

**International Conference 'Advances in Pneumology'
Bonn, 17-18 June 2011**

**NEW DATA ON THE STRUCTURE AND FUNCTION OF
MICROVESSELS IN THE LUNGS. VIDEO FILMS OF THE BLOOD
MOVEMENT IN THE VESSELS AND ALVEOLI**

K. P. Ivanov

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

The work represents a study of microcirculation in the lungs in situ in their normal physiological location inside the thorax. The study was performed with a system of contact optics. A "window" 4 x 4 mm in size was made in the tissues of the thorax of an anaesthetized rat. The pleura was incised through this window. The lung collapsed and then was filled with oxygen or hypoxic gas mixture under the pressure of 10-15 cm of water through a tracheostomic cannula. This almost excluded the respiratory movements of the lung. Then the lung was brought in contact with the lens of 1.7 mm aperture. In the works on microcirculation in the lungs (1947-2008) the authors believed that each alveolus was supplied with blood via a thinnest (5-10 μ m in diameter) lung arteriole. We showed in the photographic records that there is a whole system of wide microvessels (20-30 μ m in diameter) which run between the alveoli. These microvessels surround each alveolus almost from all the sides. In such a manner each alveolus receives a maximal amount of blood. Such a structure of the circulation system in the lungs accounts for a high blood flow through the lungs (up to 6 l per minute in humans) and a rapid saturation of the blood with oxygen (about 100 ml per second). The alveoli saturate the blood with oxygen which diffuses into the system of these microvessels, which subsequently form the lung veins entering the left auricle. The photographs and video films of the alveoli at a high magnification are presented, demonstrating the special features of the structure and circulation in the alveoli. The plausible mechanisms of rapid saturation of the blood with oxygen will be discussed.