tocopherols may be due primarily to a contaminant in the particular tocopherol preparation used. Since the mixed natural tocopherol concentrate did not produce any estrogenic effects, whereas some of the crystalline preparations obtained from the concentrate did, may have been due to some substance in the tocopherol concentrate capable of inhibiting the estrogenic material.

Gestation with subcutaneous tocopherols. To provide assurance of uniformly early and severe tocopherol depletion, the experimental animals used in this study represent offspring of mothers kept throughout pregnancy and lactation on the tocopherol-deficient diet. The young were continued on this diet and mated, when 75-100 days of age, with males reared on the stock diet. The untreated animals resorbed their young, whereas those given the tocopherol preparations during the first week of gestation had normal litters. (Table II).

Summary and conclusions. 1. Pellets of crystalline tocopherol esters (d-alpha-tocopheryl palmitate, phosphate, or succinate and d-delta-tocopheryl phosphate) were implanted into the subcutaneous tissue over the dorsal shoulder region of male and female mice. A solution of mixed natural tocopherols was injected into the same region in other animals.

2. All the tocopherol preparations produced local tissue changes resembling a foreign body reaction. Qualitatively, alpha-tocopheryl palmitate and mixed natural tocopherol concentrate produced slight local reaction. The reaction to alpha-tocopheryl succinate and delta-tocopheryl phosphate was greater, and that to alpha-tocopheryl phosphate the most pronounced.

3. All the tocopherol preparations maintained gestation in tocopherol-deficient mice.

4. Two of the alpha-tocopheryl succinate and the alpha-tocopheryl palmitate preparations produced intermittent or continuous vaginal cornification.

Received February 28, 1950, P.S.E.B.M., 1950, v73.

Turnover of P^{32} in Different Types of Nuclei from Rabbit Liver.* (17719)

A. MARSHAK AND AUDREY PECK.
From the Department of Chemistry, New York University, Bellevue Medical Center, New York City.

Hitherto investigations into nuclear metabolism have been carried out with mixtures of nuclei isolated from the various cells which make up the tissue being studied. By differential centrifugation it has been possible to separate nuclei isolated from rabbit liver into two fractions, one made up predominantly of hepatic cell nuclei, the other containing nuclei of other types of cells present in the liver and to compare P^{32}-turnover in hepatic cell nuclei with other types of nuclei found in the liver.

Nuclei were isolated in 5% citric acid as previously described(1). They were then subjected to centrifugation at 900 g for 3 minutes, after which successive layers were removed with a pipette and examined microscopically. The nuclei of the upper layers were predominantly spherical, while those near the bottom of the centrifuge tube were predominantly ellipsoidal, fusiform and cylindrical, together with occasional ones which were constricted and lobed. By repeated centrifugation (5x) of the upper and lower layers, about half of the nuclei could be separated into the two groups mentioned above (Fig. 1 and 2). In each group counts were made of the frequency of the spherical and non-spherical types. In Group 1, 90-95% of the nuclei were spherical, while in group 2, 98-99% were non-spherical. On the basis of morphology, the predominant type of nucleus in Group 1 could readily be identified as that of the hepatic cell. Those of Group 2, could be recognized as fibroblast,

* Supported by a grant from the U.S. Public Health Service.

1. Marshak, A., *J. Gen. Physiol.*, 1941, v25, 275.

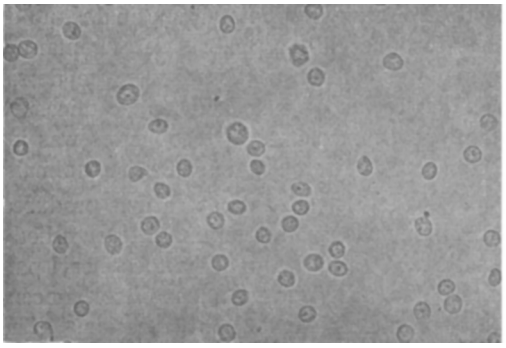

FIG. 1.
Spherical nuclei from rabbit liver.

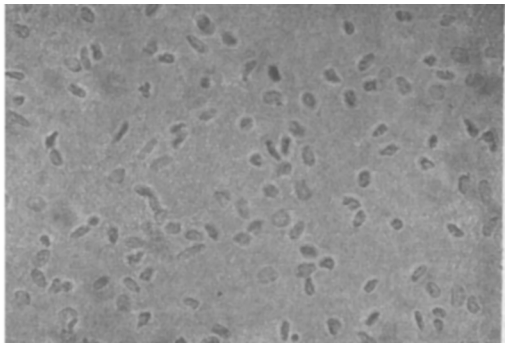

FIG. 2.
Non-spherical nuclei from rabbit liver.

TABLE I.
P31 and P32 in Nuclei.

Animal	Nuclei†	Nuclei, ml	P32,* ml	μg P31, ml	P32/P31
1	Spherical	1.20×10^8	4352	93.4	46.6
	Non-spherical	3.28×10^8	8117	265.6	30.6
2	Spherical	1.63×10^8	5311	128.4	41.1
	Non-spherical	1.28×10^8	2979	92.7	32.1

* In counts per minute as of the time of injection.
† Before separation of the two types of nuclei the suspensions contained 25-33% non-spherical nuclei.

reticulo-endothelial, endothelial and polymorpholeucocyte nuclei.

P^{32} was administered intravenously to rabbits as Na_2HPO_4, and 3 hours later the livers were perfused and the nuclei isolated and separated as described above. Total phosphorus and radioactive phosphorus were determined in aliquots of each group. Table I gives the results obtained with 2 animals.

The specific activity of the spherical nuclei from the first animal was 34% greater than that of the non-spherical nuclei, while with the second animal the difference was 23%. The total phosphorus per spherical nucleus was 7.80×10^{-7} μg and 7.87×10^{-7} μg in each of the animals while the values obtained for the non-spherical nuclei were 8.03×10^{-7} μg and 7.24×10^{-7} μg.

Since the total phosphorus content was the same in both types of nuclei within 3% the greater specific activity of the spherical nuclei could not be attributed to a lower phosphorus content per nucleus. The data therefore, indicated a higher rate of turnover of phosphorus in the spherical as compared with the non-spherical nuclei *i.e.*, in the nuclei of hepatic cells as compared with nuclei of other types of cells found in the liver. It was previously shown that most of the P^{32} in liver nuclei was in the nucleic acid and that it was released from the nucleus as nucleotide phosphorus and not as inorganic phosphate(1,2). It can be concluded therefore that nucleic acid turnover in the nuclei of hepatic cells is more rapid than that of nuclei of other cells in the liver.

2. Marshak, A., *J. Cell. Comp. Physiol.*, 1948, v32, 381.

Received February 14, 1950, P.S.E.B.M., 1950, v73.