

transport system for sodium outward and potassium inward across the membranes of intact erythrocytes. The ATPase and active sodium and potassium transport have the following unusual group of properties in common. (1) Both were located in the membrane. (2) Both utilized adenosine triphosphate (ATP) in contrast to inosine triphosphate. (3) Both required sodium and potassium ions together. Either sodium or potassium ion alone was ineffective. (4) Potassium ion activation was completely inhibited by high concentrations of sodium ion in both systems. (5) Ouabain inhibited both systems. (6) Ammonium ion substituted for potassium ion but not for sodium ion in both systems. (7) The concentrations at which sodium ion, potassium ion, ouabain, and ammonium ion showed half of their maximal effects were the same in both systems. The identification of this ATPase activity as part of a transport system implies that sodium and potassium ions are more than simple cofactors; as substrates for transport they should be moved from one part of the system to another at a rate dependent on the rate of dephosphorylation of ATP. The movement is not apparent, of course, in a suspension of broken membranes. The identification suggests that the reciprocal competitive inhibition between sodium and potassium may mean that on each side of the membrane the linked transport system must free itself of one substance as transported product before it can take on the other as transportable substrate. (Post, R. L., and others: *Membrane Adenosine Triphosphatase as Participant in Active Transport of Sodium and Potassium in Human Erythrocyte*, *J. Biol. Chem.* 235: 1796 (June) 1960.)

# **BUFFERING OF BLOOD PLASMA**

Buffering of blood plasma in man depends upon red blood cells, chemical buffers in blood and tissue cells, respiratory system, and the kidneys. The role of each in maintaining blood plasma pH is examined in detail. At a constant  $P_{CO_2}$ , the total blood buffer value is 76.8 mEq./l. for a change in one pH unit. Of this total, 3 per cent is due to plasma bicarbonate, 28 per cent to other chemical buffers in the blood, and 69 per cent to the presence of a gas phase. When the alveolar ventilation changes in response to variations

in pH and  $P_{CO_2}$ , the blood buffer value increases substantially. The tissues and kidneys have the capacity to contribute substantially to the buffer value of blood, but they react more slowly than the respiratory system and chemical buffers in the blood. (Gilbert, D. L.: *Buffering of Blood Plasma*, *Yale J. Biol. & Med.* 32: 378 (April) 1960.)

**PUMP-OXYGENATOR** In 1926 S. S. Broukhonenko devised a machine for sustaining life in mammals while cardiopulmonary bypass was performed. It consisted of two diaphragm pumps and a donor lung which was rhythmically inflated while being perfused by one of the pumps. It was used successfully three times. The inventor suggested that such machines could be perfected for the uses to which they are in fact being presently put. (Probert, W. R., and Melrose, D. G.: *Early Russian Heart-Lung Machine*, *Brit. Med. J.* 1: 1047 (April 2) 1960.)

**PUMP-OXYGENATOR** A pump-oxygenator system requiring no blood for priming adds greatly to the safety of, and makes possible a wider application of heart-lung bypass procedures. The patient's blood is collected, oxygenated, and returned through a low volume extra-corporeal circuit in which little trauma occurs. (Neptune, W. B., Bougas, J. A., and Panico, F. G.: *Open-Heart Surgery Without Need for Donor-Blood Priming in Pump-Oxygenator*, *New Eng. J. Med.* 263: 111 (July) 1960.)

**CARDIAC SURGERY** For 71 operations on the heart and great vessels a 0.1 per cent solution of Arfonad (trimetaphen) in 5 per cent glucose was injected by the drip method. The use of ganglion-blocking drugs in operations on the heart and great vessels is justified by the possible prevention of operative shock, the lowering of the blood pressure and by the creation of satisfactory conditions for the surgeon. (Meshalkin, E. N., and Stadnikova, E. I.: *Ganglion Block in Operations on Heart and Main Blood Vessels*, *Khirurgiya* 9: 3, 1959.)

**TRANSAMINASE** The serum glutamic oxaloacetic transaminase levels in 80 patients, undergoing cardiac repair and with total body perfusion, were markedly increased when po-