OBJECTIVES To study the preventive effect of Quercetin on silent mating type information regulation 2 homolog 1(SIRT1) and adenosine monophosphate-activated protein kinase (AMPK) in the rat with diabetics.

METHODS Male Wistar rats were divided into 4 group, normal control (n = 10),diabetic rats with high-fat diet (n = 10), diabetic rats with high-fat diet plus Quercetin (25 mg/kg·d, n = 10), diabetic rats with high-fat diet plus Quercetin (50 mg/kg·d, n = 10). the following indices of rats were measured respectively, Levels of blood creatine kinase (CK) and serum lactate dehydrogenase (LDH) as well as myocardial nonesterified fatty acids (NEFA) and collagen were determined using ultraviolet spectrophotometric, the concentration of myocardial fatty acid transport proteins (FATPs) and fatty acidβ-oxidase (FA-β-oxidase) were measured by ELISA method, the protein expression of NF-κB, silent mating type information regulation 2 homolog 1 (SIRT1) and adenosine mon ophosphate-activated protein kinase (AMPK) were detected by westernblot.

RESULTS Levels of CK and LDH as well as NEFA were remarkably decreased after treatment of TSG. Quercetin caused a significant increase in concentration of myocardial FATPs and FA-β-oxidase in DM rat model. In diabetic group, Cardiac tissue SOD and CAT activities were significantly lower than control group ($p < 0.05$). Quercetin caused significant increase in the SOD and CAT activities of DM+ Quercetin groups cardiac tissue compared to DM group ($p < 0.05$). In diabetic group, Cardiac tissue NF-κB and MDA levels were increased compared to control group ($p < 0.05$), and groups of DM+ Quercetin had lower NF-κB and MDA levels than diabetic group ($p < 0.05$).Quercetin dramatically restored the decrease of SIRT1, AMPKαand pAMPKα protein expression in diabetic rats.

CONCLUSIONS As a conclusion, based on the results we obtained from this study, we determined in diabetic rats with high-fat diet, increased glucose levels and cardiac damage markers decreased significantly, after administration of Quercetin, that oxidative stress and NF-κB levels increased while SIRT1 levels decreased in the diabetic group. These findings indicate that the protective mechanisms of Quercetin against diabetic rats are involved in the alleviation of Inflammatory mediator's injury and energy metabolism.

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Evaluation of exercise-induced fatigue model in rats with HR using treadmill exercise with progressively increasing load

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OBJECTIVES Exercise fatigue is a common phenomenon in athletics and a key factor that restricts an athlete's performance level. The term "exercise fatigue" refers to a state in which the physiological processes of the body systems cannot continue at a certain level or the organism cannot maintain a predetermined exercise intensity. In exercise physiology, heart rate is an important index used to evaluate exercise load and ethological changes and can accurately reflect the immediate response of physical function to changes in exercise load. There is an important correlation between heart rate and ethological performance. Therefore, in this study, we used changes of ethological indexes and heart rate to classify the exercise stages and set up a fitting formula of exercise fatigue based on the rats' treadmill exercise data.

METHODS The rat exercise fatigue model was established using treadmill exercise with three progressively increasing loads (light to heavy). The rats were subjected to 5-day adaptive treadmill training after being fed for 3 days in the laboratory. A modified Bedford treadmill exercise with a progressively increasing load was used for the exercise fatigue model. There were three total load levels: level I, 8.2 m/min, lasting for 15 min; level II, 15 m/min, lasting for 15 min; level III: 20 m/min, lasting until exhaustion. Changes in ethological indexes and heart rate were observed and recorded by video and heart rate telemetry and statistical methods were used to analyze and test the data.

RESULTS As expected, during the exercise fatigue process, the relative velocity of the rats decreased; their relative positions gradually shifted backwards; the proportions of sound and electrical stimulation time as well as slippage time gradually increased; and the heart rate increased twice and was then maintained within a certain range. According to the above data, we divided the process into four stages. We also established a fitting formula as follows:

$Y = 15.2548 + 0.4346 \cdot x_a - 0.1154 \cdot x_b + 0.6826 \cdot x_c + 0.0044 \cdot x_a \cdot x_b - 0.0021 \cdot x_b \cdot x_c - 0.0013 \cdot x_c \cdot x_a - 0.0023 \cdot x_a^2 - 0.0016 \cdot x_b^2$ ($r^2 = 0.906$); (*xa, xb, and xc represent the cumulative time of sound stimulation, electrical stimulation, and slippage time within 600 s (in seconds); y represents a fatigue score within the 600 s that indicates the degree of exercise fatigue*).

CONCLUSIONS We quantified the ethological and heart rate changes in rats during the exercise fatigue process, and determined the proportion of time in its process of the whole practice. In addition, based on the ethological changes and heart rate changes of rats, we divided the exercise fatigue phenomenon into the spontaneous exercise, transition, early fatigue, and later fatigue stages, which laid a foundation for the quantitative evaluation of the ethology in the rat model of exercise fatigue with a progressively increasing load. Meanwhile, the effective ethological indexes were screened and we successfully established a simple nonlinear regression formula to evaluate the fatigue degree of rats with ethological indexes using a mathematical modeling method of polynomial fitting. Hopefully the results shown above will provide an effective reference for the formulation of evaluation standard of exercise fatigue degree to a certain extent(31401018).

GW28-e0641

Transcatheter Mitral Valve Implantation Using the Mithos valve–Pre-Clinical Animal Study

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OBJECTIVES This pre-clinical study was aimed to evaluate the safety and feasibility of transcatheter mitral valve implantation using a novel designed Mithos valve (NewMed Medical Co., Ltd., Shanghai, China) in a porcine model.

METHODS The Mithos valve is a self-expanding bioprosthesis with cross-linked bovine pericardial tissue tricuspid leaflets mounted inside a nitinol self-expanding frame designed for transcatheter mitral valve implantation. By using porcine animal models, Mithos valve was implanted through a transapical approach. Technical feasibility, safety, durability and function of the Mithos valve were evaluated with autopsy of explanted heart, ventriculography, intracardiac echocardiography (ICE), transthoracic echocardiography (TTE), multisliced CT (MSCT), histological and electron microscopic examinations in acute study and six months following the procedure.

RESULTS Animal study of 26 swine demonstrated procedural success of 100%. Macroscopic evaluation of the explanted hearts demonstrated stable and secured positioning of the transcatheter valve, with full endothelialization of the valve leaflets and fabric coatings. Multimodality image studies including ventriculography, ICE, TTE, and MSCT showed excellent function and alignment of the valves, without coronary artery obstruction, left ventricular outflow tract obstruction, transvalvular gradients or obvious paravalvular leak. There was 7 mild-to-moderate degree of paravalvular leaks and no significant mitral regurgitation. Cardioscopy and macroscopic evaluation demonstrated stable and secure positioning of the Mithos valve without evidence of injury to the ventricular or atrial walls. Histological and electron microscopic examinations showed no obvious macro- or micro-calcification up at the 6-month follow-up.

CONCLUSIONS Transcatheter mitral valve implantation using with Mithos valve is technically safe and feasible in pre-clinical studies, resulting in a stable and well-functioning mitral bioprosthesis. With a better understanding of preclinical knowledge, patient selection criteria and first-in-human studies will be addressed.

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PCSK1 MUTANT MICE DISPLAY INCREASED APOA1 LEVEL AND DECREASED PLTP ACTIVITIY IN SERUM

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