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## **In vivo cardiac $^{31}\text{P}$ MRS in a mouse model of heart failure**

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**Objective:** To investigate myocardial energy status in a mouse model of heart failure using *in vivo*  $^{31}\text{P}$  magnetic resonance spectroscopy (MRS).

**Methods:** Male C57BL/6 mice underwent thoracic aortic constriction (TAC) surgery, inducing pressure-overload cardiomyopathy, and were measured seven weeks after surgery ( $n = 5$ ). Healthy wild-type mice served as controls ( $n = 4$ ). Cardiac cine  $^1\text{H}$  MR images were made for reference purposes and to quantify left ventricular (LV) function. Cardiac  $^{31}\text{P}$  MR spectra were measured from a ~6 mm cubic voxel enclosing the end-diastolic LV myocardium using ECG triggered, respiratory gated 3D Image-Selected *In vivo* Spectroscopy (ISIS).

**Results:** LV end-diastolic volume and LV mass normalized to body weight were higher in TAC mice compared to controls ( $91.7 \pm 19.0$  versus  $61.8 \pm 6.0$   $\mu\text{L}$  and  $4.4 \pm 0.6$  versus  $3.1 \pm 0.2$  mg/g,  $P < 0.01$ ), whereas LV ejection fraction was reduced in TAC mice ( $45.4 \pm 20.0$  versus  $64.4 \pm 5.2$  %,  $P < 0.05$ ). Myocardial phosphocreatine-to-ATP ratio was lower in TAC mice when compared to healthy controls ( $0.8 \pm 0.2$  versus  $1.2 \pm 0.2$ ,  $P < 0.05$ ).

**Conclusion:** Decreased EF in TAC mice is accompanied by decreased phosphocreatine-to-ATP ratio, indicating a disturbed energy homeostasis in this mouse model of heart failure. ***This research was funded by a VIDI grant from the Netherlands Organisation for Scientific Research (NWO).***