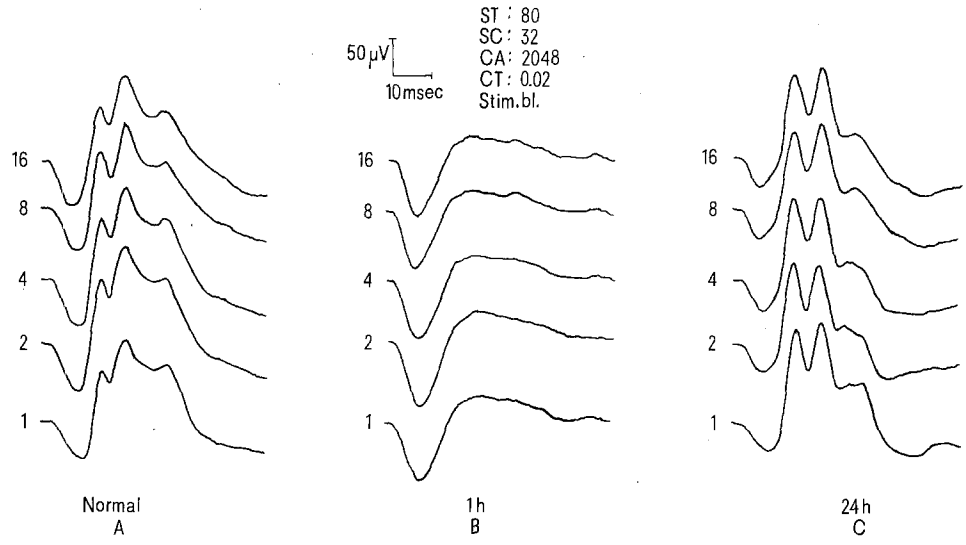

Fig. 2. Averaged ERG at different intensities (1-2-4-8-16) with a frequency of 1 Hz. A) Normal ERG; B) abolition of the oscillatory potentials 1 h after 0.005 g of glycine, and C) recovery of the oscillatory potentials 24 h after glycine (Rabbit Nr. 55).

the second OP disappears. 3. The peaktimes of OP 1 and OP 2 are slightly increased during the decrease. 4. The mean amplitude of the b-wave remains normal, its descending slope is, however, proportionally increased. 5. The averaged latency of the a-wave remains normal but the peak-time and the mean amplitude are increased between 2 to 10 h after the injection of the stronger dose and between 4 to 6 h after the injection of the weaker one. 6. CFF remains normal for the higher intensities of stimulation during the action of the drug but decreases for the lower intensities. 7. Flicker attenuation curves of OP 1, 2 and 3 peak times show a proportionally increased attenuation of the lower frequencies.

AVER (Averaged Visual Evoked Responses). 1. A diminution of the early component with conservation of the later one was found. 2. There was an increased latency of the first negative wave.

Recuperation. ERG. total recovery takes place in 24 h after the injection of the stronger dose and in 10 to 12 h after the injection of the weaker one.

In the first stage of recovery, the first oscillatory potential increases faster than the other two. The peak times of the OP 1 and OP 2 are reduced. The third oscillatory potential showed 2 distinctly separated peaks at 32.5 msec and 42.2 msec. The first of these peaks progressively takes the place of the original OP 3 (X: 35,30 msec $\pm$ 1.89)[9]. The second peak slowly decreases its amplitude and disappears in the descending slope of the b-wave.

AVER. There was a total recovery of the early component in the same time lapse.

Discussion. The origin of the oscillatory potentials has been the subject of many hypotheses. The nature of the oscillations is still obscure[4, 9, 11]. Animal studies, with the aid of intraretinal and intracellular recordings with microelectrodes, combined with electron microscopy studies, further elucidated the origin of the oscillatory potentials. BROWN[10] postulated that the oscillatory potentials are generated in neural feedback circuits in the inner nuclear ayer of cynomolgus monkey's retina. Morphologically a feed-back synaptic arrangement of amacrines and bipolars was suggested by DOWLING[3]. The present work shows the elimination of the oscillatory potentials in the rabbit ERG by glycine with partial blocking of the AVER. Being in accordance with BRUUN and EHINGER[1], our results are quite compatible with the assumption that glycine may be an inhibitory neurotransmitter in certain nerve cells of the inner plexiform layer in the rabbit retina (synaptic amacrine contact ?) with a probable function related to the origin of the oscillatory potential.

Résumé. L'injection intravitréenne de Glycine (0.005 et 0.002 g) chez le lapin entraîne l'abolition des potentiels oscillatoires de l'ERG moyenné photopique, phénomène réversible en 12–24 h. La Glycine exerce probablement un effet inhibiteur sur l'électrogenèse des potentiels oscillatoires.

S. KOROL

Clinique universitaire d'Ophtalmologie, 22, rue Alcide Jentzer, CH-1205 Genève (Switzerland), 19 March 1973.

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Permeability of the Blood-Brain-Barrier in Lymphostatic Encephalopathy Combined with Complex Vitamin B Deficiency. The Protective Effect of Vitamin (Factor) P Treatment

In spite of the well-known absence of lymph vessels from the brain tissue, cervical lymphatic blockage results in an experimental disease, lymphostatic encephalopathy. This syndrome is characterised by various pathophysiological and neuropathological alterations, i.e. by cerebral oedema with an increased permeability of the blood-brain barrier (BBB). This has been demonstrated by means of the electron microscope, using thorotrast as a tracer[1], by the Evans blue fluorescence technique[2] and by chemical analysis of Evans blue uptake by the brain tissue[3]. Recently, SEIDEL and BACK[4], using harmine as an indicator, demonstrated a prolongation of the tremor-inducing effect

of harmine and a significantly elevated harmine content of brain tissue in rats suffering from lymphostatic encephalopathy.

Cerebral oedema and collapse of the BBB are well-known consequences of severe vitamin B_1 deficiency, too. In the present paper, a complex vitamin B deficiency has been induced and its effect on the BBB, both alone and in combination with lymphostatic encephalopathy, has been studied. In a further series, the influence of treatment with two members of the 'vitamin P family', i.e. coumarin and troxerutin, has been investigated. Polyvinylpyrrolidone (PVP), with a molecular weight of 40,000, was used as an indicator of the permeability of the BBB.

Materials and methods. 60 ♂ Wistar rats (200 ± 20 g) were divided into 7 groups. Group 1. For 49 days the rats were fed a diet rich in B vitamins (Table). Between the 42th and 49th day 17 ml/kg saline was injected i.p. On the 45th day a sham operation was performed under nembutal anesthesia: From a midline incision on the neck, cervical lymph nodes were prepared but not ligated. On the 49th day 700 mg/kg PVP was administered i.v.

After completing the infusion, the rats were anesthetized. The abdominal aorta was prepared and cannulated and blood was withdrawn for PVP determination. After dissecting the vena cava inferior, saline was infused into the aorta with a pressure of 2 m H_2O until clear water left the vena cava. Finally, skull was opened and brain removed in toto. PVP content was estimated in homogenized brain tissue and in blood plasma according to the method of LEVY and FERGUS[5]. PVP content of cerebral tissue was calculated as percentage of plasma concentration.

Group 2. In this group, procedure differed only in one respect from that described in group 1: Instead of a sham operation, radical cervical lymph blockage was performed by carefully ligating all cervical lymph nodes found. Group 3. For 49 days the animals were fed a diet free of vitamins of the B group (Table). Otherwise, procedure was the same as that employed in geoup 1. Group 4. Procedure was the same as in group 3, but, instead of a sham operation, a cervical lymph blockae was performed. Group 5. Procedure was the same as in group 4, with one

Composition of diets used

Groups 1 + 2 (Altromin C 1000)		Groups 3–7 (Altromin C 1000 without B-vitamins)	
Casein	22%	Casein	22%
Rice starch-flour	64%	Rice starch-flour	64%
Soja oil	2%	Soja oil	2%
Cellulose powder	4%	Cellulose powder	4%
Minerals	6%	Minerals	6%
Vitamins[a]	2%	Vitamins[b]	2%
[a] Vitamins:		[b] Vitamins:	
DL-Methionin	1.200 mg	Vitamin A	15.000 I.U.
Vitamin A	15.000 I.U.	Vitamin D_3	500 I.U.
Vitamin D_3	500 I.U.	Vitamin E	150 I.U.
Vitamin E	150 mg	Vitamin K_3	10 mg
Vitamin K_3	10 mg	Vitamin C	20 mg
Vitamin B_1 HCl	20 mg		
Vitamin B_2	20 mg		
Vitamin B_6 HCl	15 mg		
Vitamin B_{12}	30 µg		
Pantothenic acid	50 mg		
Nicotinic acid	50 mg		
Cholinchlorid	1.000 mg		
Folic acid	10 mg		
Biotin	200 µg		
Inosit	100 mg		
p-amino benzoic ac.	100 mg		
Vitamin C	20 mg		

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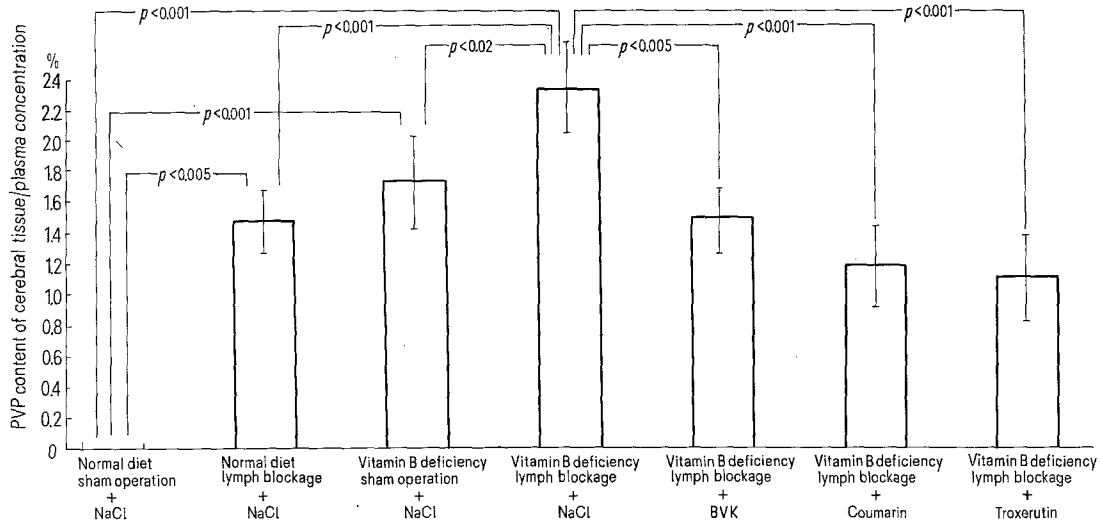

The influence of lymphostatic encephalopathy, of complex vitamin B deficiency, of lymphostatic encephalopathy combined with complex Vitamin B-deficiency and of various treatments on the permeability of the BBB. 1. Normal diet, sham operation, saline treatment; 2. Normal diet, lymph blockage, saline treatment; 3. B-avitaminosis, sham operation, saline treatment; 4. B-avitaminosis, lymph blockage, saline treatment; 5. B-avitaminosis, lymph blockage, vitamin-B-treatment; 6. B-avitaminosis, lymph blocage, Coumarin treatment; 7. B-avitaminosis, lymph blockage, Troxerutin treatment.

difference: during the last week, the rats were treated with the following vitamins: Vitamin B_1, 40; lactoflavin, 23; niamid, 160; pyridoxin, 16; panthothenic acid, 240; biotin, 2 mg/kg, and cyanocobalamin, 80 γ/kg body weigth (BVK[6]). Group 6. Procedure differed from that used in group 5 only in one respect: instead of Vitamin B, coumarin[7] was given (25 mg/kg/day). Group 7. Procedure differed from that used in group 6 by injecting troxerutin[8] (500 mg/kg/day) instead of coumarin. Data were analysed statistically by variance analysis.

Results. After cervical lymphatic blockage, permeability of the BBB increases significantly in rats fed the normal diet. Complex vitamin B defiency had the same effect. By combining Vitamin B deficiency and lymphostatic encephalopathy, the lesion of the BBB was the most pronounced. This combined effect could be influenced therapeutically not only by the administration of the Vitamin B drug BVK, but also by the 2 members of the 'vitamin P-family', coumarin and troxerutin.

Zusammenfassung. Die bereits bekannte Permeabilitätszunahme der Blut-Hirnschranke bei der lymphostatitischen Enzephalopathie wurde mittels einer neuen Methode bestätigt: i.v. infundiertes PVP, mit einem Molekulargewicht von 40.000, drang bei normalen Kontrollratten in die Hirnsubstanz nicht ein; bei Tieren mit einer lymphostatischen Enzephalopathie war PVP in der Hirnsubstanz nachweisbar. Eine komplexe B-Avitaminose führt ebenfalls zum Eindringen von PVP in die Hirnsubstanz; eine Kombination zwischen lymphostatischer Enzephalopathie und komplexer B-Avitaminose hat eine Addition der Permeabilitätsstörung zur Folge. Zwei in die «Vitamin P-Familie» gehörende Stoffe, Cumarin und Troxerutin, übten einen weitgehenden protektiven Effekt gegen die Zunahme der Permeabilität der Blut-Hirnschranke aus.

ETHEL FÖLDI-BÖRCSÖK and M. FÖLDI

Research Laboratories, Schaper und Brümmer, P.O. Box 1160, D-3324 Salzgitter-Ringelheim (Germany).
6 March 1973.

[6] BVK Roche®, Hoffmann-La Roche AG, Grenzach/Baden (Germany).
[7] A component of Venalot®, Schaper and Brümmer, Salzgitter-Ringelheim (Germany).
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Myocardial Concentrations of High Energy Phosphates in Normal Mini-Pigs and Dogs[1]

In recent years evidence indicating that the use of mini-pigs and swines might offer distinctive advantages in comparative cardiovascular research has accumulated[2,3]. In this paper we report on the normal myocardial concentration and distribution of ATP, ADP, creatine (Cr) and creatine phosphate (CrP) in mini-pigs, comparing the results with values obtained in dogs. As the myocardial stores of high energy phosphates are of primary importance for the mechanical performance of the heart[4–9], this work will serve as a basis to study hemodynamic and metabolic alterations during a controlled reduction of coronary flow.

Materials and methods. 6 mini-pigs (27–39 kg) of the Göttinger breed, premedicated with 0.5 mg/kg azaperon (Stresnil®), 3 mg/kg phencyclidin-HCl (Parkesernyl®) and 0.1 mg/kg atropine-sulfate were connected to a respirator (Bird-Mark IX) and ventilated initially with 1 vol.% and after reaching surgical tolerance with 0.5 vol. % of methoxyfluran (Pentrane®) in 50 vol. % oxygen and 50 vol. % air at 20 cycles/min. The pO_2, pCO_2 and pH of the arterial blood were controlled during the experiments and constantly readjusted to preoperative values. Details of the anaesthesia will be published elsewhere[10].

Eight mongrel dogs (18–24 kg) premedicated with 1.25 mg/kg methadon-HCl (Polamivet®) and 0.5 mg/kg propionyl-promazin (Combelen®) were anaesthetized with 25 mg/kg pentobarbital-sodium (Vetanarcol®). They were connected to an Engström-respirator and ventilated with a mixture of 50 vol. % O_2 and 50 vol. % air at 20 cycles/min.

After a thoracotomy on the left side, the heart was exposed. Proceeding from the apex to the base of the left ventricle, two to four biopsies were obtained at intervals of 30–60 sec. We used a small WOLLENBERGER-tong[11] with cutting edges (details of construction on request) precooled in liquid nitrogen. Slices of tissue with a thickness of less than 1 mm weighing between 40–120 mg were obtained.

The frozen tissue was freeze-dried, pulverized in a mycrodysmembrator (Braun, Melsungen) and extracted with freezing 0.6 M $HClO_4$ under constant stirring in an alcohol bath of −70 °C. The suspension was centrifuged for 3 min at −4 °C. The sediment was re-extracted with 0.45 M $HClO_4$ under the same conditions. The combined extracts were neutralized to pH 6 with 54 mM triethanolamine in 2 M K_2CO_3. The supernatant obtained after centrifugation was kept at 0 °C and used for analysis.

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