affected by either.

Summary. 1. In man, the intravenous injection of synthetic lysine-vasopressin causes a rise in plasma hydrocortisone concentration comparable to that following the intravenous administration of Pitressin. The effect of the latter is therefore not due to impurities. 2. The pressor effect of synthetic vasopressin is of the same order as that noted following the injection of Pitressin.

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Received September 10, 1956. P.S.E.B.M., 1956, v93.

Some Effects of Parathyroid Extract and Cortisone on Metabolism of Strontium and Calcium.* (22753)

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Diuresis with an increased urinary excretion of calcium and phosphorus results when parathyroid extract is administered intraperitoneally to rats(1,2). After injection of the hormone into normal animals the blood calcium rises followed by an accompanying rise in urinary calcium. Burrows(3) reported that the rise of blood calcium following injection of parathyroid extract is a result of mobilization of calcium from bones. The subepiphyseal plate appears to be the region of the bone from which the parathyroid extract brings about removal of calcium(4). The kidneys of rats receiving parathyroid extract contained 365 times more calcium than the controls when observed within 24 hours after receiving the extract containing the hormone. However, after the first 24 hours no significant difference was observed between treatments. Cortisone has been found to increase excretion of potassium, sodium and chloride in normal dogs. Its relation to calcium deposition in soft tissues and bone growth(5,6) has been reported from several laboratories.

The investigation here reported was undertaken to determine whether strontium would respond similarly to calcium when experimental animals receive parathyroid extract and also whether cortisone would counteract deposition of these minerals in kidney tissue in rats receiving parathyroid extract.

Methods. Two experiments were conducted during these studies. Uniform Rockland rats weighing approximately 160 g were used for these experiments. The rats were housed in metabolism cages for ease of making balance studies as outlined by Hansard and Comar (7). In each experiment the rats were given 5 μc of calcium-45 or strontium-89, subcutaneously 24 hours before receiving injections of the hormones. The parathyroid extract was administered subcutaneously in doses of 100 I. U. each, 24, 32, 48 and 56 hours after receiving the nuclide. When cortisone was administered, it was given in 4 subcutaneous injections of 25 mg in a saline solution, at the same time as the parathyroid extract. Sixteen hours after receiving the final hormone

* This manuscript is published with permission of the director of University of Tennesee, Agric. Exper. Station, Knoxville. The radioactive materials used were obtained from Oak Ridge National Laboratory on allocation from U. S. Atomic Energy Commission. This work was completed under Contract No. AT-40-1-GEN-242 between University of Tennessee, College of Agriculture, and Atomic Energy Commission.

TABLE I. Relation of Parathyroid Extract to Calcium and Strontium Metabolism.* Six rats per series.

Treatment	Nuclide	Femur, %/femur	Femur, %/mg Ca.	Urinary excretion, %/rat 24 hr	48 hr	72 hr	Kidney, %/g (wet wt)	Fecal excretion, %/rat 24 hr	48 hr	72 hr
None	Sr-89	4.2	.035	5.3	1.36	.43	.02	5.9	4.3	1.24
PTH	"	4.7	.041	5.4	1.11	.74	.26	6.5	5.0	.94
None	Ca-45	4.7	.034	1.7	.24	.13	.00	5.3	2.3	.99
PTH	"	3.6	.022	2.9	.30	.59	.34	5.2	2.5	.78

* Expressed as % of administered dose.

injection the rats were sacrificed and the femur and kidneys assayed for calcium-45 or strontium-89. The daily urine and feces were collected and assayed for the radionuclide being studied. All samples were dry-ashed at 650°C. dissolved in concentrated hydrochloric acid and an aliquot dried in a stainless steel counting cup and counted under a Geiger-Muller tube. Total calcium was determined by precipitating calcium as oxalate and titrating the precipitate with potassium permanganate using the method described by Comar *et al.*(8).

Results. Since the rat uses calcium in preference to strontium, the first experiment was designed to study the influence of parathyroid extract on both calcium and strontium metabolism and this relationship. The results are summarized in Table I. Parathyroid extract influenced the metabolism of strontium and calcium similarly as related to deposition in kidney tissue and urinary excretion. Statistical analysis of the data indicated a significant difference at the 5% level of confidence between treatments in 72 hour urinary excretion and kidney tissue deposition. Parathyroid extract caused diuresis, increased urinary excretion of calcium and strontium during 24 to 48-hour period after administration of the hormone and increased deposition of these nuclides in the kidneys. The amount removed from the bones was not of sufficient magnitude to detect differences by analysis of bones or autoradiographs.

In the second experiment the relation of cortisone to the influence exerted by parathyroid extract on calcium and strontium metabolism was studied. Parathyroid extract, alone or with cortisone, significantly (5% level) increased urinary excretion of calcium and strontium during the 24 to 48-hour period after administration of the hormone over the control rats. The significant increase in calcium and strontium deposition in the kidney tissues observed when parathyroid extract was administered did not appear when cortisone was administered with parathyroid extract. Cortisone prevented the accumulation of both calcium and strontium in kidney tissue. It is interesting to observe that whereas parathyroid extract increases both urinary and kidney calcium and strontium; cortisone influences

TABLE II. Relation of Parathyroid Extract and Cortisone to Calcium and Strontium Metabolism.*

Treatment	No. rats	Nuclide	Femur, %/femur	Urinary excretion, %/rat 24 hr	48 hr	72 hr	Kidney, %/g (wet wt)	Fecal excretion, %/rat 24 hr	48 hr	72 hr
None	4	Sr-89	3.2	6.2	1.13	.61	.014	8.5	4.12	2.28
PTH	6	"	3.1	6.9	1.61	1.45	.390	8.4	4.23	1.07
PTH + cortisone	6	"	2.9	8.8	1.48	1.50	.014	8.6	5.09	1.06
None	4	Ca-45	1.9	1.6	.21	.09	.037	1.8	.71	.44
PTH	6	"	2.1	1.5	.19	.22	.166	2.0	.68	.33
PTH + cortisone	6	"	2.1	2.1	.36	.27	.032	2.2	.97	.43

* Expressed as % of administered dose.

only the accumulation in the kidney tissue. Cortisone did not influence the diuresis caused by the parathyroid extract.

Summary. 1) Parathyroid extract increased the urinary excretion of calcium and strontium as well as increased deposition of these minerals in the kidney tissue. 2) Cortisone prevents accumulation of strontium and calcium in kidney tissue but does not influence urinary excretion or diuresis.

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Received September 13, 1956. P.S.E.B.M., 1956, v93.

Deoxyribonucleic Acid Content and Mitotic Activity of Vagino-Cervical Epithelium in Colchicine-Treated Mice During Estrus.* (22754)

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The estrous cycle of the mouse is characterized by alternating periods of rapid cell growth and involution of genital tissues and affords an excellent opportunity for study of fundamental chemical aspects of cellular growth in response to hormonal stimulation. Quantitative cytochemical studies of estrus have been limited largely to the study of resting cells of uterine glands, to surface epithelial cells of rat uteri(1) and to total nucleic acid content of uteri. Greater accuracy of microspectrophotometric analysis of individual cells in elucidating their chemical status over chemical analysis of tissues containing heterogeneous cell types has been shown. The value of exfoliative cytology in following physiological and pathological events in the female genital tract has been well established(3-5). The present work was undertaken to study the deoxyribonucleic acid (DNA) content of exfoliated cervical and vaginal cells during the estrous cycle and to correlate these findings with DNA content and mitotic index of basal cells in tissue sections of vaginal fornix.

Materials and methods. Fourteen female C3H mice, 2 to 3 months of age and weighing 18 to 22 g, were divided into 6 groups. Groups 1 and 2 consisted of 3 animals each, Groups 3, 4, 5 and 6 of 2 animals each. Animals of Groups 5 and 6 were ovariectomized 10 days before start of experiment. Animals were kept in air-conditioned room (68-72° F), fed Purina Dog Checkers supplemented by daily addition of fresh bread and carrots. Daily vaginal smears were taken and animals sacrificed at various stages of estrous cycle. Animals of Group 6 were injected subcutaneously with 25 RU of theelin in peanut oil and sacrificed 10 and 20 hours later. Animals of Group 5 served as ovariectomized controls. Mitoses in basal cells of vagina and cervix were arrested in metaphase by the colchicine method of Bullough(6) in which period of treatment was limited to 5 hours to prevent interference with normal mitotic rate. Each animal received 0.1 mg of drug in 0.25 ml of normal saline subcutaneously and sacrificed by cervical dislocation 5 hours later. Smears were prepared immediately and stained by method of Papanicolaou(7). Vaginas and uteri were removed *in toto*, fixed in 10% buf-

* This investigation was supported by research grant C-2148 from National Cancer Institute of N.I.H., U.S.P.H.S.

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