ium or ATP were without effect in reversing the effects of diethylstilbesterol, dienesterol or hexosterol on mitochondrial swelling. These relatively large quantities of inhibitors needed to produce significant changes in mitochondrial volume together with a lack of correlation of the relative abilities of these estrogenic substances to produce swelling and potentiate 6-aminonicotinamide toxicity on the 755 tumor[1] apparently discount possible *in vivo* changes in mitochondrial volume, produced by these compounds, as being pertinent to the biological results. Thus, subsequent increases in mitochondrial permeability to 6-aminonicotinamide or pyridine nucleotide analogues containing 6-aminonicotinamide may be ruled out as a major factor in enhancing 6-aminonicotinamide antagonism of intramitochondrial enzymes dependent on pyridine nucleotide.

[1] Diethylstilbesterol and hexosterol are far more effective than estradiol, dienesterol and phloretin in potentiating the anti-tumor activity of the niacin antagonist 6-aminonicotinamide in the 755 tumor grown in 755 black mice (unpublished data, Dietrich, L. S. and Martin, D. S.).

Summary. The ability of the compounds diethylstilbesterol, hexosterol, dienesterol, phloretin and estradiol to induce swelling of liver mitochondria was determined. Diethylstilbesterol, hexosterol and dienesterol produced marked mitochondrial swelling at final concentration of 4-8 $\times$ 10^{-5}M. The compounds estradiol and phloretin were inactive at the highest levels tested (8 $\times$ 10^{-5}M). Under the experimental conditions ATP, Mg^{++} or versene did not prevent the mitochondrial swelling induced by diethylstilbesterol.

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Proteins in Normal Cerebrospinal Fluid Not Found in Serum.* (26569)

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Recent reports dealing with proteins in the cerebrospinal fluid (CSF) have neither proved nor disproved the existence of proteins specific for CSF and not found in serum. Paper electrophoresis(1,2,3) does not demonstrate antigenic differences between the 2 fluids. The commercially available antiserum against human serum proteins has been used in several immuno-electrophoretic investigations of CSF (see survey by Burtin(4) and by Clausen (5)). These investigations, however, did not reveal the existence of special CSF proteins not found in serum. Immuno-electrophoresis using specific sera against CSF is a reliable method of demonstrating differences between proteins of CSF and proteins of serum. This communication adds some data to the very few results obtained in this field(6).

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Materials and methods. Normal cerebrospinal fluids were obtained from patients who had undergone pneumo-encephalography at The Municipal Hospital, Copenhagen, Denmark. These patients had no other neurological complaints than cephalalgia, without objective findings.

Immuno-electrophoresis was performed as described by Scheidegger(7). The antisera made in this laboratory were manufactured as described previously(8). The following antisera were used: 1) Rabbit anti CSF anti-

serum (No. 11), made in this laboratory. 2) Rabbit anti human gamma globulin antiserum from Behringwerke Marburg/Lahn, Germany.

The CSF used for immunization and immuno-electrophoresis was pooled from several persons and concentrated to 5 g% (w/v) by suction dialysis in an apparatus and membranes from Membrangesellschaft, Göttingen, Germany.

The 5 CSF gamma globulin fractions, found in agar gel micro-electrophoresis especially distinctly in CSF from patients with infectious diseases, were demonstrated with agar gel micro-electrophoresis of CSF from a patient with lymphocytic meningitis as described by Loewenthal *et al.*(9).

Results. Fig. 1 shows the immuno-electrophoresis of normal CSF developed with specific antiserum No. 11. The findings are correlated to similar tracings obtained when No. 11 developed normal human serum.

One prealbumin line, one albumin line, and several precipitation lines in the alpha- and beta-areas corresponding to similar lines in human serum immuno-electrophoresis can be seen. These lines are neither visualized in immuno-electrophoresis when antiserum 11 is absorbed with normal human serum nor when CSF is developed with specific anti gamma globulin. Thus all the precipitation bows in the prealbumin, albumin, and alpha-areas correspond to antigenically closely related proteins in human serum. On the other hand, 2 precipitation lines in the beta- and gamma-areas, called beta-CSF and gamma-CSF, can also be developed in immuno-electrophoresis with anti-CSF 11 absorbed with normal human serum. This means that these 2 proteins might be specific for CSF.

The precipitation line corresponding to beta-CSF corresponds to a group of antigenically identical proteins with different mobilities, from the slow albumin zone to the intermediate gamma globulin area.

Gamma-CSF has a small interval of mobility from the intermediate gamma-area to a mobility somewhat slower than the slowest gamma-mobility in serum.

Discussion. Previous investigations seem to indicate differences between CSF and human serum, for example, the tau-fraction

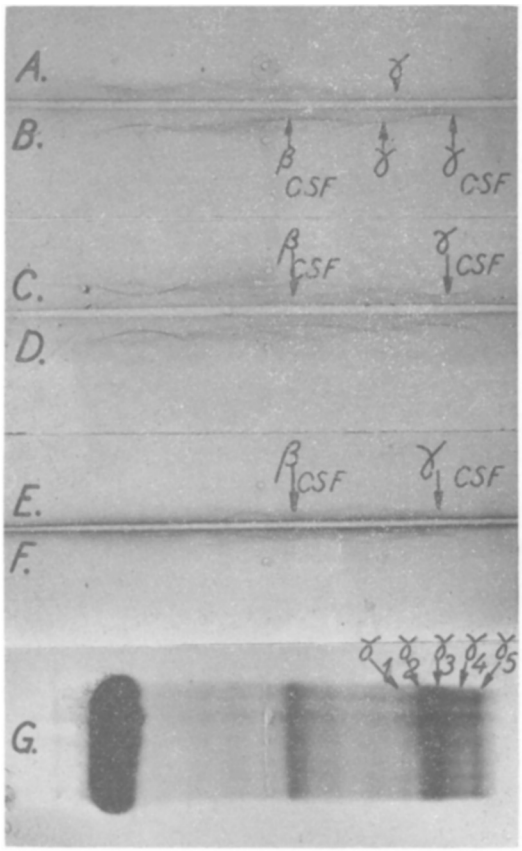

FIG. 1. Immuno-electrophoretic findings in normal cerebrospinal fluid. Demonstration of 2 specific proteins in CSF by means of a specific anti-CSF antiserum (No. 11). A. Imuno-electrophoresis of normal human serum developed with the anti-CSF antiserum No. 11. Only one precipitation line corresponding to the conventional serum gamma globulin in gamma area is seen. B. Normal concentrated CSF developed as A. Beside the serum gamma precipitation line precipitation lines corresponding to beta-CSF and gamma-CSF are visualized. C and D. Same tracings as B. E and F. Same tracings as C and D developed with anti-CSF antiserum absorbed with normal human serum in the proportion 3:1. Precipitation lines corresponding to the 2 specific proteins: beta-CSF and gamma-CSF are seen selectively. G. Agar gel micro-electrophoresis of CSF from a patient with lymphocytic meningitis, demonstrating the 5 gamma globulin fractions, of which some might correspond to the gamma-CSF fraction found in immuno-electrophoresis.

found in paper electrophoresis(10), and the 5 gamma globulin fractions in CSF revealed in agar gel micro-electrophoresis(11). These investigations could not, however, show any possible antigenic differences between the proteins of the 2 media. Immuno-electrophoresis has shown that the tau-fraction possibly cor-

responds to enzymatically changed transferrin, which has preserved the antigenic properties involved in the immuno-electrophoretic procedure(12,13,14).

Chevance, Galli, Jeanmaire, and Gerard(6) have recently described an immuno-electrophoresis with specific CSF antiserum. They have described 9 precipitation lines, among them a slowly moving gamma globulin. However, as mentioned by Burtin, the explanation of the immuno-electrophoretic findings was limited by lack of a potent antiserum. The data given here support the findings by Chevance *et al.*(6) of a slowly moving fraction in CSF with a mobility slower than that of the serum gamma globulin, antigenically different from serum gamma globulin. Both the absorption experiments with normal human serum and the crossing of the 2 slowest moving precipitation lines seem to exclude a very close antigenic relation between serum gamma globulin and gamma-CSF (Fig. 1). These findings may account for some of the slowest moving gamma globulin fractions revealed in agar gel micro-electrophoresis and explain the selective increase of these in diseases of the central nervous system (Fig. 1).

Summary. Immuno-electrophoresis of normal concentrated cerebrospinal fluid, developed with a specific rabbit anti cerebrospinal fluid antiserum, has demonstrated the existence in the gamma and beta areas of 2 proteins not found in serum.

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A Study of the Mechanism of the Increase in Cardiac Output Induced by Isopropylarterenol Hydrochloride (Isuprel®).* (26570)

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Many investigators(1-5) have studied the effect of isopropylarterenol hydrochloride (Isuprel®) on various aspects of the circulation and have demonstrated that the drug increases heart rate and cardiac output, decreases mean arterial blood pressure or leaves it unchanged, and lowers total peripheral resistance. To evaluate the role of the rise in heart rate normally induced by Isuprel in the genesis of the increase in cardiac output caused by the drug, the effect of Isuprel on

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