Evidence that an increase in the number of enzyme molecules in the membranes takes place under the influence of eserine is given by the increase in the number of binding sites for [^{3}H]ouabain (Fig. 1). It was shown that [^{3}H]ouabain has two types of binding sites in the membrane; the number of both types increased after treatment with eserine.

Differences in the action of eserine *in vivo* and *in vitro* suggest that when the integrity of the brain is disturbed, certain stages in the processes of regulation of Na,K-ATPase activity are blocked. One of them may be a disturbance of intercellular interaction, such as disappearance of the influence of interneurons, releasing inhibitory mediators (noradrenalin, dopamine) which have an action on synthetic processes opposite to that of ACh, on acetylcholine-sensitive cells [1, 5].

The results of these experiments thus indicated the existence of a complex system of mediator regulation of the level of Na,K-ATPase activity in nerve cells, the principal features of which can be represented as follows: When synthesis of the enzyme is activated, this is accompanied by synthesis of an inhibiting factor and, conversely, when enzyme synthesis is inhibited, an activating factor may be formed. These opposite processes are evidently stages in a single system maintaining activity of the enzyme at the optimal functionally determined level.

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PHOSPHOLIPID LEVEL AND LIPID PEROXIDATION ACTIVITY IN THE MYOCARDIUM OF RABBITS WITH CHRONIC BRONCHOPULMONARY INFLAMMATION

P. A. Kazaryan and K. G. Karagezyan

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KEY WORDS: phospholipids; lipid peroxidation; myocardium; chronic bronchopulmonary inflammation.

The results of the study both of chronic nonspecific lung diseases (CNLD) themselves and of complications caused by them have demonstrated a causative link between the degree of disability and mortality among such patients and the level of accompanying cardiopulmonary failure [1, 2, 4, 8, 11, 12].

The object of this investigation was to study the role of changes in activity of free-radical reactions in disturbance of metabolism of individual phospholipid (PL) fractions — highly important components of membranes — in the myocardium in chronic bronchopulmonary inflammation.

Central Research Laboratory, Erevan Postgraduate Medical Institute, Ministry of Health of the USSR. Laboratory of Lipid Biochemistry, Institute of Biochemistry, Academy of Sciences of the Armenian SSR, Erevan. (Presented by Academician of the Academy of Medical Sciences of the USSR A. N. Klimov.) Translated from Byulleten' Éksperimental'noi Biologii i Meditsiny, Vol. 95, No. 2, pp. 42-43, February, 1983. Original article submitted May 19, 1982.

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TABLE 1. Changes in PL Spectrum (%) and in Lipid Peroxidation Activity (in μmoles MDA/g tissue) in Right Heart Tissue in Chronic Bronchopulmonary Inflammation

Fraction	Control (n = 10)	Experiment (n = 9)
LPCh	—	5,05—1,17
PI	6,87—0,80	8,80—1,05*
SM	8,26—0,92	9,46—0,91
PCh	41,43—0,47	36,08—1,35†
PE	22,83—0,69	23,31—0,92
PS	10,50—0,40	8,30—0,12*
DPG	11,10—0,60	9,11—0,70*
Total PL	100	100 P=0,001
MDA	0,96—0,07 (11)	1,85—0,15 (14) $P<0,001$

*P < 0.05.
†P < 0.002.

EXPERIMENTAL METHOD

Experiments were carried out on 25 male rabbits weighing 2-3 kg. Chronic bronchopulmonary inflammation was induced by the method in [6]. The animals were killed under thiopental anesthesia 6 months after production of the disease. Tissue from the right side of the heart was investigated. Lipid peroxidation activity was estimated as yield of malonic dialdehyde (MDA) [10]. Total lipids were extracted from acetone powders of heart tissue [3]. Individual PL were fractionated by thin-layer chromatography [9] and their content of lipid phosphorus was then determined [7].

EXPERIMENTAL RESULTS

The experiments showed (Table 1) that PL in heart muscle of intact animals are distributed in the following order: phosphatidylcholines (PCh) > phosphatidylethanolamines (PE) > diphosphatidylglycerins (DPG) > phosphatidylserines (PS) > sphingomyelins (SM) > phosphatidylinositols (PI). The high content of DPG or cardiolipins (11.1%) and the absence of lysophosphatidylcholines (LPCh) must be noted. Chronic bronchopulmonary inflammation was accompanied by a marked fall in the total PL level (from 1080 ± 28.6 to 810 ± 21.3 μg lipid phosphorus/g tissue), chiefly on account of PCh, PS, and DPG. The decline of PCh was accompanied by the appearance of LPCh (about 5%), which are toxic products of lipolysis, evidence of activation of phospholipase A as an important pathogenetic factor in this disease. A clear decrease in the content of acid PL, mainly PS and DPG, was found. Changes in the quantitative ratio between lipid fractions in the myocardium portend serious disturbances in the physicochemical properties of the cell membranes and in their physiological activity, especially a disturbance of function of membrane-bound enzyme systems catalyzing transmembrane electron transfer, mainly cytochrome oxidase, purified preparations of which contain about 33% of PL, including DPG in amounts up to 30% of the total level of lipids [13].

It can thus be concluded from these results that substantial changes take place in the PL spectrum and concentration in tissue of the right side of the heart in chronic bronchopulmonary inflammation.

Chronic bronchopulmonary inflammation is also characterized by considerable activation (92.7%) of lipid peroxidation, most marked in fractions of membrane PE, PCh, and DPG [5]. The results are evidence that changes in the PS, PCh, and DPG content are linked with activity of lipid peroxidation. The fall in the level of the fractions listed above, which are distinguished by their higher content of polyene fatty acids, in the pathologically changed heart muscle may perhaps be due to their active involvement in free-radical oxidation reactions.

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EFFECT OF ANTITUBERCULOSIS AGENTS ON CYTOCHROME P450 ISOFORM COMPOSITION IN RAT LIVER MICROSOMES

Ch. S. Dzhuzenova, G. F. Zhirnov, N. V. Andrianov, and A. I. Archakov

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KEY WORDS: electrophoresis; liver; cytochrome P450; induction; isoform.

The cytochrome P450-hydroxylase system of endoplasmic reticulum membrane of liver cells plays an important role in the metabolism of nonpolar exogenous and endogenous compounds [1]. The final electron acceptor in the oxidation chain, namely cytochrome P450, can exist as several isoforms. Under the influence of phenobarbital, a subfraction cytochrome $P450_B$, with subunit molecular weight of 52,000 daltons, is induced in the rat liver, whereas by the action of 3-methylcholanthrene, subfraction cytochrome $P450_C$, with subunit molecular weight of 56,000 daltons is induced [9]. Many substances inducing cytochrome P450 in the liver are now known. Between 20 and 30 different isoforms of this hemoprotein have now been identified

TABLE 1. Effect of Antituberculosis Drugs, Phenobarbital, and 3-Methylcholanthrene on Cytochrome P450 Content in Rat Liver Microsomes (M ± m)

Preparation	Cytochrome P450, nmoles/mg protein
Phenobarbital sodium	2,8±0,2
3-Methylcholanthrene	1,5±0,1
Isoniazid	1,1±0,05
Phthivazid	1,2±0,06
PAS	0,9±0,1
Streptomycin	1,1±0,2
	1,0±0,1

Legend. Mean results of four experiments shown. Microsome preparation from livers of five animals.

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