

THE MORPHOLOGIC PATTERN OF THE INTRINSIC CARDIAC NEURONAL CLUSTERS IN THE RABBIT HEART: A HISTO- AND IMMUNOHISTOCHEMICAL QUANTITATIVE STUDY

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Abstract. The purpose of this study was to examine the distribution and the structural organization of the intrinsic cardiac neuronal clusters in the rabbit heart. Cardiac nerve structures were stained histochemically for acetylcholinesterase (AChE) in whole-mount preparations derived from 11 young and 5 old rabbits. To reveal the neurochemical phenotype of intrinsic cardiac neurons (ICNs), double labeling for tyrosine hydroxylase (TH) and choline acetyltransferase (ChAT) was performed on paraffin sections from 2 rabbits. The clusters of ICNs were localized on the heart base at the roots of the pulmonary veins and scattered on the conus arteriosus (CA). The ChAT (+) neuronal somata were predominant within neuronal clusters. The moderate statistical significant ($P < 0.05$) correlation between the cluster area and number of the ICNs was determined within both the compact ($R = 0.7$) and the scattered ($R = 0.8$) clusters. The total number of the ICNs on the heart base was 2013 ± 120 , on average, and ranged from 1312 to 2723. The differences in the mean number of neuronal clusters, in the mean neuron number per cluster, and in the mean neuron number on the heart base were statistically insignificant between young and old rabbits ($P > 0.05$). These findings demonstrate the neuronal clusters, involved about two thousands of ChAT immunoreactive neurons, predominantly distributed on the heart base near the roots of pulmonary veins, and suggest that the distribution and the morphology of the rabbit neuronal clusters correspond to the mouse and rat hearts.

Keywords: intrinsic cardiac neurons, intrinsic cardiac nervous system, rabbit, heart, acetylcholinesterase, choline acetyltransferase.