expansine) which has been previously obtained from culture filtrates of *P. expansum*[1], *P. claviforme*[2], *P. patulum*[3], and *Asp. clavatus*[4]. Like *P. expansum*, *P. patulum*, and *P. claviforme*, *P. divergens* belongs to the group *Asymmetrica fasciculata* of the genus *Penicillium*.

Using the method described by BRACK, we found among other metabolites of this mould gentisinic acid and gentisin alcohol. The statements[5] about their antibacterial activity have been checked[6].

J. BARTA and R. MEČIŘ

Prague, March 14, 1948.

Zusammenfassung

Aus den Kulturfiltraten des Schimmelpilzes *P. divergens* BAINIER wurden drei antibiotische Stoffe – Patulin, Gentisinalkohol und Gentisinsäure – isoliert.

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Glomerular and Tubular Function in Experimental Renal Cortex Ischæmia

Recent studies by TRUETA, BARCLAY, DANIEL, FRANKLIN, and PRICHARD[1] opened new aspects in the research field of renal physiology and pathology. These authors were able to show that the application of certain stimuli (such as faradic stimulation of the sciatic nerve or of the nervous network of the renal artery, administration of pituitrin, staphylococcus toxin, various pathological events, etc.) results in a very marked circulatory change, i.e. the blood of the renal artery flows via "juxtamedullary" glomeruli (glomeruli of the deepest zone of the renal cortex)—vasa recta, directly to the renal vein, thus rendering the cortex ischæmic and the medulla hyperæmic. Consequently, the glomeruli and tubuli of the cortex, representing the vast majority of the filtering and excreting elements of the kidneys, are completely excluded from the circulation. So the blood of the renal artery, diverted by this shunt, traverses the kidney only through the juxtamedullary glomeruli, the number of which is inadequate to cope with the task of normal urine production, but on the other hand their larger size and, in the first place, the fact that their vas efferens is wider too especially enables them to act as shunters.

In our experiments (20 adult dogs in narconumal anæsthesia), the changes of glomerular and tubular functions in cortical ischæmia caused by bilateral faradic stimulation of the nervous networks surrounding the renal arteries were investigated, by the well-known and excellent clearance methods of H. SMITH[2].

Our results can be summarized as follows:

(1) *Glomerular filtration* as measured by the mannitol (Cm) and creatinine (Ck) clearances decreased in all cases of cortical ischæmia, in some cases even below one-tenth of its original value. This phenomenon is obviously the direct consequence of the fact that the "by-pass" circuit excludes all cortical glomeruli from the circulation.

(2) *The effective renal blood flow* (i.e. the amount of blood supplying the acting renal parenchyma) as measured by the p-aminohippuric acid clearance (C_{PAH}) decreases too in accordance with the changed blood flow, being thus diverted from the numerous cortical to the few juxtamedullary elements. Glomerular filtration rate and effective renal blood flow usually decrease parallel to each other, which proves that the same proportion of the kidney's effective blood flow undergoes filtration in the still functioning glomeruli; in other terms, the filtration fraction (the proportion of the kidney's effective blood flow undergoing filtration, Ff) remains unaltered. The filtration fraction increased, however, in cases where a very marked effect, leading to a strongly reduced glomerular filtration rate, was obtained. This phenomenon can be explained as follows: The vas efferens of the juxtamedullary glomerulus contracts too if strong stimuli are applied; this again, by raising the intraglomerular blood pressure, results in increased filtration in the same glomeruli.

(3) *Urine flow* decreased significantly in every case; in some cases even temporary anuria occurred. This latter is in all probability the consequence of the ischæmia involving even the juxtamedullary glomeruli if very strong stimuli are applied. *Tubular* water reabsorption remained unaltered in some cases (pure glomerular oliguria) but increased in others.

(4) *Maximal tubulary secretion* (tubulary mass, Tm_{PAH}) greatly diminished as a consequence of the ischæmia, leaving the cortical tubuli unsupplied.

(5) *Maximal rate of tubular glucose reabsorption* of the kidney (glucose tubulary mass Tmg) decreased too; this is only natural if the reduced or abolished function of the cortical glomeruli due to ischæmia is taken into consideration. Decrease of Tmg, however, is not proportional to that of glomerular filtration (Cm) as shown by the general and well-marked increase of the Tmg/Cm ratio after faradic stimulation of the periarterial plexuses. The Tmg/Cm ratio was 1·3 in general; after stimulation its highest value was 4·3 (in one case). Raised values of this ratio could be explained either by decreased filtration in the functioning juxtamedullary glomeruli or by the assumption of increased glucose reabsorption in the same nephrons. The first assumption can safely be discarded by recalling that increase rather than diminution of Ff has been observed in some of the experiments. Consequently it seems likely that the second assumption holds good and raised values of the ratio occur on account of increased maximal glucose reabsorption in the juxtamedullary nephrons (i.e. in the tubuli attached to the juxtamedullary glomeruli). This phenomenon is easily explained by considering that these tubuli lie in the medulla, tightly surrounded by the vasa recta in which, according to TRUETA and co-workers the blood flow greatly increases whenever cortical ischæmia occurs. Naturally this medullary hyperæmia is likely to increase tubular reabsorption to a considerable extent. Increased water reabsorption, observed occasionally, may set in as a result of the same mechanism. Besides, the possibility that under the same conditions passive re-diffusion in the thin segment of the Henle loops occurs has to be taken into consideration.

(6) The p-aminohippuric acid concentration of the renal vein's blood increases following faradic stimulation (*diminished extraction*), thus proving that a great proportion of the blood escapes the functioning parenchyma

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and traverses the kidney through the by-pass circuit.

As soon as completed, our detailed work will be published.

We wish to express our gratitude to the Hungarian Chinoin Co. for synthesizing p-amino hippuric acid as well as to the Hoffmann-La Roche Co. for their gift of Narconumal, and to the Ciba and Richter Co. for supplying us with mannitol.

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First Medical Clinic of the University of Budapest, February 18, 1948.

Zusammenfassung

Bei Nierenrindenischämie (hervorgerufen nach TRUETA und Mitarbeitern durch Faradisation des Nierenhilus) wurde die Nierenfunktion geprüft. Die Glomerulusfiltration, die effektive Blutdurchströmung und die maximale PAH-Ausscheidung, sanken bedeutend ab. Auch die maximale Zuckerresorption wurde erheblich reduziert, aber erheblich weniger als die „Clearance" die Zuckerresorption im juxtamedullären Tubulus scheint demnach zu steigen. Die PAH-Konzentration des Blutes in der Vena renalis stieg nach der Faradisation sehr stark an; die Extraktion war also herabgesetzt.

The Absence of the Effect of Percorten in Alloxan-Diabetic Dogs

Recently we published our experiments[1] performed on normal dogs; as an introduction to the present work we have to summarize our previous results.

If the kidneys are loaded with glucose by means of intravenous infusion, the amount of glucose filtered in a unit of time steadily increases at an unchanged glomerular filtration rate; tubular reabsorption increases for a time, but after reaching its maximal value the amount of sugar reabsorbed remains constant, even if glucose filtration is further enhanced. This number, the Tmg[2] is a stationary, reproducible, individual value. If the tubuli are forced to maximal effort, glucose reabsorption diminishes after a while[3].

We could prove in our previous work that Tmg can be greatly elevated by the administration of synthetic adrenal cortex hormone (Percorten Ciba, Desoxycorticosterone acetateglucoside). We could draw the conclusion that the absolute value of Tmg depends, first of all, on the intensity of phosphorylation processes.

According to LASZT[4] phosphorylation processes are abnormally increased in diabetes; so we thought it would be of interest to investigate the effect of Percorten on Tmg in diabetes.

Our experiments were performed on alloxan-diabetic dogs. The day before the experiment the dogs were given 100 mg/kg bodyweight alloxan intravenously and thereafter a large glucose infusion to prevent hypoglycæmia. Next day the dogs were diabetic, their blood sugar was between 180–350 mg%. In such state we performed the glucose infusion and, after reaching the Tmg, we administered Percorten. As can be seen from the table, Percorten was wholly ineffective in these cases.

Further experiments for the interpretation of our results are in progress. Perhaps they can be explained according to LASZT: it is possible that the effect of Percorten is missing in these cases because phosphorylation processes are already increased in diabetes. LASZT was able to prove that the cells of the intestinal villi show increased glucose reabsorption in diabetes.

Before Percorten				
Dog No.	Clearance	Fg	Eg	Rg (Tmg)
1	4	60	34	26
2	20	276	21	255
3	11	168	104	64
4	12	120	42	78
After Percorten				
Clearance		Fg	Eg	Rg (Tmg)
3·3		73	48	25
19·5		312	20	292
10·0		174	124	50
11·0		134	57	77

Fg = Filtered glucose mg/min. Eg = Excreted glucose mg/min. Rg = Reabsorbed glucose mg/min.

Blood sugar was determined by the method of FUIJTA-IWATAKE. Glomerular filtration rate was calculated by means of the mannitol and creatinine clearances.

The other possibility that the effect of Percorten is missing may be because a severe tubular lesion is produced by alloxan.

We have to express our gratitude to the firm Richter, to the Ciba AG., and the firm La Roche for supplying us with mannitol, Percorten, Narconumal, and Alloxan.

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Zusammenfassung

Es wurde in früheren Arbeiten mitgeteilt, daß die maximale tubuläre Zuckerresorption (Tmg) durch Percorten bedeutend erhöht wird. In der vorliegenden Untersuchung wird gezeigt, daß das Percorten im alloxandiabetischen Organismus keine Wirkung auf die Tmg hat.

Statistical Investigations on the Relation between the Ultra-violet Rays of the Sun and Spasmophilic Convulsions

While it is certain that tetany is a seasonal disease, the meteorological factors responsible for its acute manifestations have not been identified up to now, according to the view of those who speak of "tetanic weather". MORO[1] (Föhn) and MOURIQUAND[2] (Vent du midi) attach importance to the barometrical falling, but they do not report any cases, neither does GYÖRGY[3], who studied the effects of sunlight following bad weather.

BAAR[4] on the contrary observed an increased excitability by galvanic current during the days rich in sunlight and GERSTENBERGER *et al.*[5] have seen tetany develop in

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