

Action Potential of the Atrio-ventricular Node (Tawara)*

Kojiro Matsuda†, Takeshi Hoshi† and Shigenori Kameyama

(松田 幸次郎)

(星 猛)

(亀山 重徳)

*The Department of Applied Physiology, Tohoku University
Medical School, Sendai*

(Received for publication, April 25, 1958)

The membrane potential of the cells of the atrioventricular (A-V) node was investigated in the puppy by means of the ultramicroelectrode technique. Excised atrial preparations containing the A-V nodal region were used, under abundant supply of oxygen.

The characteristic features of the cellular action potential as follows were observed only in the localized area where the A-V node was known to exist. The characteristics are: 1) slow rise of depolarization, 2) definite delay of the spike from the start of depolarization amounting from 40 to 80 mSec; preceding the spike there is a slow rise simulating the synaptic potential, at times a step-like potential, 3) the overshoot is small or absent, 4) slight undershooting following the repolarization and slightly lowered resting potential (Fig. 1). While the start of depolarization is almost simultaneous with that of the adjacent atrial fiber, the spike is delayed distinctly.

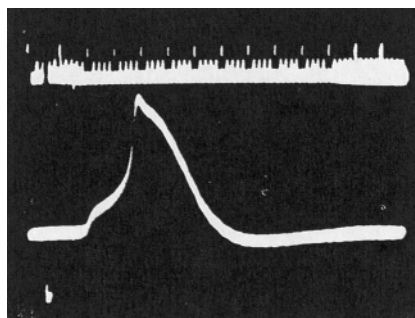


Fig. 1. Membrane action potential of the A-V node. Dog. Time mark : 10+50 mSec on the zero potential line. Voltage calibration : -100 mV.

Though it was not possible to trace the action potential changes from the A-V node to the bundle of His, the authors would consider that the "A-V conduction delay" is due to the spike delay of the action potential occurring in the course of the impulse conduction in a short distance at the proximal portion of the A-V node, owing to the characteristic behavior of the cellular membrane there.

* Reported in the 34th general meeting of the Physiological Society of Japan on May 26, 1957 at Kobe. † Present address : Department of Physiology, Faculty of Medicine, University of Tokyo.

Addenda. According to a recent, personal communication from Dr. B. F. Hoffman, State University of New York, he noticed in the A-V node of the rabbit the action potentials which were low in amplitude and provided with a slow, notched rising phase. He supposed the decremental conduction at very low velocities.