h and 20 h respectively. In the course of

cleavage, the duration of the stages becomes shortened by about half. The stage of 4 blastomeres is the shortest in its duration, which is 8-10 h.

A similar duration of the individual stages of cleavage has been found in the case of C57BL mouse embryos [2]. However, the duration of the zygote stage in C57BL embryos is 26-30 h, whereas in (CBA × C57BL)F_1 embryos it is 14-16 h. These differences may perhaps be attributed to the use of different methods for dating pregnancy. The duration of all stages of cleavage in the mouse embryos studied in the present investigation differs from that in mice of inbred lines BALB and 129 and their hybrids [3, 6]. For instance, the zygote stage in mouse embryos of line 129 takes 29 h, compared with 26 h for BALB mice. The stage of 2 blastomeres in mouse embryos of line 129 occupies 21 h, compared with 25 h for BALB mice. The stage of 4 blastomeres in embryos of both lines was fairly long, taking 14 h. The shortest stage was that of 4-8 blastomeres, which lasted 4 h in BALB embryos and 10 h in mouse embryos of line 129. The features distinguishing the duration of the stages of cleavage in (CBA × C57BL)F_1 hybrid mice from those of other strains of mice, observed in the present investigation, agree with the view that genetic differences between mice are reflected in the duration of the stages of cleavage [3, 6].

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EFFECT OF DIHYDROTACHYSTEROL ON BONE TISSUE IN RATS WITH EXPERIMENTAL RENAL INSUFFICIENCY

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Recent data on the character of the effect of the vitamin D analog dihydrotachysterol (DTS) in renal osteodystrophy are contradictory. According to Kaye et al. [5], the compound stimulates calcium absorption in the intestine, raises its blood level, depresses alkaline phosphatase activity in the blood serum, and weakens the roentgenological and histological manifestations of renal osteodystrophy. However, Pogglitsch et al. [7] found that DTS aggravates the manifestations of this process in the bones and increases the "demineralization of the skeleton."

It was accordingly decided to analyze the effect of DTS on the state of the bones in experimental renal insuffiency (RI).

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