naturally occurring plasma corticosterone. Glycerol-extracted fibers from rats whose plasma corticosterone has been significantly decreased or significantly increased demonstrated a decreased contractility. This change seemed to be at the level of the contractile proteins.

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Normal Manganese Turnover in Wilson's Disease (33795)

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Similarities in the clinical presentation of manganese poisoning and Wilson's disease and in transport of manganese and copper suggested a study of manganese turnover in patients with Wilson's disease.

Materials and Methods. Two patients with well-established Wilson's disease and three control subjects with impairment due either to spinal cord injury, dystonia, or surgically treated cerebral arteriovenous malformation were each given intravenously 1 μCi of carrier-free ^{54}Mn.[1] Characteristics of the nuclide include a physical half-life of 303 days and a prominent gamma emission at 0.83 MeV. The isotope was injected intravenously as $^{54}MnCl_2$ in saline solution. Oral D-penicillamine treatment of the patients with Wilson's disease was discontinued for 4 weeks beginning on the day prior to injection of the $^{54}MnCl_2$; and on day 28 after Mn injection, oral D-penicillamine was resumed in the patients with Wilson's disease. All subjects were males of similar ages and weights.

Iso/Serve, Inc., Division of Cambridge Nuclear Corporation, 133 Portland Street, Cambridge, Massachusetts 02139.

Total body gamma radiation counts were obtained in a total body counter using a 4 $\times$ 8 in. sodium iodide crystal suspended 18 in. above the subject's trunk in a 4 $\times$ 6 $\times$ 6 ft (120 $\times$ 180 $\times$ 180 cm) counting chamber shielded with 6 in. steel walls. The subject is counted in a partially sitting position. Only those counts in the region of the 0.83 MeV photopeak of ^{54}Mn were utilized.

A control total body count was obtained prior to intravenous injection of the isotope. Subsequent counts were done at 30 min, 24 and 48 hr after the $^{54}MnCl_2$ was administered. Further total body counts were done at appropriate intervals, as indicated in Table I, up to 78 days after the isotope was administered.

Results. The mean effective half-time for the two Wilson's disease cases was approximately 43 days and for the control group approximately 37 days. In Fig. 1, the curve illustrates the average rate of falloff of total body count in each of the two groups of patients. Table I indicates falloff in count of each of the five subjects.

Discussion. Chronic manganese poisoning

TABLE I. Falloff in Total Body Count Expressed as Percentage of Initial Count[a] in Five Patients after i.v. Injection of 1 μCi of $^{54}MnCl_2$.

Subject	Days after injection															50% of initial count (days)
	1	2	5	7	9	13	15	19	23	26	29	33	36	50	78	
Patients with Wilson's disease																
R. L.	96.8	89.3	82.7	76.6	74.1	66.6	61.7	56.6	50.9	—	44.8	41.2	39.9	32.6	21.9	24
R. M.	97.3	101.1	86.7	87.3	84.5	83.0	81.1	78.7	73.5	69.1	69.0	66.3	66.2	56.5	44.5	62
Patients without Wilson's disease																
D. Mc	91.6	89.9	82.4	76.7	73.9	67.3	67.9	63.6	58.4	55.4	55.7	50.1	50.2	43.4	—	33
I. T.	98.7	93.2	85.8	82.4	79.3	78.7	74.8	—	68.3	67.4	64.6	61.5	59.1	50.7	37.9	52
A. K.	92.8	83.3	79.8	72.3	68.8	61.4	59.1	55.1	52.9	51.0	50.5	48.2	47.4	38.7	29.5	31

[a] Thirty min after injection.

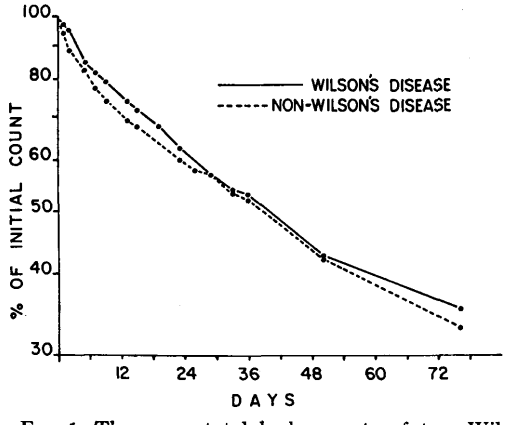

FIG. 1. The mean total body counts of two Wilson's disease and three non-Wilson's disease patients after intravenous injections of 1 μCi of ^{51}Mn and $^{54}MnCl_2$. The initial count was taken 30 min after injection and subsequent counts are expressed as percentages of this initial count. On day 28, the Wilson's disease patients resumed oral *d*-penicillamine.

causes neurological symptoms, some of which relate to basal ganglia dysfunction (1–3). Gubler *et al.* (4) reported that administration of large amounts of manganese to rats was associated with an increase in concentration of copper in brain and plasma but it did not affect total body copper content.

In the human subject manganese appears to pursue a pathway which is not normally affected by other metals. Although manganese is slowly and incompletely absorbed from the intestine, deficiency probably rarely occurs. Manganese is reported to be bound in blood to a B_1 globulin sometimes called transmanganin (5). A single intravenous dose of labeled manganese is rapidly cleared from blood (6) at a rate which resembles that which has been demonstrated for labeled copper (7). The biological half-time of whole-body copper disappearance is prolonged in Wilson's disease (8). If the abnormality of copper metabolism in Wilson's disease was paralleled by an abnormality of manganese metabolism, a prolonged turnover of manganese would be expected. Since no significant prlongation was noted here, it is suggested that manganese metabolism is not abnormal in Wilson's disease, at least as reflected in the whole-body turnover time. The lack of a manganese abnormality in Wilson's disease is further suggested by the finding of normal manganese content in liver in Wilson's disease (9).

Summary. No significant difference was noted between falloff of total body counts after intravenous injection of $^{54}MnCl_2$ in two patients with Wilson's disease and in three control patients. From the results of this study, it appears that total body manganese turnover in Wilson's disease does not differ significantly from that of non-Wilsonian patients.

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Hypoxia and Edema of the Perfused Isolated Canine Lung* (33796)

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In view of the persistence of the concept that hypoxia may play a role in the production of lung edema suggested by Maurer (1) and Drinker (2–4), a direct study has been made of the effects of variations in oxygen saturation of the blood on rates of weight gain in the isolated perfused canine lung.

Methods. Portions of the lungs of dogs removed after anesthetization with sodium pentobarbital (30 mg/kg) were suspended on a Strain gauge torsion balance, after cannulation of the pulmonary artery and the trachea. The connecting tubing was suspended to the arm and fulcrum of the balance and weights placed on a counterpoise pan to allow continuous measurement of changes in weight of the lung to be made to an accuracy of 1 g, following the method of Stish *et al.* (5). Besides lung weight, measurements were also made continuously of pulmonary artery perfusion pressure and pulmonary blood flow rate. Periodic measurements of blood oxygen saturation were made in some experiments using a Gilford densitometer with blood withdrawn from the pulmonary vein collecting system. Heparinized autologous

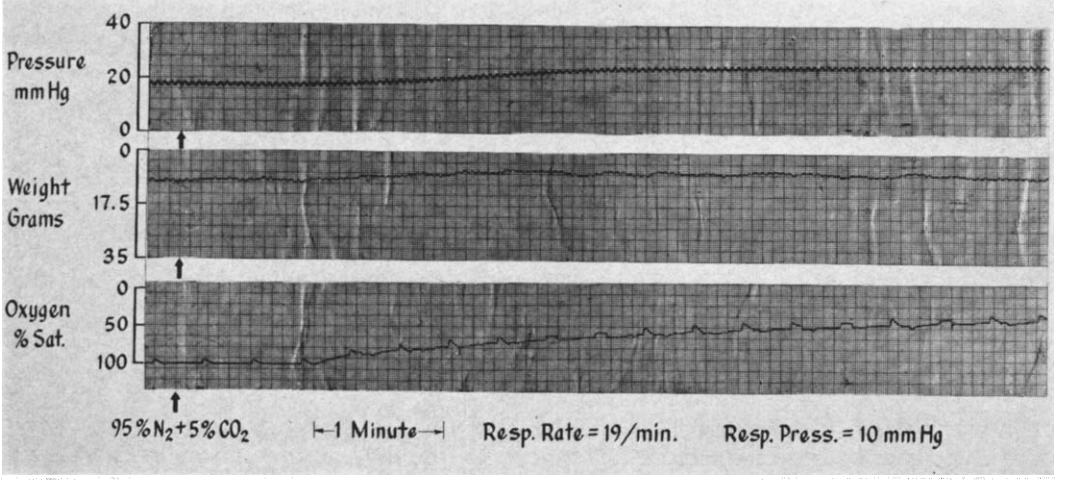

FIG. 1. Associated with the decline in oxygen saturation, there is an initial rise in pulmonary artery pressure and a decline in lung weight. Blood flow was kept constant.

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