

## MICROCIRCULATION IN THE LUNGS

K.P. Ivanov

I.P. Pavlov Institute of Physiology, Russian Academy of Sciences, Sankt-Petersburg, Russia

Microcirculation in the lungs has been studied far from adequately compared to the microcirculation in the muscles, brain, and liver. In essence up to now there is no unified scheme of microvessel location in the lung tissues and of the direction of the blood flows in them. We were able to advance a method of studying microcirculation in the rat lungs in situ - given their normal location in the thoracic cavity of the animal. The objective of a contact microscope was brought into contact with the lung surface through a "window" in the tissues of the thoracic cavity 4x4 mm in size upon continuous ventilation of the lungs with oxygen. Our observations, photographs, and films recorded by a computer showed that the alveoli are located in rows in parallel to the lung surface. Relatively large microvessels, up to 40  $\mu$ m and even more in width, appeared to run between the lung alveoli (the tissue capillary in the rats has a diameter 3-4  $\mu$ m). All the alveoli are located in the net of these vessels and seem to get the venous or mixed blood from them. After passing alveoli the arterial blood flows in these very vessels. Eventually the pure arterial blood reaches the left auricle from the net of these relatively large vessels through the branches of the pulmonary veins. The estimated total surface of the net of relatively large microvessels comprises 15-17% of the alveoli surface. The blood flow rate according to our calculations is 7-10 mm/s. Owing to such a structure the lungs with their small mass (600 g for humans) allow to pass 5-6 liters of blood per minute through them. This is 5 times as much as the blood flow through the kidneys and 7 times as much as the blood flow through the brain. The report will be accompanied by a film illustrating the blood flow in the lung microvessels.