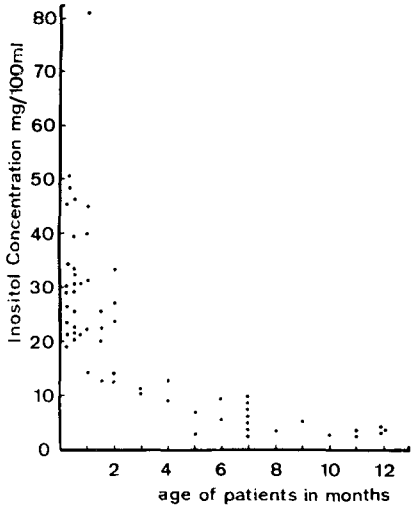
Highly Elevated Content of Free Myo-Inositol in the Cerebrospinal Fluid of Neonates

In the course of an investigation on the concentration of free myo-inositol in cerebrospinal fluid (CSF) specimens of more than 500 patients admitted to our hospital, surprisingly high values were found in the newborns. In this communication, the results of inositol determinations are reported in CSF of 60 babies, their ages ranging from newborn to 12 months. Of these patients, 11 showed CNS disease (convulsions, hydrocephalus, epilepsia, meningitis). The others suffered from respiratory distress, congenital heart disease, newborn jaundice, electrolyte imbalance, diseases of the gastrointestinal and urinary tract or from some other less frequent conditions.

The method used for inositol quantitation was an enzymatic procedure described by WEISSBACH[1]. As shown in the Figure, the highest inositol content in CSF of neonates was 81 mg/100 ml, the lowest 18, as compared with a published normal range in the adult of 2.0–3.4 mg/100 ml[2]. A gradual decrease in concentration to normal levels was observed at the age of approximately 12 months. No obvious relationship was apparent between inositol content and the disease state of the patients. Moreover, there seemed to be no difference between premature babies and those born at term. Only the age of the patients appeared to correlate with the inositol concentration in CSF.



Inositol content in CSF of 60 patients.

The significance of the findings reported here is not clear. PFAFFENBERGER et al.[3], in their studies on human urinary polyols, found a high excretion of inositol in the neonates, amounting to an average of 2.2 mg/mg creatinine as compared to 0.033 mg/mg creatinine in the adult. These authors relate this finding to the continuing synthesis of central nervous system tissue during the first days of life. Since myo-inositol is largely bound to phospholipids, the concentration of its free form in CSF could reflect metabolic activity of the mono- and polyphosphatidyl inositol during the development of the central nervous system, in particular myelinization. In serum of some of the neonates investigated, the inositol levels were found to be only slightly elevated, indicating a fast renal clearance. An extensive survey of inositol content in human body fluids is in progress in order to shed more light on the significance of the elevated inositol concentration in CSF during the first year of life.

Summary. Free myo-inositol in cerebrospinal fluid was determined in 60 babies aged from newborn to 12 months. In the neonates, a high inositol concentration was found (18–81 mg/100 ml). With increasing age, the values gradually decreased. The finding is discussed in relation to the maturation processes in central nervous tissue.

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The Activity of Newcastle Disease Virus-Envelope Proteins after Treatment with Detergents

It is known that treatment of Newcastle disease virus (NDV) with lipid solvents, anionic or nonionic detergents disrupts the virus into separated or aggregated subunits. Since the influence of various detergents on the protein-phospholipid linkages differ[1], we studied the activity of the main envelope proteins after disruption with lipid solvents, anionic, and nonionic detergents to explain the importance of protein-phospholipid linkages for this activity.

Materials and methods. The avirulent strain 'Russeff' of NDV, grown on primary cultures of chick embryo fibroblasts, was used. The virus was partially purified with Zn $(OH)_2$[2] and 2 cycles of differential centrifugation. The infectious titer of the virus was determined by the plaque method on monolayers of chick embryo cells and was 4×10^8 pfu/ml. The virus was disrupted in 30 min with equal volumes of peroxide-free ether, with arcton[3], sodium dodecylsulfate (SDS) and sodium deoxycholate (SDC) according to LAVER[4], and with tween 80 and ether[5], triton $\times 100$[6], and nonidet[7]. The hemagglutination (HA) of the intact and disrupted virus was determined by 0.5% suspension of chick erythrocytes and 1% suspension of guinea-pig erythrocytes. The activity of the viral neuraminidase (N-ase) was expressed as the quantity of free N-acetylneuraminic acid (NANA), separated from 100 µg N-acetylneuraminlactose by 0.1 ml virus during 15 min incubation at 37 °C. Free NANA was determined

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Activity of NDV-envelope proteins

Material	Hemagglutination		Neuraminidase (μg NANA)	H
	Chick ετ	Guinea-pig ετ		
NDV	1280	320	21	42
NDV + ether	0	0	0	0
NDV + arcton	640	160	8	42
NDV + tween + ether	1280	320	25	—
NDV + triton × 100	1280	320	23	—
NDV + nonidet	1280	320	22	—
NDV + 0.125% SDS	640	320	0	—
NDV + 0.250% SDS	640	320	0	—
NDV + 0.750% SDS	0	0	0	—
NDV + 0.750% SDS dial.[a]	0	0	0	—
NDV + SDC	0	0	0	—
NDV + SDC dial.[a]	0	0	0	—

[a] The dialysis was performed for 48 h against 0.85% NaCl.

by the method of AMINOFF[8]. The percent of the hemolysis of the chick erythrocytes caused from the virus, which expressed the hemolytic activity (H), was estimated according to NUMAZAKI et al.[9].

Results. The results in the Table show that the activities of HA, N-ase, and H were lost after the extraction of viral lipids with ether. Arcton does not completely extract the lipids, and partial activity remained. Disruption of the virus with triton, tween 80, and nonidet did not inhibit the HA and N-ase, but SDS and SDC completely destroyed these activities.

Discussion. It can be concluded that the phospholipids-protein linkages are very important for the biological properties of NDV-envelope proteins, since the solubilization of the lipids with tween 80 and triton does not influence the phospholipid-protein linkages[10] but the same solubilization with SDS and SDC completely breaks these linkages, causing conformational changes[1,11,12]. According to SCHEID and CHOPPIN[6], HA and N-ase reside on a single polypeptide molecule. It can be suggested that the active center of the viral enzyme occupies the part of the molecule which is bound to phospholipids of viral envelope. Hydrophilic end of the molecule is necessary for hemagglutination, which occurs only when the protein molecules aggregate in the presence of phospholipids.

Summary. Treatment of NDV with anionic detergents or lipid solvents destroys the activities of hemagglutinin and neuraminidase. After disruption of the virus with non-ionic detergents, the activities of envelope proteins remain unchanged. It is suggested that the phospholipids are very important for the biological activity of NDV-envelope proteins.

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Is the Basal Activity of Rat Stomach Histidine Decarboxylase Affected by Antrectomy?

The activity of histidine decarboxylase in the oxyntic mucosa of the rat stomach is low in the fasted state and high following feeding or treatment with gastrin or insulin[1,2]. With the exception of gastrin itself, all agents or treatments that activate the enzyme do so by releasing gastrin[3]. After removal of the bulk of endogenous gastrin through antrectomy, feeding and treatment with insulin or other gastrin-releasing agents failed to activate the enzyme[3–10]. Pentagastrin, however, still raised the enzyme activity[3,4]. Thus, gastrin seems to be the physiological mediator of the enzyme activation[3,11]. Contradictory results are on record as to the effect of antrectomy on the enzyme activity in the fasted rat. JOHNSON et al.[11,12] reported that basal enzyme activity was abolished, while ROSENGREN and SVENSSON[13], SVENSSON[14] and LUNDELL[15] found the activity to be significantly reduced by antrectomy. By contrast, we have never observed any effect of antrectomy on the enzyme activity in the fasted state[3–10]. In our studies, all rats were fasted for 48 h before the basal enzyme activity was determined. Considerably shorter fasting periods have been used by others[13–15]. So far the influence of the time of fasting on the enzyme activity has not been studied systematically. The present study was undertaken to determine the rate and extent of decline of the enzyme activity in unoperated and antrectomized rats after withdrawal of food. At the same time, the serum gastrin concentration was measured. 125 adult male Wistar rats weighing 150–200 g were used. 23 rats had been antrectomized 4–6 weeks before the actual experiments, as previously described[4]. The animals were either fed ad libitum or fasted for a defined period of time (not exceeding 48 h). During fasting, the rats were kept single in cages with wire mesh bottoms in

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