induce in vitro cardiomyocytes ischemia-reperfusion injury. Propofol (5-20 μM) were added to the cell cultures before and during the OGD/R phases to investigate the underlying mechanism.

RESULTS Our data showed that OGD/R decreased cell viability, increased lactate dehydrogenase leakage, reactive oxygen species and malondialdehyde production in H9c2 cells, all of which were significantly reversed by propofol. Moreover, we found that propofol increased both the activities and protein expressions of superoxide dismutase and catalase. In addition, propofol increased FoxO1 expression in a dose-dependent manner and inhibited p-AMPK formation significantly.

CONCLUSIONS These results indicate that the propofol might exert its antioxidative effect through FoxO1 in H9c2 cells, and it has a potential therapeutic effect on cardiac disorders involved in oxidative stress.

GW26-e2343

Echocardiography-guided percutaneous laser ablation of canine ventricular septum

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OBJECTIVES Currently surgical myectomy and ethanol ablation are two established interventions for relieving the left ventricular outflow obstruction in hypertrophic cardiomyopathy (HCM) patients. The limitations in safety and efficacy in these interventions call for minimally invasive, potentially safer and more efficacious approach. The aim of this study is to validate the feasibility of echocardiography-guided percutaneous per-ventricular laser ablation of the canine ventricular septum.

METHODS Six domestic dogs were chosen for the study. Laser (Nd: YAG, 800-1064 nm-wavelength, 300μm-diameter fiber, Echo Laser X4, Elesta S.R.L., Italy) was used. The laser passed through a needle (21G, PTC, ECOCHIBA, Italy) that inserted from the right ventricle into the targeted septum under the guidance of the echocardiography via a percutaneous route. Laser ablation was performed as follows: 1 W laser for 3 and 5 min at 180 and 300 J, respectively. Echocardiography, serology examination and pathology were performed to assess the results of laser ablation.

RESULTS There was no death or major complication, i.e. tamponade, pericardial effusion or ventricular fibrillation. The real-time echocardiography monitor of M-mode, 2D (LVEF), PW Doppler and TDI presented no significant variation before and after the laser ablation. Contrast echocardiography confirmed the perfusion defects in the ablated septal regions. The laser ablated areas were well demarcated on pathology examination and the diameters of the ablated region were (mm) 4.42 ± 0.57 and 5.28 ± 0.83 for 3- and 5-minute ablation, respectively. Pre- and post-ablation cardiac enzymes (IU/L) were: AST: 39.17 ± 11.23 vs 183 ± 101.07 (p=0.02), LDH: 71 ± 33.89 vs 253.33 ± 179.63 (p=0.07), CK: 468.17 ±192.42 vs 2775.17 ± 1309.35 (p=0.007), and CK-MB: 174.33 ± 113.34 vs 897.17 ± 486.84 (p=0.03). Microscopically, the ablated myocardium showed contracted coagulative changes. Nuclei disappeared and a zone of vacuoles was formed with red blood cells infiltrating into the widened intercellular space.

CONCLUSIONS Our research showed that percutaneous laser ablation of the septum is feasible, potentially safe and efficacious and may become a viable alternative solution to septum ablation.

GW26-e2407

Protective Effects of Dihydromyricetin and Myricetin against Myocardial Ischemia/Reperfusion Injury In Vivo and In Vitro

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OBJECTIVES The aims of this study were to determine whether Myr or DMY exert any cardioprotective effect against I/R injury and investigate the responsible underlying mechanisms.

METHODS The study utilized an in vitro rat cardiomyocyte H9C2 model of hypoxia/reoxygenation (H/R) injury and an in vivo rat model of MI/R injury. H/R injury was determined by Cell Counting Kit-8 (CCK-8) assay and lactate dehydrogenase (LDH) leakage assay. In the in vivo experiment, histopathology staining was examined. Additionally, cardiac injury markers maleic dialdehyde (MDA), superoxide dismutase (SOD), glutathione reductase (GSH), myeloperoxidase (MPO), nitric-oxide synthase (NOS), Ca^{2+}-Mg^{2+}-ATPase and Na^{+}-K^{+}-ATPase were detected. TUNEL assay and caspases activation assays were used to investigate apoptosis. To assess levels of apoptotic regulators, immunohistochemical staining and real-time PCR were employed.

RESULTS Both Myr and DMY have no cytotoxic effect at the concentrations of 0.5-80 μM Myr or 10-200 μM DMY for 24 hours in H9C2 cells. after being subject to H/R, cellular viability was significantly reduced in the H/R group ($P < 0.01$ compared to control), and LDH leakage was highly increased compared to control ($P < 0.01$). DMY or Myr post-conditioning significantly increased cell viability compared with the H/R group. DMY (25, 50 and 100 μM) or Myr (20 and 50 μM) markedly reduced H/R-induced cell death and decreased LDH leakage ($P < 0.05$ or $P < 0.01$). These results indicate that DMY and Myr significantly preserved cellular viability post-H/R injury in a dose-dependent manner. Both DMY and Myr protected myocardium against I/R (or H/R) injury by increasing NOS, SOD, GSH and ATPases activity, decreasing MDA content and MPO activity at different degrees and attenuating histopathology injury. Meanwhile, DMY and Myr inhibited the cardiomyocyte apoptosis. The level of Bcl-2 protein and mRNA were restored to the normal level by DMY or Myr pharmacological postconditioning. In contrast, the Bax protein level and mRNA level were markedly reduced by DMY and Myr pharmacological postconditioning.

CONCLUSIONS DMY and Myr pharmacological postconditioning could protect against myocardial I/R injury in both in vivo and in vitro models, which are related to apoptosis pathway and antioxidant activity.

GW26-e2435

Role of calreticulin-induced mitochondrial damage in high glucose induced apoptosis in myocardial cells

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OBJECTIVES To observe the effect of high glucose on the protein expression of calreticulin (CRT) and its association with cell apoptosis and mitochondrial dysfunction in the cardiomyocytes.

METHODS AC-16 cardiomyocytes were randomly divided into normal glucose group, high glucose group, high glucose+ CRT siRNA and isotonic control group. The cell apoptotic rate, reactive oxygen species (ROS), mitochondrial membrane potential level, respiratory enzyme activities, and protein expression of CRT were observed.

RESULTS Compared with the cardiomyocytes in normal glucose group, the apoptotic rate of cardiomyocytes and ROS production increased in high glucose groups, accompanying with the decreases in the mitochondrial membrane potential level and enzyme activities of the respiratory chain. The protein expression of CRT was significantly increased in high glucose group. However, compared with high glucose group, high glucose+ CRT siRNA decreased the expression of CRT and attenuated the damage of mitochondrion, but CRT siRNA did not reduce the ROS level in cardiomyocytes.

CONCLUSIONS High glucose brought about CRT over-expression to induce mitochondrial injury, which may be a reason of increasing myocardial apoptosis.

GW26-e4818

The L-carnitine Ameliorates Pulmonary Arterial Hypertension by Improving Energy Metabolism Dysfunction of Right Ventricular Failure

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OBJECTIVES L-carnitine is indispensable for energy metabolism and mitochondrial function in the myocardium. Although carnitine

deficiency have been implicated in development of left ventricular failure, little is known about the role of L-carnitine in the right ventricular failure in pulmonary arterial hypertension.

METHODS Experimental pulmonary hypertension develops in male Sprague-Dawley rats subjected to a single subcutaneous injection of monocrotaline (60 mg kg-1, MCT group). Compared with the vehicle group, by day 21, MCT group developed higher right ventricular systolic pressure (34±5 mmHg versus 19±4 mmHg; P<0.001) and right ventricular hypertrophy (0.51±0.13 versus 0.28±0.05; P<0.001). In MCT group, L-carnitine levels were significantly decreased in both the right ventricular myocardium (159±47 nmol/g vs 435±76 nmol/g, P<0.05) and plasma (7±3 umol/l vs 16±10 umol/l, P<0.05), indicating L-carnitine deficiency was associated with the right ventricular failure. To evaluate whether supplementation with L-carnitine could attenuate right ventricular failure, we treat the rats received monocrotaline with either L-carnitine (500mg kg-1 day-1, L-carnitine MCT group) or saline (saline MCT group) for 14 days.

RESULTS In comparison with saline MCT group, the mean pulmonary arterial pressure and the right ventricular systolic pressure decreased by 34% (P=0.04) and 25% (P=0.01) in the L-carnitine MCT group, respectively. The right ventricular hypertrophy index and right ventricular free wall thickness decreased by 25% (P=0.02) and 14% (P=0.03) in the L-carnitine MCT group, respectively. Furthermore, the myocardial PET/ CT demonstrated that SUVRV / LV of L-carnitine MCT group reduced by 15% when compared with saline MCT group (P<0.05).

CONCLUSIONS The L-carnitine deficiency may aggravate development of pulmonary hypertension. Supplementation with L-carnitine could improve pulmonary arterial hypertension by reversing energy metabolism dysfunction of right ventricular failure.

GW26-e1573

Apelin: An Endogenous Peptide Essential for Cardiomyogenic Differentiation of Mesenchymal Stem Cells via Activating Extracellular Signal-Regulated Kinase 1/2 and 5

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OBJECTIVES Growing evidence has shown that apelin/APJ system functions as a critical mediator of cardiac development as well as cardiovascular function. Here we investigated the role of apelin in the cardiomyogenic differentiation of mesenchymal stem cells derived from Wharton's jelly-derived mesenchymal stem cells (WJ-MSCs) and undescribed functional link between MAPK/ERK signaling cascade and apelin/APJ axis in vitro.

METHODS We used RNA interference methodology and gene transfection technique to regulate the expression of apelin in WJ-MSCs, which were divided into four groups: (A) WJ-MSCs; (B) apelin-silenced WJ-MSCs; (C) apelin-regained WJ-MSCs and the control group. All groups were treated with an effective cardiac differentiation protocol including 5-azacytidine and bFGF, except the control group. Cells were analyzed by real-time RT-PCR, Western blot, Immunofluorescence and Calcium flux assay. MEK1/2 inhibitor PD0325901 and MEK5 inhibitor BIX02189 were used to regulated ERK1/2 and ERK5 in apelin-silenced WJ-MSCs with/without supplementary apelin-13 during Cardiomyogenic Differentiation.

RESULTS Four weeks after induction, cells in group A and C assumed a stick-like morphology and myotube-like structures except apelin-silenced cells and the control group. The silencing of apelin decreased the expressions of several critical cardiac progenitor transcription factors (Mesp1, Mef2c, NKX2.5) and cardiac phenotypes (cardiac α-actin, β-MHC, cTnT and connexin-43). Meanwhile, endogenous compensation of apelin contributed to differentiating into cells with characteristics of cardiomyocytes in vitro. Remarkably, our experiment indicated that apelin up-regulated cardiac specific genes in Wharton's jelly-derived mesenchymal stem cells via activating ERK1/2 and ERK5.

CONCLUSIONS Our study indicated that apelin was essential for cardiomyogenic differentiation of WJ-MSCs via activating MEK1/2-ERK1/2 and MEK5-ERK5, which were involved in MAPK signaling pathway. Down-regulation of apelin in WJ-MSCs decreases the expression of several critical cardiac progenitor transcription factors and cardiac phenotypes.

GW26-e2239

Liqihuoxue Pills Ameliorates Atrial Fibrillation via Prevention Atrial Fibrosis in Rats

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OBJECTIVES Liqihuoxue pills (LQHX) is a compound Miao medicine in China used for treatment of cardiovascular diseases, and can decrease acute myocardial infarct and refusion injury in cat and rat. This study was to investigate whether LQHX ameliorates atrial fibrillation by prevention atrial fibrosis in the isoproterenol- induced myocardial infarct in rats. his study was to investigate whether LQHX ameliorates atrial fibrillation by prevention atrial fibrosis in the isoproterenol- induced myocardial infarct in rats.

METHODS Myocardial infarct (MI) rat model was induced by subcutaneous injection of 120 mg/kg/d isoproterenol for 2 days. We studied a normal control group and 4 groups of rats undergoing isoproterenol-induced MI 1 week prior to treatment: isoproterenol (ISO) group, and ISO combined with LQHX (ISO+LQHX) group. The three ISO+LQHX groups were administered LQHX (187.5 mg/Kg, 75 mg/Kg, 37.5mg/Kg respectively) by gavage for 4 weeks after 7d for ISO treatment. After treatment for 4 weeks, cardiac function were measured by echocardiography and the histopathological changes of cardiac tissue was observed via Masson's staining. AF inducibility and duration were detected by transesophageal programmed electrical stimulation AF inducing technology. The atrial conduction velocity was detected by multi-electrodes arrays measurements. The expression of typeI and III collagen and the changes of transforming growth factor β1 (TGF-β1) in left atrial were detected by western blot.

RESULTS LQHX (at the dose of 37.5 mg/Kg) significantly improved left systolic functions, resulting in improved LV ejection fraction (64.6±4.42% *vs* 57.9±5.66%; $P<0.05$), LV internal dimension in systole (4.74±0.51 mm *vs* 5.73±0.48 mm; $P<0.01$). LQHX-treated rats had lower rates of AF inducibility (70%, 56%, 50% in LQHX groups vs. 90% in ISO group), and shorter AF duration. Masson's trichrome staining in ISO treated group reveals increased left atrial fibrosis (63.4±5.8%), while treatment with LQHX resulted in reversal of atrial fibrosis, and in the lower dose of LQHX group (37.5 mg/Kg) could decreased the left atrial fibrosis areas to (15.3±2.4)%. LQHX (at the dose of 75 mg/Kg and 37.5 mg/Kg) also obviously reduced the expression of type I and III collagen in left atrium and markedly inhibited TGF-β1 protein expression.

CONCLUSIONS LQHX pills reduced the AF inducibility rate and duration after ISO induced myocardial infarct by inhibiting left atrial fibrosis, and associate with inhibition typeIand III collagen and TGF-β1 protein expression in left atrium of rat heart. It obviously suggests that LQHX could be an effective Chinese drug for the prevention atrial fibrillation induced by post-MI myocardial remodeling.

GW26-e2289

The impacts of renal sympathetic activation on atrial fibrillation: the potential role of the autonomic cross talk between kidney and heart

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OBJECTIVES The aim of our study was to investigate the roles of renal sympathetic nerve stimulation (RSS) on atrial fibrillation (AF) and cardiac autonomic nervous activity.

METHODS RSS was performed using electrical stimulation on the left renal artery at the 30 volts for 3 hours. Twenty-eight dogs were randomly assigned to the proximal renal sympathetic stimulation (RSS) group (P-RSS, N=7), middle RSS group (M-RSS, N=7), distal RSS group (D-RSS, N=7), and the control group (sham RSS, N=7). Effective refractory period (ERP) and the window of vulnerability (WOV) were measured. SLGP and LSG function were determined. Neural activities were recorded from the SLGP and LSG. C-fos and nerve growth factor (NGF) protein expressing in the SLGP and LSG were examined. Serum inflammatory cytokines were assayed.

RESULTS

(1) Only P-RSS caused pronounced blood pressure rises, induced a significant decrease in ERP, and generated a marked increase in WOV and ERP Dispersion (all $P < 0.05$).
(2) P-RSS significantly facilitated SLGP and LSG function.
(3) The frequency and amplitude of the neural activity in the SLGP and LSG were markedly increased by P-RSS.