

at the time of death varied from 30 to 40 mg. per 100 cc. whole blood. The non-protein nitrogen of the rats on high protein and high albumen diets varied from 40 to 62 mg. per 100 cc. No clinical signs of nephritis were found.

The rats were autopsied, and the organs were studied grossly and microscopically. With the exception of a pseudo-tuberculous lesion in the lungs of some rats, no pathology was found.

The kidneys of the rats on high protein diets were considerably hypertrophied. Microscopically there were no lesions in the glomeruli, tubules or interstitial tissue. Occasional casts were found in the kidneys of rats on alkali diet.

We have been unable to produce nephritis of any sort in rats by high protein diets over a long period of time.

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Extractives of liver possessing blood pressure reducing properties. Report of clinical tests.

By W. J. MACDONALD. (Introduced by John R. Williams).

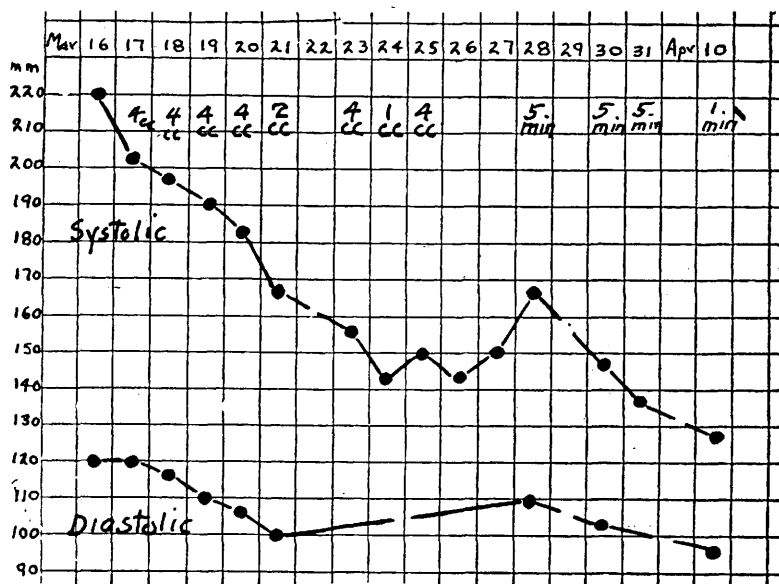
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In January, 1923, I became interested in the effect of certain extracts of the liver on the metabolism of uric acid in dogs. While this investigation did not yield information of significance, it was observed that the intravenous injection of these products possessed depressor principles which caused a sharp and fairly persistent fall in both systolic and diastolic blood pressures.

It is quite generally known that various fragments of protein cleavage, notably histamine and the guanidine salts, possess depressor and pressor properties; and that various proteins, when injected into the circulation, induce shock and accompanying fall in blood pressure.

The theory underlying the experiments here reported is that the liver structure may contain an active principle which will regulate blood pressure.

Preliminary tests indicated that the extracts employed were non-toxic to dogs. It was therefore decided to use the material on individuals known to be suffering from persistent and long standing arterial hypertension. The first tests were made on cases who presented no gross physiological or metabolic defects other than hypertension. In later tests the patients were more critically studied with reference to associated disease phenomena.



Curves showing systolic and diastolic pressures in a case of essential hypertension. Patient, female, age 45 years. Known duration of hypertension, 2 years. Previous systolic range 200-240 mm. Previous diastolic range 120-130 mm. In 1923 patient had a slight hemiplegia from which she made a good recovery. From March 21 to March 28 diastolic pressure difficult to obtain.

Total number of cases observed	33
Range of age of patients	45-67 yrs.
Average age	61 yrs.
Average known duration of hypertension in years	6
Average range of systolic pressure before injection.....	204 mm.
Average range of systolic pressure after injection.....	142 mm.
Average fall in systolic pressure	62 mm.
Average range of diastolic pressure before injection.....	114 mm.
Average range of diastolic pressure after injection.....	86 mm.
Average fall in diastolic pressure	28 mm.
Cases where no reactions occurred	25
Number of cases experiencing reaction	8

It is the purpose of this paper to report blood pressure observations on a series of cases of arterial hypertension in which there has been a fall in both systolic and diastolic pressures, following the administration of certain extracts prepared from the liver. In all, 33 cases have been studied. The procedure of administration has been as follows: A normal salt solution of the extracts of varying dosage was injected intravenously. In 25 cases the patients experienced no disagreeable symptoms, most of them reporting apparent relief. In 8 cases there followed reactions of varying degrees, some of which closely resembled protein shock, namely, chill, rise in temperature lasting several hours, nervousness, loss of appetite and weakness, together with a sharp fall in both systolic and diastolic pressures. Of these reacting cases five were studied in the Highland Hospital, Rochester, with Dr. J. R. Williams. The shock phenomena were observed only in cases treated from one batch of extract. In the cases free from symptoms, one injection served to depress the blood pressure from 1 to 3 or more days, according to size of dose. In all of the favorable cases, the return to hypertension was gradual and rarely to the former level.

The following physicians made independent observations on selected cases, and their results are included in this report: Drs. Mullin, Tice, Park, McGhie, Pain and Farmer of Hamilton; Dr. Bertram of Dundas; Dr. Williams of Rochester.

The chemical character of the extract has not yet been identified. Preliminary chemical study suggests that it is not histamine. It is possible that the effects observed are due to protein shock, but this latter phenomenon is usually briefer in action (a matter of hours) and accompanied by quite marked physiological reactions; whereas in most of the cases observed in this study, the depressor effect was sustained for one or more days, and without noticeable reactions. Chemical and physiological studies are now in progress in the further investigation of the problem. These clinical tests would indicate that the liver possesses a principle which may be of use in the control of certain cases of arterial hypertension.