takes place over a wider area than in the case of erythroblasts, so that the electric charge on the membrane falls more sharply.

The change in the surface charge of the proliferating cells of the erythron after the action of the chalone is evidently a special kind of signal leading to subsequent intracellular changes in ionic composition and in nucleic acid synthesis, and ultimately to the delay of mitosis in the erythroid series, as was observed in the experiments now described.

LITERATURE CITED

STATE OF THE LUNG SURFAC'TANT IN ANIMALS OF DIFFERENT SPECIES

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The activity of the lung surfactant in mice, rats, guinea pigs, hamsters, rabbits, and dogs was found to be within normal limits with variation of the coefficient of stability of the air bubbles between 0.84 and 0.93. Differences in the content of surfactant in animals of different species depend on the frequency, severity, and character of spontaneous pulmonary pathology. The data obtained can be used as the starting point for the study of the surfactant system of the lungs in various experimentally induced pathological states of the lung tissue.

KEY WORDS: lungs; surfactant; surface-active substance; type II pneumocytes.

During the last two decades the surfactant system of the lungs (SSL), which is responsible for maintaining the surface tension of the alveoli, has been studied. Numerous clinical and experimental investigations have shown that in several different pathological states of the respiratory organs the activity of the lung surfactant is modified, with the consequent development of atelectasis, an increase in the permeability of the air–blood barrier, and the development of pulmonary edema [2, 3, 5, 7, 10, 11, 13, 14]. Meanwhile the state of the surfactant of the lungs under normal conditions has been inadequately studied, although such initial data are essential for assessing the degree of damage to the SSL in pathological states of the respiratory organs. In a few investigations activity of the lung surfactant under normal conditions has been estimated mainly in only a single species of animal, and usually only one index, which was rarely compared with morphological changes in the lungs, was taken as the criterion [1, 3, 4, 12].

The object of this investigation was to make a combined study of SSL in animals of different species, including the estimation of surfactant by a quantitative method, identification of type II pneumocytes, which synthesize surfactant, and morphological analysis of the structure of the lungs.

**EXPERIMENTAL METHOD**

The SSL was investigated in animals of six species: noninbred mice and rats, guinea pigs, golden hamsters, rabbits, and dogs. At least 10 animals of each species were studied. The mice, rats, guinea pigs, and hamsters were killed with ether, the rabbits by air embolism, and the dogs by electric shock. The state of the surfactant was assessed by Pattie's microscopic method [12], by determining the coefficient of stability of air bubbles isolated from the lungs (Fig. 1). Type II pneumocytes were detected by Berg's caffeine-benzpyrene method [6], based on the appearance of secondary fluorescence in ultraviolet light. The number of cell was counted in the ML-2A microscope (UFS-6-5 and BSF-2 entry filters, ZhS-3 suppressing filter) in 100 fields of vision in a total area of 1.2 mm\(^2\), with a magnification of: ocular 5, objective 65 (water immersion). The morphological study of the lungs was carried out on paraffin sections stained with hematoxylin-eosin. The results were subjected to statistical analysis.

**EXPERIMENTAL RESULTS**

In mice, rats, guinea pigs, hamsters, rabbits, and dogs the coefficient of stability of air bubbles separated from the lungs was shown to vary from 0.84 to 0.93 (Table 1). The highest surfactant activity was found in mice, in which the coefficient of stability was close to unity (0.93). Rats, guinea pigs, rabbits, hamsters, and dogs have relatively low surfactant activity. Investigation of the type II pneumocytes in ultraviolet light showed that the number of these cells was approximately the same in mice, rats, guinea pigs, and rabbits, and it varied between 474 and 502 in 1.2 mm\(^2\) (Table 1). Meanwhile, the number of type II pneumocytes in these animals differed significantly from the number of pneumocytes in the dogs and hamsters (Table 1). In dogs, for instance, their number was only one-quarter of that found in hamsters and one-third of that in the other species of animals. Conversely, in hamsters the number of pneumocytes was 1.5 times greater than in the other rodents.

In all the animals type II pneumocytes were located in the alveolar septa as separate cells, mainly oval in shape with an eccentric nucleus. Numerous large granules, giving whitish blue luminescence, were present in the cytoplasm, which occupied a large part of the cell (Fig. 2). Some pneumocytes containing small granules of yellow fat in their cytoplasm were observed. The accumulation of granules of this type also was found extracellularly in the alveolar septa.