order to eliminate the KBr, which masks coloration, the lipids were extracted with a 2/1 (v/v) chloroform/methanol mixture. After evaporation a 2nd extraction was carried out using petroleum ether. The KBr, which is insoluble in petroleum ether, was eliminated by washing with water, and the upper phase which contained the lipids was evaporated to dryness. This residue was used to assay the cholesterol[3].

Results and discussion. The presence of KBr hampers the assays but it can be easily eliminated during lipid extraction. It was noticed, however, that after extraction enzymatic assay was disturbed, so a colorimetric cholesterol assay was selected. Ultracentrifugation on a density gradient was chosen for lipoprotein separation since this method limits the losses incurred during each phase of successive centrifugation. Furthermore the absence of dialysis before cholesterol assay again reduces the errors due to loss - the yields obtained were therefore excellent. Out of 83 plasmas analyzed, an average of 96.1 ± 1.69% cholesterol was recovered. The table shows results obtained in 2 laboratory animals. In conclusion, this method allows quantitative and qualitative lipoprotein analysis, with high yield, after only 1 centrifugation, on 4 ml plasma.

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Bilinear correlation between tissue water content and diastolic stiffness of the ventricular myocardium

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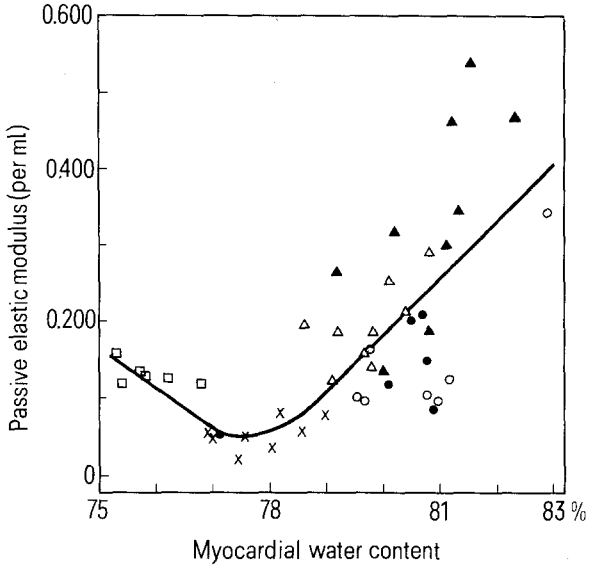
Summary. In oedematous and dehydrated canine hearts a close bilinear correlation was demonstrated between myocardial water content and diastolic stiffness (characterized by the passive elastic modulus) with an optimal minimum of stiffness at normal myocardial water content.

Elevated diastolic stiffness of the ventricular wall plays an important role in the pathomechanism of a number of heart diseases[1-9]. Recently, we have found that left ventricular diastolic stiffness is equally elevated in myocardial oedema[10,11] and in myocardial dehydration[12-14]. The aim of the present study was, therefore, to demonstrate a universally valid correlation between the values of tissue water content and ventricular diastolic stiffness of the myocardium.

Methods. The calculations of the study were performed using the data from 45 mongrel dogs of both sexes, weighing 10-25 kg, subjected to our earlier investigations[10,11,13]. In 6 pancreatectomized animals myocardial dehydration was induced by hyperosmolality effected by 2 or 3 repeated i.v. bolus injections of 11 mmoles/kg glucose in 5 ml/kg water[13]. Insulin influences the dehydrating effect of glucose-induced hyperosmolality[13], therefore, pancreatectomy was performed in these animals. Myocardial oedema was induced partly by i.v. infusion of 1.0 µg/min/kg noradrenaline for 10 min, which was performed 2 or 48 h after the ligation of the left anterior descending coronary artery in 6 and 7 animals, respectively[10], and partly by the overloading of non-working hearts by hyposmotic solutions during cardiopulmonary bypass for 60 min in 18 animals[11]. The data from 8 intact animals served as controls. Tissue water content was determined by drying the myocardium to constant weight, and expressed as a percentage of the total wet weight. Left ventricular diastolic stiffness was characterized by the value of left ventricular passive elastic modulus, which was determined by the modified[15] method of Diamand and Forrester[2]. The determination of left ventricular passive elastic modulus was carried out in all instances on open chest and pericardiectomized animals. Stiffness of the left ventricle was characterized by the slope of the linear relationship between diastolic $\Delta P/\Delta V$ and mean intraventricular diastolic pressure at various segments of the exponential pressure-volume curve, where ΔP is the arithmetic difference between end-diastolic and end-systolic pressure and ΔV is the stroke volume. In order to measure $\Delta P/\Delta V$ as well as mean intraventricular diastolic pressure in a wide range, flow in the descending aorta was gradually blocked by means of step-by-step inflation of an embolectomy catheter introduced through the femoral artery. Since pressure-volume relationship is not exponential at low values of pressure, data obtained at pressure less than 333 Pa were excluded. The calculations were carried out using regression analysis. Bilinear correlation was calculated by the method of Kubinyi and Kehrhahn[16].

Results and discussion. Pooling data for animals with myocardial oedema of different origins, and in the control state, a close linear correlation ($y = 0.034\ x - 2.534$; $r = 0.625$) was found between the values for the left ventricular water content and the left ventricular passive elastic modulus. On the other hand, pooling the data obtained in myocardial dehydration and in the control state, an inverse linear correlation ($y = -0.010\ x + 0.865$; $r = 0.428$) was detectable between the above variables. Considering the diverse alterations of myocardial water content in synthesis, a close bilinear correlation ($y = 2.120 - 0.027\ x + 0.072 \cdot \log(\beta \cdot 10^x + 1)$ where $\log \beta = -77.76$; $r = 0.685$) was demonstrable between the values for tissue water content and those for the passive elastic modulus in the left ventricular myocardium. This finding demonstrates that the smallest (optimal) diastolic stiffness of the myocardial wall coincides with the normal level of tissue water content.

It is a common feature of biological phenomena that optimal function of a certain organ is assured solely in those cases where important characteristics do not deviate from their normal levels. The present observation demonstrates this kind of correlation between tissue water content and diastolic stiffness in myocardium. It is known that myocardial water content normally oscillates between extremly close limits, and 100.0 g of wet myocardium contains under normal circumstances 77.8 ± 0.1 g water (mean ± SEM)[10-14,17]. This fact indicates that the normal level of tissue water content is maintained in the myocardium by very sensitive regulatory mechanisms. This is not only of theoretical interest, but has clinical significance,



Bilinear correlation ($y = 2.210 - 0.027\ x + 0.072 \cdot \log(\beta \cdot 10^x + 1)$ where $\log \beta = -77.76$; $r = 0.685$) between the values of tissue water content and passive elastic modulus in the left ventricular myocardium. X, control animals; □, pancreatectomized animals suffering from myocardial dehydration caused by hyperosmolality; ○, animals receiving noradrenaline 2 h after coronary artery ligation; ●, animals receiving noradrenaline 48 h after coronary artery ligation; △, animals with empty beating hearts during cardiopulmonary bypass; ▲, animals with empty fibrillating hearts during cardiopulmonary bypass. The last 4 groups of animals were suffering from myocardial oedema.

since ventricular performance was found to decrease in cases where diastolic stiffness increases, i.e. the compliance of the ventricular wall is diminished[8,10-14].

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Changes in brain oxidative metabolism in rats with portocaval shunt

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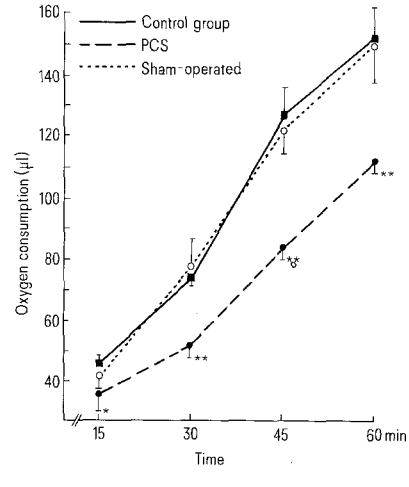
Summary. Oxygen and glucose consumption in brain slices of rats were found to be diminished after 7 days of portocaval shunt. This decrease may be an index of early metabolic alterations produced by the operation.

Hepatic encephalopathy has been classified as acute, chronic (or porto-systemic) and acute-on-chronic[2]. A number of etiopathogenic theories have been proposed for hepatic encephalopathy but many of them have been studied in acute hepatic coma[3] or in acute-on-chronic encephalopathy, clinical or experimental[4].

One of the metabolic abnormalities considered in acute hepatic coma of more than 24 h' duration is the decrease of brain oxygen consumption and glucose utilization[5]. Equally, in the human clinical picture of early chronic portosystemic encephalopathy it has been shown that brain oxygen consumption is reduced and Levodopa treatment produces an increase in brain oxygen consumption and an improvement in the O_2/glucose rate[6].

The object of this paper is to study changes in the cerebral oxidative metabolism after 7 days of portocaval shunt (PCS) in order to study the early variations in control and sham-operated rats.

Material and methods. 18 male Sprague-Dawley rats weighing 250–300 g were used, divided into 3 groups: a) Controls; b) rats after 7 days of porto-caval shunt and c) sham-operated rats. The porto-caval shunt was made by the technique of Arias et al.[7].



Oxygen consumption variations in brain cortex slices of rats, 7 days after portocaval shunt (PCS), compared with control and sham-operated rats. The measures were made 15, 30, 45 and 60 min after the preparation was stabilized. * $p < 0.05$; ** $p < 0.01$.