Conclusions

We also observed that expression of c-Myc can be increased by I/R injury in rat cardiac myocytes. The Ndrg2 expression in myocardial tissue after I/R injury in rat myocardium may contribute to the down-regulation of pro-apoptotic Ndrg2. Furthermore, the rapid apoptotic rate at the early phase of reperfusion was ameliorated in the late phase. Some results in vivo were further confirmed by ex vivo study in cultured cardiomyocytes subjected to simulated I/R.

Conclusions

The method of establishment closed chest porcine model of AMI by implantation balloon embolism in target vessel is feasible, safe, quick and relatively effective.

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Aims

It has been shown that Ndrg2 (N-Myc downstream-regulated gene 2), a Myc-repressed gene, is markedly expressed in heart. Ndrg2 can act as a stress response under hypoxia and is necessary for hypoxia-induced apoptosis in certain tumour cell lines. In the present study, we investigated whether ischaemia/reperfusion (I/R) injury played a role in the regulation of Ndrg2 expression in rat heart and further explored the possible relationship between Ndrg2 expression and cardiomyocyte apoptosis induced by I/R injury.

Methods

Rats were subjected to open chest surgery coronary artery ligation for ischaemia only or followed by reperfusion. Immunostaining and Western blot were applied to test the expression of Ndrg2, c-Myc, cleaved-caspase3 from myocardium, and TUNEL (terminal dUTP nick end labelling)-staining for apoptosis determination in myocardium.

Results

The immunostaining confirmed Ndrg2 distribution in cardiomyocytes. The Ndrg2 expression in myocardial tissue after I/R injury was significantly reduced at both mRNA and protein levels. We also observed that expression of c-Myc can be increased by I/R injury and was significantly inversely correlated with Ndrg2 expression. Furthermore, the rapid apoptotic rate at the early stage of reperfusion was ameliorated in the late phase. Some results in vivo were further confirmed by ex vivo study in cultured cardiomyocytes subjected to simulated I/R.

Conclusions

Our data suggests that up-regulation of pro-apoptotic c-Myc expression induced by I/R injury in rat myocardium may contribute to the down-regulation of pro-apoptotic Ndrg2. Such stress response may be involved in the post I/R anti-apoptosis mechanism and myocardial repair in rat.

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Objectives

In order to investigate the potential mechanism of Piperine, which is the active substance from Rhodobryum roseum Limpr., on acute atrial electrical remodelling in atrial fibrillation by inducing of rapid atrial pacing, as well as its protective effect on injury of oxidative stress in myocardium.

Methods

24 healthy rabbits were collected, and randomly assigned to four groups as follows: normal saline (NS), normal saline+rapid atrial pacing (NS+RAP), piperine (PI), piperine+ rapid atrial pacing (PI+RAP). In the study, acute electrical remodelling was conducted by rapid atrial pacing. In pacing group, right atrium was paced with a frequency of 500–600 bpm for 3 h, atrial effective refractory period was measured at 0 h, 0.5 h, 1 h, 1.5 h, 2 h, 2.5 h and 3 h after pacing, respectively. Then we calculated the rate adaptation of atrial effective refractory periods in different basic pacing cycle lengths. Soon after the experiment, we dissected the atrium of rabbits, the left atrium, right atrium and pulmonary veins were dissected, consequently the levels of MDA, SOD, XOD and Calcium were measured with special kits. All the results were analysed with SPSS17.0.

Results

1. In the experiment, paroxysmal atrial fibrillation or atrial tachycardia can be induced only in NS+RAP group, whereas no similar phenomenon was observed in the other three groups. 2. AERP was markedly shorter in NS+RAP group but it was not changed in NS and PI+RAP group. The rate adaptation of AERP was reduced in NS+RAP, but got lowest point (~0.24±0.59) 1 h after pacing, while the rate adaptation of AERP presented no significant changes in NS and PI group. 3. MDA of PI+RAP group in left atrium and pulmonary vein was lower than that of NS+RAP group (p<0.01), but no significant difference of MDA in RA was observed between the two groups. 4. SOD activity in RV is higher in PI+RAP than that in NS+RAP, but no significant difference was observed in other locations between PI+RAP group and NS+RAP group. 5. XOD activity in LA and PV is lower in PI+RAP than that in NS+RAP (p<0.05), but XOD activity in RA presented no difference between the two groups. 6. Calcium level in LA, RA and PV, presented lower in PI+RAP group compared with that in NS+RAP group.

Conclusion

Piperine can help reduce incidence of AF, prevent the shortening of AERP and the rate adaptation of AERP, in other words, piperine can alleviate acute electrical remodelling in acute phase of AF. 2. Piperine can alleviate injury of oxidative stress in AF through suppression of MDA overproduction, reducing the consumption of SOD, suppression of XOD activity as well as Calcium overload, consequently develops the protective effect on myocardium during AF. 3. When AF is present, PV has the most serious injury of oxidative stress but RA suffer the slightest injury. Meanwhile, antioxidant effect of piperine is the most conspicuous in PV.

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Objective

To investigate the acute proarrhythmic effects of low concentration BPA on female adult rat and the electrophysiological mechanisms.

Methods and results

Acute exposure to BPA increased the contractility of cardiac myocytes from female rat heart with inverted U-shaped dose-response curve, these effects were female specific. After-contraction or after-transient rate of female rat cardiac myocytes increased in BPA group, and increased much more by exposure to the mixture of BPA and 10^{-9} M E_{2}. Increasing BPA or E_{2} from 10^{-9} M to 2X 10^{-9} M did not increase the effects induced responses. Although BPA combined with E_{2} did not induce the
premature ventricular beats of ex vivo heart, under the acute adrenergic challenge, they significantly enhanced the frequency of premature ventricular beats.

**Conclusions** BPA promotes arrhythmogenesis in female rat heart by induced DADs, and effects of BPA and E2 are synergistic instead of additive.

**e0181** RENALASE DEFICIENCY IN HEART FAILURE—A NOVEL MECHANISM UNDERLYING CIRCULATING NOREPINEPHRINE ACCUMULATION

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**Background** Sympathetic overactivity and catecholamine accumulation are important characteristic findings in heart failure, which contribute to its pathophysiology. However, the mechanism underlying circulating catecholamine accumulation remains largely unclear.

**Objective** To identify a novel mechanism underlying norepinephrine accumulation in a rat model of heart failure.

**Methods and results** Initially, we constructed a rat model of unilateral renal artery stenosis and found that the expression of renalase, a previously identified secreted amine oxidase, was markedly reduced in the ischaemic compared to the non-ischaemic kidney. Subsequently, we utilised an isolated perfused rat kidney model to demonstrate that the clearance rate of norepinephrine decreased with reduction of either perfusion flow or pressure. On the basis of these findings, we hypothesised that the reduced renal blood supply which occurs in heart failure would result in impaired synthesis of renalase by the kidney and consequently reduced degradation of circulating norepinephrine. To verify this, we used a rat model of infarction-induced heart failure caused by ligation of the left anterior descending coronary artery. In these rats, renal expression of renalase, when measured at 4 weeks, was reduced, and this was associated with an increase in circulating norepinephrine.

**Conclusions** We conclude that impaired synthesis of renalase by the kidney may represent a novel mechanism underlying circulating norepinephrine accumulation in heart failure.

**e0182** ELECTROPHYSIOLOGICAL SUBSTRATE FOR CANINE ATRIUM

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**Objective** Hypertension is frequently complicated by atrial fibrillation (AF). However, the atrial substrate for AF is not known. This study investigated the electrophysiological properties of atrial repolarisation by monophasic action potential (MAP) in order to explore the mechanism of paroxysmal AF initiation and maintenance.

**Methods** MAP were recorded from left and right atrium in 14 canine action potential duration (APD) at 90% repolarisation (APD90). Repetitive atrial firing (RAF, the occurrence of two or more successive premature atrial activations with return cycle of 250 msec or less following atrial stimulation) and APD alternans (the difference in APD between two consecutive beats, were induced by overdrive pacing at LA and RA) were induced by use of programmed stimulation at LA and RA. In the study, episodes of RAF were recorded and analysed.

**Results** APD90 were significantly shorter in the left atrium compared to the right atrium ((157.4±43.5) vs (170.9±37.9), p<0.05). The mean S1S2 interval induced RAF was (150±52) ms. 15 RAF were induced in 14 dogs. RAF induced in LA were more than in RA (11 vs 4, p<0.05). Alternans of APD were induced at CL of (162±25) ms. 13 APD alternans were induced at LA (8) and RA (5) of 14 dogs. In total, 61 episodes of RAF were induced in 14 canines. 38 episodes of RAF were induced in the left atrium, more than in the right atrium (23, p<0.05).

**Conclusions** The incidence of RAF and alternans was significantly higher in LA than in RA. Heterogeneity between LA and RA repolarisation creates substrate for re-entrant arrhythmias and vulnerability to atrial fibrillation.

**e0183** LIVIN PROTECTS AGAINST CARDIOMYOCYTE APOPTOSIS IN ANOXIA/REOXYGENATION INJURY VIA P38-MEDIATED SIGNAL PATHWAY

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**Introduction** Although anoxic preconditioning (APC) in the myocardium has been investigated for many years, its physiological mechanism is still not completely understood. Increasing evidence indicates that transiently increased resistance to ischaemic damage following APC is dependent on de novo protein synthesis. However, the key effector pathway(s) associated with APC still remains unclear. Livin, a member of the inhibitor of apoptosis protein (IAP) family, since IAP-mediated activation of JNK1, as well as protection against TNF-β and ICE-induced apoptosis. The detailed mechanism underlying its antiapoptotic function in cardiomyocytes has not yet been fully characterised.

**Objective** To investigate whether Livin expression might be aberrantly induced in cardiomyocytes that were subjected to anoxia/reoxygenation (A/R) injury and to investigate whether Livin might also contribute to cardio-protection after APC.

**Methods** We cloned a Livin expression vector, transfected it into rat cardiomyocytes, and examined Livin expression in rat cardiomyocytes that were subjected to A/R injury. Moreover, we studied the role of three major MAPK pathways, for example, p38 MAPK, JNK, and ERK1/2, in order to evaluate the molecular mechanism underlying Livin up-regulation and A/R induced cardiomyocyte injury.

**Results** APC induced an up-regulation of Livin and the transfection of Livin gene into the cardiomyocytes attenuated A/R induced cardiomyocyte injury. The inhibition of p38 MAPK by SB203580 abolished both the Livin up-regulation and A/R induced cardiomyocyte injury.

**Conclusion** APC could act to protect the heart from A/R injury with cooperation from the Livin in addition, it up-regulates Livin expression through a p38 MAPK signalling pathway.

**e0184** THE PROTECTION EFFECTS OF TRIMETAZIDINE ON RATS MYOCARDIAL INFARCTION

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**Objective** To observe the myocardial protection effects of trimetazidine on Sprague-Dawley (SD) rats with myocardial infarctions (MI).

**Methods** 90 SD rats were randomly assigned to normal control group (NL, n=30), Trimetazidine group (T, n=30) and sham-operated group (S, n=30) at 90 min. Trimetazidine group were intraperitoneally injected with 30 mg/kg trimetazidine hydrochloride three times. Sham-operated group were 30 min pretreated with saline, followed by 60 min ischemia, then 60 min reperfusion. At the end of the reperfusion period, the hearts were excised and weighed. The infarct size was determined by the triphenyltetrazolium chloride (TTC) method.

**Results** The mean weight of left ventricle of the rats in the NL group were significantly lower than those of the T and S group (p<0.05). The mean weight of left ventricle of the T group were significantly higher than those of the S group (p<0.05). The mean weight of left ventricle of the S group were significantly higher than those of the NL group (p<0.05). The mean weight of left ventricle of the T group were significantly higher than those of the S group (p<0.05).

**Conclusions** Trimetazidine has a protective effect on myocardial infarctions (MI) induced by ischemia/reperfusion in rats.