

the same titer as the homologous virus and hence might be considered a "prime" strain of type 18. Since type 18 virus is not known to hemagglutinate, it cannot be checked in this direction by HI. In view of its hemagglutinating properties, it is proposed that BP-7 virus be considered a distinct serotype until its relationship to type 18 can be evaluated by further studies.

BP-6 and BP-7 viruses were not tested against the "type 19" virus described by Zhdanov and Dreizin(5) since it has been shown(6) that this virus is identical with type 21 described by Bell, *et al.*(7).

The data presented here and that described previously(1,2) indicate that neutralization and HI tests do not always show parallel relationships among adenoviruses. Which, if either, of these two types of tests yields the more significant information is presently unknown. It is obvious, however, that if one of the methods is used exclusively, some simi-

larities and differences will not be detected.

Summary. "Prime" strains of adenovirus types 16, 17, and 27 and 2 possible newly recognized adenoviruses are described. Data are presented on cross HI reactions among members of 2 adenovirus subgroups.

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Effect of Varying Doses of Progesterone on Implantation in the Ovariectomized Hamster.* (27627)

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Implantation takes place without delay in females ovariectomized in the first 4 days of gestation and given 2 or 3 mg of progesterone daily from time of ovariectomy to time of autopsy on the 7-9th day(1,2). The present experiment was designed to study the effect of small doses of progesterone on implantation in the castrate hamster, and to determine if very small doses could induce delay such as that described for the rat by Chambon(3).

Materials and methods. Virgin females weighing 80 to 130 g in which several normal cycles had been followed were used. Females were placed overnight with males of known fertility, or, for animals raised under reverse light and dark conditions (LD), actual matings were observed. Presence of sperm was confirmed by vaginal smears. For this pa-

per, day 1 of pregnancy was the day in which sperm were detected or the day following the observed matings in the LD colony. Ovariectomies were performed on day 2 and synthetic U.S.P. progesterone administered from time of ovariectomy to day of autopsy, day 6, 7 or 9, when conceptual swellings are easily visible. All injections were administered in $\frac{1}{4}$ cc of corn oil subcutaneously. The dose of progesterone was decreased progressively from 2 mg to .0312 mg.

Each animal was isolated after ovariectomy, maintained on Purina Laboratory Rat Chow and water, weighed and examined daily for the appearance of the vaginal phenomena (4).

At autopsy the entire tract was removed, pinned out on aluminum foil supported by cardboard, and fixed in AFA (3 parts 95% alcohol, 1 part commercial formalin, 1 part

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glacial acetic acid and 5 parts water). The number of implantations and condition of each was recorded. When the tract showed no indication of implantation one or both horns were flushed with normal saline prior to fixation.

All tracts were slowly dehydrated through ascending alcohols with a few drops of Superoxal added to the lower alcohols for bleaching, and cleared through benzol to benzyl-benzoate. They were then reexamined by oblique light for completeness of ovariectomy, the stage of development of the conceptuses and condition of resorption sites. They were compared with normal tracts and earlier stages of development. The various stages of development during the 5th to the 9th day are easily distinguishable by this technic.

Four control groups were used: 1) ovariectomized and given 1 μ g of estrone in $\frac{1}{4}$ cc of corn oil daily; 2) ovariectomized and given

corn oil alone; 3) ovariectomized and not injected; and 4) the bursa was opened, the ovary was exposed but not removed and no injections were given.

Observations. Table I summarizes the results obtained in the experimental and control series, and shows the variations in experimental design.

Three of the 9 animals in Series E (.125 mg progesterone) failed to show any indication of implantation; one of the series showing normal sized implantations had one tiny opacity as well.

Six of Series F (.0625 mg progesterone) had no sign of implantation nor were ova recovered by flushing. Two of the 7 animals showing indications of implantation had conceptual swellings typical of the normal at time of autopsy, 2 showed only small opaque masses which in no way correspond to normal stages, while 3 animals formed a transitional

TABLE I. Effect of Varying Doses of Progesterone on Nidation in the Castrate Hamster.

	No. of animals	Progesterone per day (mg)	Day of autopsy	No. of animals	
				With sites at autopsy	Without sites at autopsy—uterus flushed
Series A — 5	5	2	7	5	0
B — 7	7	1	7	6	1
C — 8	8	.5	7	7	1 *
D — 7	7	.25	6 at day 7 1 " " 6	6	1 *
E — 9	9	.125	7 at day 7 2 " " 6	6	3 2 * 1
F — 13	13	.0625	12 at day 7 1 " " 6	7	6 2 * 4
G — 8	8	.03125	6 at day 7 1 " " 6 1 " " 9	0	7 1
Control Series—No Progesterone Given					
	No. of animals	Injection per day	Day of autopsy	No. of animals	
				With sites at autopsy	Without sites at autopsy—sites flushed
Series H — 6	6	1 μ g estrone in .25 cc corn oil	1 at day 6 5 " " 7	0	6
I — 6	6	.25 ml cc corn oil alone	1 at day 6 5 " " 7	0	6
J — 6	6	None	1 at day 6 5 " " 7	0	6
K — 3 (sham operated)	3	None	7	3 normal	

* One horn was removed at time of laparotomy and flushed. Animal was given progesterone and 1 μ g of estrone and killed on day 14. No implantation occurred.

group with some sites which appeared not too abnormal but small, and accompanied by extremely small opacities.

With the use of a dissecting microscope it is possible to distinguish a range of abnormality from these minute opacities to discrete localized regions of the uterus marked by pigment crystals which are probably hemosiderin (5). These are not visible in the virgin uterus, but are similar to the uterine involutinal areas underlying the placental scar in postpartum stages. One of the non-pregnant tracts in Series F showed such uterine involutinal areas; another, in which there was a normal implantation in one horn, showed 4 such areas in the non-pregnant horn, and one showed such involutinal regions in a uterus which also had small opacities.

In considering the variety of development in Group F, two possibilities must be considered: (1) delay in implantation resulting in different stages of development or (2) resorption of conceptuses. Representative material was sectioned serially to determine whether delay or resorption was involved. Sections of small opacities showed advanced resorption, *i.e.*, decidua with or without fetal trophoblastic cells. The larger sites which approximated the normal size showed degeneration of a more advanced stage of development. None was normal, indicating that resorption, rather than delay, is responsible for the variation from the normal.

No indication of nidation was observed in Series G (.0312 mg progesterone), and no involutinal indications were observed. Degenerating ova in zona pellucidas were found in flushings from 3 individuals.

All sham operated controls had conceptual

sites of expected size and stage; none of the other control series showed any indication of nidation or hemosiderin crystals. One fragmented ovum was flushed from one of the estrone treated series.

Results in the experimental series suggest that .125 mg approximates the subliminal dose, since in this series the first indication of resorption was obtained, and the decrease in percentage of animals showing nidation is clear. Series F (.0625), suggests that .0625 mg is the minimal dose level for nidation, at which only a few animals could achieve nidation and even fewer maintain it. The data from Series G (.0325) demonstrate that this dose level is insufficient. No evidence for any delay was observed, since the variation in development was found to be due to resorption.

Summary. No delay in implantation was obtained in hamsters castrated on the second day of pregnancy and given daily doses of progesterone (2-.25 mg). Percentage of implantation obtained decreases as the dose level is lowered to .125 mg daily. At .0625 mg nidation may occur, but, in the majority of cases it either fails or resorption subsequently occurs. Nidation does not take place when .0312 mg is given.

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