28. *Effect of Beta-Blockade on Conjunctival Microvascular Hemodynamics in Post-myocardial Infarction Patients.* G. DUDA* AND H. MAYROVITZ, Miami Heart Institute, Miami Beach, Fla. 33140.

The purpose of this study was to determine whether post-myocardial infarction (MI) patients treated with the beta-blocker propranolol would demonstrate differences in microvascular hemodynamics as compared with post-MI controls. Red blood cell velocity (Vrbc) and diameter (D) data were obtained from bulbar conjunctiva venules in 30 post-MI patients followed sequentially for periods up to 18 months. Initial data were obtained at times ranging from one to twelve months following the MI. For each patient video data was obtained from the same vessel(s) using a standard slit-lamp microscope fitted with a closed circuit TV recording system. Using the videodensiometric-correlation technique a frame-by-frame analysis of the video information yielded Vrbc data from which vessel blood flow was calculated. At present, data from 10 of these patients representing 85 paired D-Vrbc values have been analyzed. In the placebo group, vessel diameters ranged from 16.9 to 46.0 μm and Vrbc from 0.1 to 2.0 mm/sec whereas in the propranolol-treated group D and Vrbc ranged from 22.5 to 43.0 μm and 0.35 to 3.3 mm/sec, respectively. No conclusive trends in the temporal changes of the hemodynamics of individual patients has as yet been determined. However, when the two patient groups are considered the preliminary data suggest that in vessels of equivalent diameter range the blood flow in the propranolol treated group is significantly greater. This fact, combined with the finding of a lower mean blood pressure in the propranolol-treated group (91 vs 107 mm Hg), suggests a reduced microvascular resistance possibly related to the antihypertensive effect of the drug. (Research supported by Grant HL-23477 from NHLI.)

29. *Passage of Hydrogen Ions through the Pulmonary Vasculature.* R. M. EFFROS, S. NIOKA, G. MASON, P. SILVERMAN, AND E. REID, Department of Medicine, Harbor-UCLA Medical Center, Torrance, Calif. 90509.

Lactic acid is released into the venous circulation during vigorous exercise and is subsequently delivered in the arterial blood to the peripheral chemoreceptors. The transit of acid or alkaline signals through the pulmonary vasculature will be delayed by the pulmonary tissue buffers which are accessible to the blood. This study was designed to detect delays in the passage of acid transients due to fixed (nonbicarbonate) pulmonary buffers. Five rabbits were anesthetized with pentobarbital, intubated, and mechanically ventilated with air. Catheters were placed in the pulmonary artery and left atrium and the lungs were perfused at 100 ml/min and 37°C with isotonic 5 g/dl albumin solutions containing the pH indicator, bromthymol blue, and set at pH 7.4 and 7.0 with the buffer Hepes (N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid, $pK_a = 7.3$). ^{125}I-Albumin, ^{22}Na$^+$, and ^{3}H$_2$O were added to one of these solutions. The solutions were abruptly alternated during perfusion to impose step function changes in pH and radioactivity. The left atrial outflow was collected at one-second intervals and the mean transit times and distribution volumes of H$^+$ and each indicator were calculated. The extravascular volume (V_e) of H$^+$ averaged 33 ± 10% (SEM) that of ^{3}H$_2$O; V_e of ^{22}Na$^+$ averaged 37 ± 1% that of ^{3}H$_2$O. These data indicate that the effect of fixed buffering in the lung is slight and delays in H$^+$ transit due to this phenomenon would generally be less than one second. (Supported by NIH Grant HL18606.)

30. *Measurement of Capillary Diameter Based on the Passage of Red Cells.* C. G. ELLIS, R. G. SAFRANYOS,* K. TYML,* AND A. C. GROOM, Department of Biophysics, University of Western Ontario, London, Canada, and Max Planck Institut für Systemphysiologie, Dortmund, W. Germany.

Capillary diameter is generally measured by methods which require a trained observer to determine the location of the vessel walls. We have developed a new video—computer method for measurement of capillary diameter, based on temporal fluctuations of optical density within the vessel lumen due to the passage of red cells. These fluctuations were quantified, at successive points along a line perpendicular to the capillary, by sampling the output of a videoanalyzer (CVI-321), using a Cro-