ERYTHROCYTE PERMEABILITY The cellular membrane of the human red cell is composed largely of proteins and lipids; in addition, calcium is believed to be present. A substance may enter the cell either actively or passively. Its transport may be classified as active when it passes against an ascending electrochemical potential gradient, or along a descending electrochemical potential gradient at a rate faster than that of diffusion and therefore requires a supply of energy. The cellular membrane is believed to be sparsely pierced by aqueous channels about 7 angstroms in diameter through which small, neutral or negatively charged particles may penetrate passively. Oxygen and carbon dioxide are important examples. Another passive route is open to lipid soluble molecules which may enter the cell by dissolution in the membrane. The rate of entrance of larger lipid soluble molecules appears to be dependent, in addition, upon their molecular size. Positively charged particles such as potassium ions enter very slowly requiring 45 hours for exchange of half of the potassium in the red cell; in contrast chloride exchange half time is about 0.2 second. Since they have almost the same mobility in free solution, a factor other than free diffusion must be invoked. One explanation assumes that the channels in the membrane contain positive charges. Since these positive charges discriminate effectively against potassium diffusion, a carrier mechanism is proposed to account for the entrance of potassium into the cell. The cation is considered to enter into a reaction on the cell surface with a negatively charged lipid-soluble character which transports it into the cell. There it dissociates. Chloride and bicarbonate distribution is considered to be passive. (*Solomon, A. K.: The Permeability of Red Cells to Water and Ions, Ann. New York Acad. Sc. 75: 175 (Oct. 13) 1958.*)

GAS UPTAKE BY ERYTHROCYTE Oxygen or carbon dioxide exchange by blood involves: (1) diffusion through pulmonary epithelium and capillary wall; (2) passage through plasma, probably partly by diffusion and partly by mechanical mixing; (3) diffusion through red cell membrane; and (4) diffusion through the interior of the cell plus simultaneous combination with hemoglobin. Regarding oxygen uptake, processes 1 and 2 (measured together) normally provide about half the total resistance to the passage of gas, while 3 and 4 each provide about $\frac{1}{4}$ of the total. Less is known of the relative kinetic importance of these factors in carbon dioxide uptake. The "resistances" of the capillary wall plus plasma and red cell membrane are about $\frac{1}{20}$ of the resistances to oxygen. After passage through the cell membrane, three processes occur, the first two concurrently: (1) reversible combination of carbon dioxide with hemoglobin (carbamino); (2) reversible combination with water to form carbonic acid under the catalytic influence of carbonic anhydrase; and (3) exchange of bicarbonate ions formed by ionic dissociation of carbonic acid with chloride ions from the plasma. Of these processes carbamino binding is believed to be responsible for about 30 per cent of carbon dioxide transport, the other processes for most of the remainder. (*Roughton, F. J. W. and Rupp, J. C.: Problems Concerning the Kinetics of the Reactions of Oxygen, Carbon Monoxide and Carbon Dioxide in the Intact Cell, Ann. New York Acad. Sc. 75: 156 (Oct. 13) 1958.*)

LIFE SPAN OF ERYTHROCYTE The levels of three enzymes important in erythrocyte glucose metabolism, glucose-6-phosphate dehydrogenase, 6-phosphogluconic dehydrogenase, and phosphohexose isomerase are relatively high in young erythrocytes and decrease markedly with aging of the red blood cell *in vivo*. Glucose oxidation and lipid synthesis vary with the changes in enzyme activity. It is suggested that the diminution in activity of certain critical enzymes such as these may be a determinant of the life span of the erythrocyte *in vivo*. (*Marks, P. A., and others: Studies on the Mechanism of Aging of Human Red Blood Cells, Ann. New York Acad. Sc. 75: 95 (Oct. 13) 1958.*)

COAGULATION Bleeding and clotting time determinations are unreliable as preoperative screening tests. Bleeding and clotting times may be normal in the presence of severe coagulation defects. Conversely, bleeding and clotting times may be abnormal in the absence of demonstrable specific defect in coagulation.