**Supplementary data**

**Generation of HCN2-deficient mice**

Using a clone from a genomic 129/Sv P1 phage library (Genome Systems), the targeting vector was constructed such that exons 2 and 3 were flanked by a loxP-\textit{neo/tk}-loxP cassette and a single loxP site. The construct was electroporated in R1 ES cells and G418 resistant clones were screened by Southern blot. Two positive clones were transfected with a Cre-expressing plasmid to delete exons 2 and 3 including \textit{neo/tk} marker genes. Five clones with the correct deletion event were injected in C57BL/6 blastocysts. Chimeras were bred with C57BL/6 mice and resulting heterozygotes were intercrossed to yield HCN2$^{-/-}$ mice. Genotyping was done by PCR using primers 14 (5’-GGTCCCAGGCACTTCCATCTCCTT-3’), 15 (5’-GGAAAAATGGCTGCTGAGCTGTCTC-3’) and 16 (5’-CAGCTCCCATTTGCCCTTGTGC-3’).

**Electrophysiological analysis of I_h**

$I_h$ was analyzed as the time-dependent current following an initial lag in the activation time course, i.e. an instantaneous current component was subtracted from the current at the end of an hyperpolarizing pulse. The steady-state activation curve was estimated by normalizing tail current amplitudes measured 50 ms after stepping from the test potentials to –80 mV. Activation was given by $p(V) = (I_{tail} - I_{min}) / (I_{max} - I_{min})$; $I_{max}$: tail current amplitude for step from –130 mV to –80 mV, $I_{min}$: tail current amplitude for step from –40 mV to –80 mV. Half-maximal activation values ($V_{1/2}$) were determined using Boltzmann fits of activation curves. A liquid junction potential of 9.7 ± 0.5 mV (n=4) was taken into account for data presentation. Signals were acquired using a HEKA EPC-9 amplifier and Pulse software.
Fig. 1 Activation curve of $I_h$ from wild-type and HCN2$^{-/-}$-sinoatrial cells.

The steady-state activation curves of $I_h$ from wild-type (closed symbols) and HCN2-knockout (open symbols) sinoatrial cells were determined by the following protocol: Cells were voltage clamped from a holding potential of $-40$ mV to various prepulse voltages ($-140$ mV to $-40$ mV, in 10 mV increments) for 2.4 s followed by a test pulse to $-140$ mV. The amplitudes of the tail-currents measured immediately after the beginning of the test pulse were plotted as a function of the preceding membrane potential. The curves were fitted by a Boltzmann equation. The $V_{1/2}$ values and slope factors of both curves were not significantly different ($V_{1/2}$ : $-92.0 \pm 1.4$ mV for wild-type (n=13) and $-92.2 \pm 1.4$ mV for HCN2$^{-/-}$- cells (n= 14), slope: $-15.0 \pm 1.8$ mV for wild-type and $-14 \pm 1.4$ mV for HCN2$^{-/-}$- cells).