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THE ELECTROPHYSIOLOGIC PROPERTIES OF AGE-RELATED CHANGE IN MOLECULE MECHANISM OF L-TYPE CALCIUM CHANNEL

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Objectives To investigate the molecular basis of L-type calcium channel in adult and aged canine.

Methods Two groups of mongrels were investigated: seven adult and ten-year-old canines. The effective refractory period (ERP) of HRA, coronary sinus proximal (CSp), coronary sinus distal (CSd), left atrial appendage (LAA), right atrial appendage (RAA), left superior pulmonary vein (LSPV), left inferior pulmonary vein (LIPV), right superior pulmonary vein (RSPV) and right inferior pulmonary vein (RIPV) were measured in sequence at an atrial pacing of S_1S_2. We measured the mRNA gene and protein expression levels of L-type calcium channel α_1 subunit (CaV1.2), sarcoplasmic reticulum Ca^{2+}-ATPase ($SECRA_2$), Calpain-I, ryanodine receptor (RyR_2) in atrial myocardial tissue from two groups.

Results The ERP of RAA and CSp were significantly longer in the aged than in the adult dogs ($p<0.05$).2) The mRNA gene expression levels of CaV1.2 was significantly lower in the aged dogs (0.9±0.35) than in the adult dogs (2.38±0.4, $p<0.05$), The mRNA gene expression levels of RYR_2 was significantly higher in the aged dogs (4.39±4.68) than in the adult dogs (1.49±1.69 , $p<0.05$). There were not significantly different gene expression levels of $SECRA_2$ and Calpain I in two groups; The protein expression levels of CaV1.2 was significantly lower in the aged dogs than in the adult dogs (0.13±0.10 vs 0.29±0.12, $p<0.05$), The protein expression levels of RYR_2 was significantly higher in the aged dogs than in the adult dogs (0.18±0.21 vs 0.08±0.36, $p<0.05$). There were no significantly different protein expression levels of $SECRA_2$ and Calpain-I in two groups.

Conclusions The present study demonstrated that ageing-related changes of atrial myocyte electrical properties and molecular changes in aged dogs play an important role in the predisposition to developing and maintaining AF due to ageing.