

CE-9

Background Non-Selective Cation Channels in Rat Atrial Myocytes

Jae-Boum Youm*, Yin-Hua Zhang, Won-Kyung Ho, and Yung-E Earm
*Department of Physiology and Biophysics, Seoul National University
College of Medicine.*

Resting membrane potential of atrial myocytes is less negative than K^+ equilibrium potential, suggesting the presence of ion channels carrying inward currents. We investigated the background Na^+ current in rat atrial myocytes using both conventional whole cell voltage clamp technique and single channel recording.

When Ca^{2+} current, K^+ current were blocked by nifedipine, 4-AP and TEA, time-independent currents which showed a linear I-V relationship were recorded. The amplitude of inward current increased when Na^+ was replaced with Cs^+ , whereas it decreased when Na^+ was replaced with Cs^+ . Replacement of Na^+ with NMDG⁺ almost abolished inward current. Both inward and outward currents were blocked dose dependently by $GdCl_3$, which is known as non-selective cation channel blocker. We have also identified single channel currents in cell attached patch in the presence of above blockers. Single channel conductance was about 16 pS in 140 mM NaCl pipette solution, and open probability was not voltage dependent. Inward channel activity was also observed in CsCl or LiCl solution, but not in NMDG-Cl solution.

From above results, we concluded that rat atrial myocytes have the non-selective cation channels whose permeability sequence was $Cs^+ > Na^+ > Li^+$.