



**Stably Transfected Cell Line - Product Data Sheet**  
**hK<sub>v</sub>1.5-HEK**  
**Catalog Number CT6138**

**Related Services and Products**

FastPatch<sup>®</sup> and ScreenPatch<sup>™</sup> automated patch clamp services  
Replicating hK<sub>v</sub>1.5-CHO cell line. Cat. No. CT6137  
Additional information available at [www.chantest.com](http://www.chantest.com)

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## 1 Cell Line Description

### 1.1 Background

K<sub>v</sub>1.5 is a voltage-gated, K<sup>+</sup>-selective channel expressed in aorta, heart, colon, kidney, stomach, smooth muscle, central nervous system, pituitary, and pulmonary artery. In the heart, K<sub>v</sub>1.5 is responsible for I<sub>Kur</sub>, the ultra-rapid delayed rectifier potassium current. The channel is a potential therapeutic target in multiple sclerosis, atrial fibrillation, and pulmonary hypertension.

### 1.2 Pore-forming subunit identifier: hK<sub>v</sub>1.5

Class: Voltage-gated potassium channel

Species: Human

Gene name: KCNA5

### 1.3 Sequence Information

The cDNA sequence of the KCNA5 gene used to create this cell line was confirmed prior to transfection. The amino acid sequence encoded by the transfected cDNA is identical to the translated sequence for GenBank accession number NM\_002234.2.

### 1.4 Expression System

HEK293 (human embryonic kidney) cells, constitutive expression.

### 1.5 Product Format

Cryopreserved cells, 1 x10<sup>6</sup> cells/vial.

### 1.6 Mycoplasma Status: Negative

The absence of mycoplasma species in this cell line was confirmed with the MycoAlert Kit (Lonza Rockland, Inc.).

### 1.7 Cell Line Stability

**Table 1. Stability of hK<sub>v</sub>1.5 Current**

Passage Number	Current Amplitude (nA)	n (cells)
27	5.16 ± 0.72	7
31	8.56 ± 1.20	10
39	8.09 ± 1.32	15
47	6.07 ± 1.26	12
55	5.42 ± 0.76	5

A frozen vial at P22 was thawed and passaged for stability measurements. hK<sub>v</sub>1.5 current amplitudes recorded on PatchXpress<sup>®</sup> (mean ± standard deviation). Table 1 shows that current amplitude measured from hK<sub>v</sub>1.5-HEK remains stable for at least 33 passages beyond the original frozen vial.

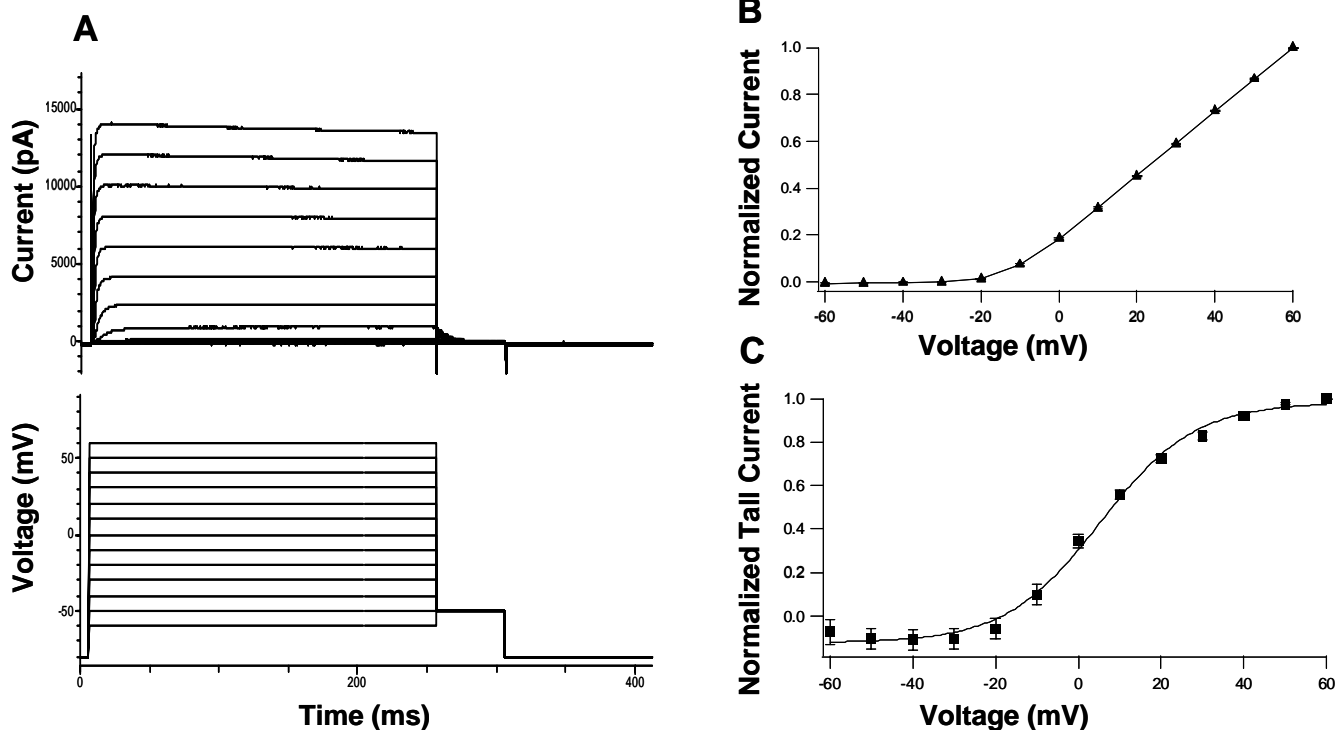
## 2 Validated Test Platforms

Electrophysiological and pharmacological verification of the functional properties of the cloned channels was assessed in the following test platforms:

Manual Patch Clamp

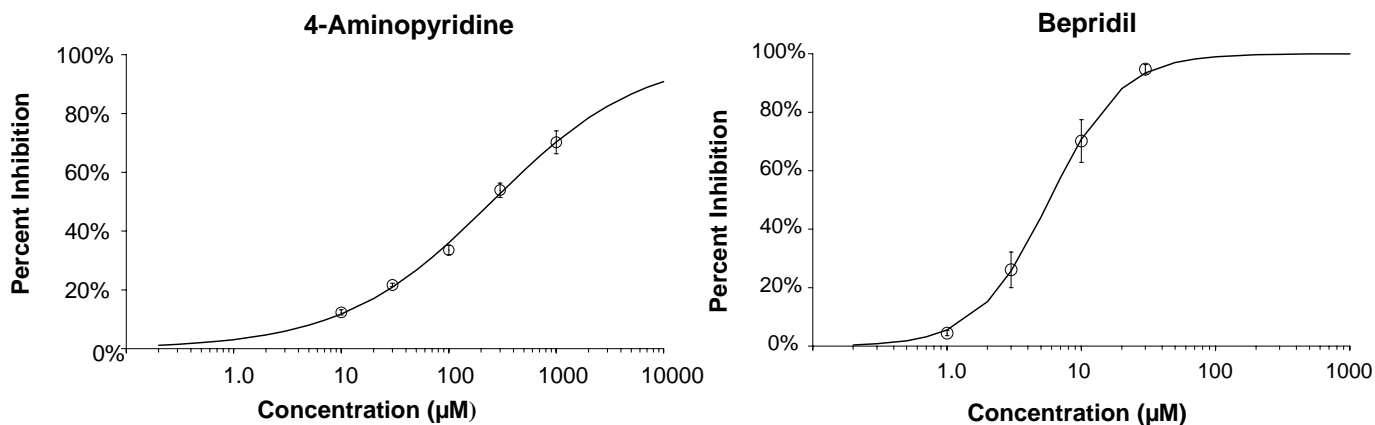
PatchXpress<sup>®</sup> (MDS-AT)

## 2.1 Manual Patch Clamp Representative Data



**Figure 1. Voltage-Dependent hK<sub>v</sub>1.5 Gating in Manual Patch Clamp**

**A:** Current-voltage family of current traces (upper panel) elicited by a voltage pattern (lower panel) of test pulses ranging from -60 to +60 mV, in 10 mV increments, with return potential to -50 mV, holding potential -80 mV. **B:** Current-voltage relationship. **C:** Voltage-dependence of activation from tail current amplitude at the -50 mV return potential. Mid-point potential = +5.2 mV.

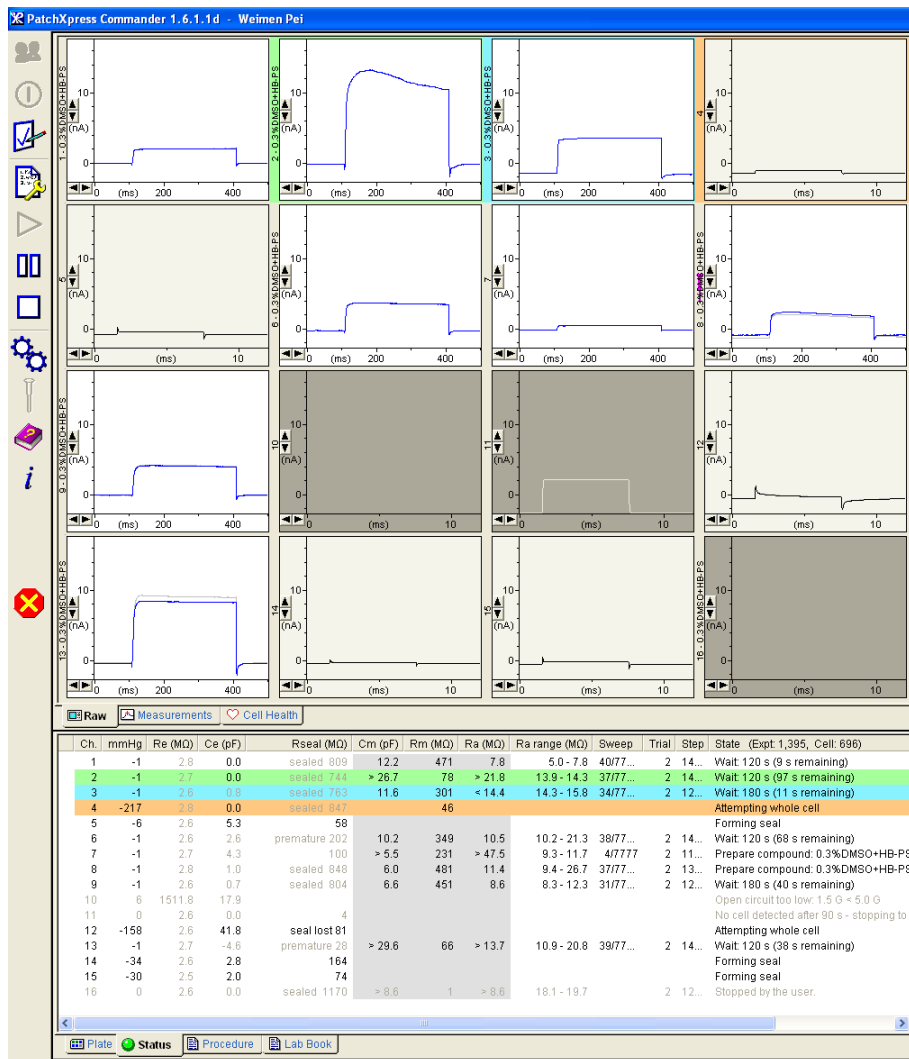


**Figure 2. Effects of hK<sub>v</sub>1.5 Antagonists in Manual Patch Clamp**

**A:** 4-Aminopyridine concentration-response relationship (Mean  $\pm$  SEM, n = 3 - 4, IC<sub>50</sub> = 251  $\mu$ M). **B:** Bepridil concentration-response relationship (Mean  $\pm$  SEM, n = 3 - 10, IC<sub>50</sub> = 5.8  $\mu$ M).

## 2.2 PatchXpress®

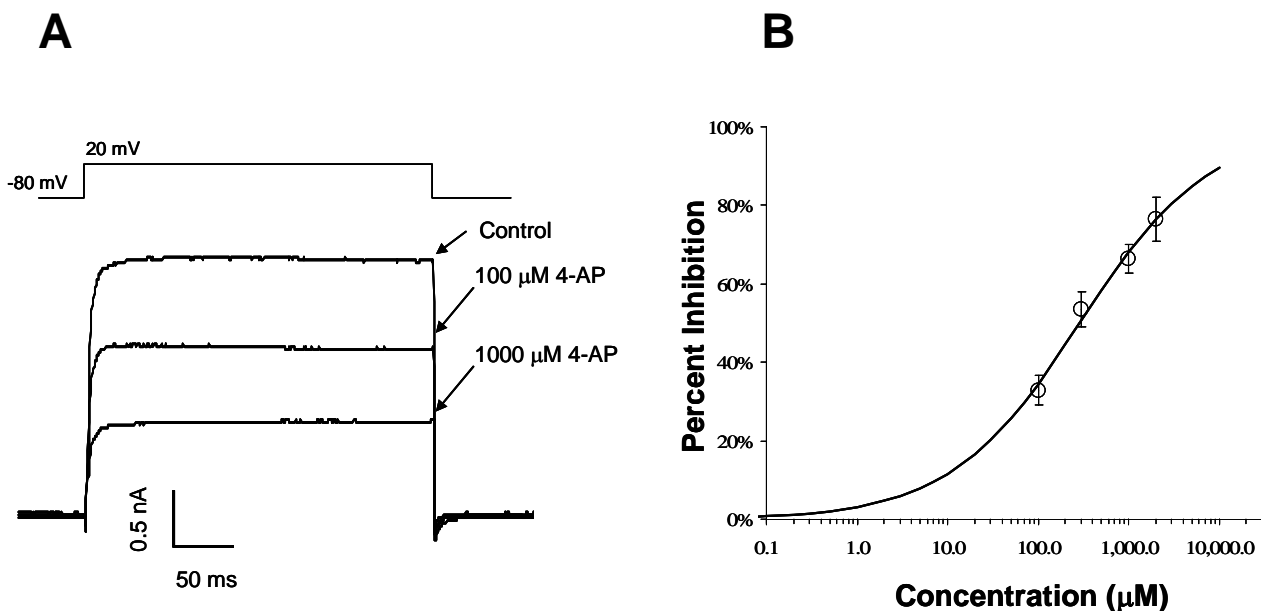
### 2.2.1 Throughput Capability in PatchXpress®



**Figure 3. PatchXpress® hKv1.5-HEK Screen Capture.**

Throughput capability in PatchXpress® depends upon many factors which may result in success rate variability. The screen capture shows a typical hKv1.5 PatchXpress® experiment: 8 of a possible 16 seals were formed, whole-cell configuration was achieved in 8 cells, and 6 cells showed characteristic hKv1.5 current waveforms with little leak current and peak current amplitudes > 1 nA.

## 2.2.2 Representative Data



**Figure 4. 4-Aminopyridine (4-AP) block in PatchXpress<sup>®</sup>**

**A:** Superimposed current traces elicited by 300-ms test pulses to +20 mV in the absence (control) and presence of 4-AP. **B:** Concentration-response relationship (mean  $\pm$  SEM,  $n = 2 - 3$ ,  $IC_{50} = 288 \mu M$ ).

## 3 References

Grissmer S, et al. 1994. Pharmacological characterization of five cloned voltage-gated K<sup>+</sup> channels, types Kv1.1, 1.2, 1.3, 1.5, and 3.1, stably expressed in mammalian cell lines. *Mol Pharmacol* 45:1227-1234.

Gutman GA, et al. 2005. International Union of Pharmacology. LIII. Nomenclature and molecular relationships of voltage-gated potassium channels. *Pharmacol Rev.* 57:473-508.