related to members of coxsackievirus group but lack the property of mouse pathogenicity (intermediate strains). Cross serum neutralization, CF and HI tests failed to reveal any antigenic relationship between Pett virus and coxsackievirus A24 as well as V1030 and V1880 viruses. The basis for the suggested antigenic relationship between Pett and coxsackie A24 viruses is not clear. To our knowledge, no convincing data indicating such a relationship have been documented.

Summary. Two viruses isolated from children vaccinated with inactivated polio-diphtheria-pertussis-tetanus vaccine and designated V1030 and V1880 were submitted to this laboratory as possible new enterovirus prototypes. Cross serum neutralization, complement fixation and hemagglutination inhibition tests indicated that V1030 and V1880 viruses are antigenically related to the prototype coxsackievirus A24. However, both viruses, when tested after several passages in human amnion cells, failed to show mouse pathogenicity. These two viruses appear to be prime strains of coxsackievirus A type 24 that are either devoid of mouse pathogenicity or have lost this property due to excessive passage in cell culture. No antigenic relationship between Pett virus and coxsackievirus A24 could be detected.

The authors wish to thank Mrs. Malini Joglekar for technical assistance in the early phase of this study.

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Received June 20, 1966. P.S.E.B.M., 1966, v123.

Dithizone Induced Changes in Carbonic Anhydrase and Alkaline Phosphatase of Rat Dorsolateral Prostates.* (31470)

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The dorsolateral prostate of the rat contains an unusually high content of zinc and carbonic anhydrase. The lateral lobes are much richer in these two components than are the dorsal lobes(1). The ventral prostate on the other hand is not distinguished by its high content of either component. Dithizone (diphenylthiocarbazone) is a zinc chelating agent and has been utilized for the *in vivo* and *in vitro* demonstration of zinc in the prostates of various species(2,3,4). Injection of dithizone into rats produces rapid and selective damage to the lateral lobe only(2,4,5). The sequence of changes in the lateral lobe of the rat prostate resulting from dithizone injection has been described by light and electron microscopy. In this presentation we report on the sequential changes in the weight

* Supported by a grant from the Population Council.

TABLE I. Weight and Enzymatic Activities of Dorsolateral Prostates from Rats Treated with Dithizone.

			Lateral prostate					Dorsal prostate				
				CA		AP			CA		AP	
Treatment	No. rats	Body wt, g	Mean wt, mg	Total EU, mean	EU/g, mean ± S.E.	Total SU, mean	SU/mg, mean ± S.E.	Mean wt, mg	Total EU, mean	EU/g, mean ± S.E.	Total SU, mean	SU/mg, mean ± S.E.
Control 0 days	4	305	63.0	877	13,962 ± 555	67	1.08 ± .437	99.9	490	4,994 ± 962	117	1.49 ± .806
" 15-17 days	3	393	102.7	1,184	11,437 ±1,393	45	.45 ± .073	132.1	427	3,194 ± 175	112	.84 ± .124
" 32-36 days	6	454	168.2	1,598	9,517 ± 598	99	.59 ± .120	173.1	607	3,520 ± 280	109	.66 ± .101
Dithizone treated hr or days after treatment												
1 hr	4	295	115.3	1,078	9,353 ± 452	75	.68 ± .148	130.5	459	3,535 ± 319	170	1.32 ± .238
2.5 "	3	310	110.0	1,123	9,963 ±1,034	175	1.87 ± .762	87.3	333	3,846 ± 513	257	2.98 ± .048
6 "	3	313	81.5	385	4,883 ± 577	422	5.45 ±1.204	105.8	445	4,052 ± 333	186	2.05 ± .653
8 "	2	298	59.8	319	5,320	380	6.36	112.4	303	2,699	159	1.40
21 "	4	269	60.0	116	1,910 ± 318	378	6.21 ± .683	88.0	405	4,462 ± 390	194	2.28 ± .316
68 " (3 days)	2	275	38.7	123	3,245	173	4.42	86.3	327	3,750	158	1.73
168 " (7 ")	2	309	32.0	65	2,023	98	3.06	86.2	270	3,241	131	1.19
15-17 days	5	393	83.8	537	6,105 ± 876	235.7	3.32 ± .828	145.2	498	3,477 ± 549	195	1.69 ± .395
32-36 "	6	471	131.6	970	7,474 ± 587	133.1	1.22 ± .431	179.2	705	3,924 ± 712	142	.82 ± .164

and the activities of carbonic anhydrase (CA) and alkaline phosphatase (AP) in the dorsal and lateral lobes of prostates from dithizone-treated rats.

Materials and methods. Mature male rats weighing approximately 300 g were obtained from the Charles River Breeding Laboratories. Dithizone was prepared for injection by the method outlined by Schrodt(4). All injections were administered intraperitoneally. Initially all rats were injected with 20 mg of dithizone per rat. In view of the significant mortality (35%) of the injected rats, some subsequent animals were injected with only 15 mg of the drug. This resulted in only slight reduction of the mortality rate and had no effect on the results.

At the indicated time intervals (see Table I) the rats were killed by cervical dislocation and the various accessory sexual structures were removed and weighed on a torsion balance. The separation of the dorsal from lateral lobes of the prostate could be easily accomplished on basis of staining intensities, and at later intervals on basis of morphological appearance. In control animals this separation was somewhat more difficult to accomplish. Carbonic anhydrase (CA) activity was determined manometrically(6) and alkaline phosphatase (AP) activity was determined colorimetrically(7). CA activity is expressed in enzyme units per gram of wet tissue (EU/g) and AP activity in Sigma units per mg of tissue (SU/mg).

Results. In the Table we present data on the weight and activities of CA and AP of lateral and dorsal prostates from control and dithizone-treated rats. The data for the seminal vesicles and the ventral prostates are not included in the Table, because dithizone treatment did not affect these endpoints. It is clearly evident that by 6 hours after injection there was a significant decrease in CA activity of the lateral lobes. From 21 hours to 168 hours after dithizone injection lowest values were observed for CA activity of the lateral lobes. After this time interval CA activity values tended to increase and at 32-36 days after the injection CA activity approached control values. It is of interest that within 1 and 2.5 hours after injection,

CA activity per gram of tissue was diminished, whereas activity per gland was not changed. The lateral lobes at this time were bright red in color and appeared swollen. This reflects the glandular hyperemia that has been previously described(5). By 21 hours the red coloration of the lateral lobes has disappeared and thereafter the glands were pale and granular in appearance. The changes in the weight of the lateral lobes follow closely the changes in CA activity. The CA activity of the dorsal prostate was not influenced by dithizone injection. At the earlier time intervals the glands were pinkish in color indicating that only a small quantity of dithizone was picked up by this tissue.

AP activity in the lateral lobes followed a course opposite to that of CA. From low levels observed in control lobes, activity increased 5- to 6-fold in lobes from animals treated 6 to 68 hours prior with dithizone. In 32-36 days after treatment AP activity was reduced, but it was still about twice as high as in controls. In the dorsal lobes AP was not elevated to the same extent as in the lateral lobes and it appeared to return to normal levels at the latest intervals examined.

Discussion. The selective damage produced by dithizone in the rat lateral prostate has been clearly described(4,5). It involves the progressive destruction of the epithelium lining the prostatic acini, desquamation of the cells into the lumens and infiltration of the tissue by neutrophils and mononuclear cells. By 5 days post-injection regenerative processes have been initiated. In the dorsal lobe only limited destruction was observed(5). In the present study CA activity of the lateral prostate decreased in a pattern similar to the histological finding. Two possible explanations can be put forth for the observed changes in CA activity pattern. Dithizone chelates zinc and this would make the element unavailable for the synthesis of CA, which is a zinc containing enzyme. A more probable explanation for the observed decrease in CA activity would be the extensive destruction of epithelium with concomitant loss of the intracellular enzyme. CA activity in this study was increased from 15 days on, when extensive tissue regeneration takes place. Dithizone damage to prostates of dogs has likewise been described(8,9). It appears that high content of zinc is a prerequisite for the cytotoxic effect on the prostate(9). In immature rats and in rats weighing 150 g we were not able to duplicate the changes in lateral prostate CA activity that were demonstrated in rats weighing 300 g. This failure is most probably related to the low prostatic zinc content of the young rats as compared to the older animals(1).

The interpretation of AP results is somewhat more difficult. The increased AP activity of the damaged tissue could reflect activity exogenous to the prostatic tissue itself. Presence of blood in the tissue would increase the AP activity. It is also possible that the high Zn content of normal lateral prostates(1) inhibits the activity of the tissue AP. In immature and young rats we have observed considerably higher AP activities than in the 300-400 g rats.

With respect to the dorsal prostate our results are in agreement with the microscopic findings(4,5). The dorsal lobe does not suffer any extensive damage and only small changes were observed in the enzyme studies.

Summary. Activities of carbonic anhydrase (CA) and alkaline phosphatase (AP) were investigated in the lateral and dorsal lobes of dithizone-treated mature rats. Within 6 hours after treatment CA activity of the lateral lobe was significantly reduced. Recovery of CA activity was initiated at approximately 15 days post-injection. AP activity followed a course opposite to that of CA, being much higher in the damaged tissue. In dorsal prostate CA activity was not affected by dithizone. AP activity was increased slightly but returned to normal at the end of the experimental period.

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Received July 1, 1966. P.S.E.B.M., 1966, v123.