translational modifications (ox-PTMs) which can regulate intracellular signalling by either potentiating or inhibiting protein activity. One of these, S-glutathionylation is a common oxPTM reversed by glutaredoxin (Glrx). We aimed to investigate the role of Glrx in a murine model of pregnancy combining physiological in vivo cardiac dynamics with histological assessment of maternal organs, to identify how perturbation of redox signalling can lead to pregnancy-induced cardiovascular complications.

Mice overexpressing Glrx(Glrx-TG) and littermate controls (WT) underwent timed pregnancy. Left-ventricle (LV) pressure-volume (PV) loops was measured on day 18.5 by catheter inserted into LV. Pregnancy outcome and maternal organ pathology was conducted. At day 18.5 of pregnancy Glrx-TG mice had higher aortic blood pressure, with more incidents of fetal reabsorptions compared to WT. End-systolic pressure assessed from PV-loops showed a trend for increase in TG vs WT, although there was no overall effect on cardiac ejection fraction or stroke-volume. Interestingly, TG LV appeared to have higher contractility (End-systolic PV relationship). TG mice had an increase in cardiomyocyte size with no change in capillary density. Moreover, there was a significant increase in cardiac and renal fibrosis in Glrx-TG mothers.

Further studies will be needed to identify the redox sensitive molecular pathways, that are altered by Glrx overexpression in the maternal cardiovascular system.

11 CARDIAC FUNCTION IS COMPROMISED IN PATIENTS WITH ELEVATED BLOOD COBALT LEVELS SECONDARY TO METAL-ON-METAL HIP IMPLANTS

Elevated blood cobalt secondary to metal-on-metal (MoM) hip arthroplasties has been shown to be a risk factor for developing cardiovascular complications including cardiomyopathy. Published case reports document cardiomyopathy in patients with blood cobalt levels as low as 13µg/l. Clinical studies have found conflicting evidence of cobalt-induced cardiomyopathy in patients with MoM hips. The extent of cardiovascular injury, measured by global longitudinal strain (GLS), in patients with elevated blood cobalt levels has not previously been examined.

Sixteen patients with documented blood cobalt ion levels above 13µg/l were identified and matched with eight patients awaiting hip arthroplasty with no history of cobalt implants. Patients underwent echocardiogram assessment including GLS.

Patients with MoM hip arthroplasties had a mean blood cobalt level of 29µg/l compared to 0.01µg/l in the control group. There was no difference or correlation in EF, left ventricular (LV) end systolic dimension, LV end diastolic dimension, fractional shortening, ventricular wall thickness or E/e' ratio. However, GLS was significantly reduced in patients with MoM hip arthroplasties compared to those without (-15.2% v -18%, (MoM v control) p= 0.0125). Pearson correlation demonstrated that GLS is significantly correlated with blood cobalt level (r= 0.8742, p=0.0009).

This study has demonstrated reduced cardiac function in the presence of normal EF as assessed by GLS in patients with elevated cobalt above 13µg/l. As GLS is a more sensitive measure of systolic function than EF, routine echocardiogram assessment including GLS should be performed in all patients with MoM hip arthroplasties and elevated blood cobalt.

12 GLUTAREDOXIN-OVEREXPRESSION ATTENUATES CHRONIC ANGIOTENSIN-II INDUCED HYPERTENSION AND CHANGES CARDIAC DYNAMICS

Angiotensin-II (AngII) induces hypertension and cardiac hypertrophy and is a potent inducer of oxidative stress, which causes oxidative post-translational modifications (oxPTMs). Glutaredoxin-1 (Glrx) catalyses the removal of an oxPTM, S-glutathionylation, and has been shown to be important in peripheral artery disease. Therefore, we investigated the effect of Glrx overexpression on ANGII-pressure overload.

Glrx transgenic (TG) and wild-type (WT) littersmates were implanted with osmotic pumps (Alzet) containing either saline or ANGII (1.1mg/kg/day; s.c). After 2 weeks, mice were anaesthetised (2% isoflurane) and a pressure-volume (PV) catheter was inserted retrogradely into the left ventricle (LV).

In WT mice, ANGII increased systolic and diastolic BP. However, no significant increase in SBP and DBP were observed in TG mice. Heart rates remained similar between all 4 groups. Although AngII increased BP in WT mice, LV end-diastolic/systolic pressure (EDP/ESP) and end systolic volume (ESV) remained unchanged between the four groups. However, ANGII significantly lowered end diastolic volume (EDV) in TG compared to WT. Hence, stroke volume (SV) was also lowered in TG compared to WT. Yet, these changes had no overall effect on LV cardiac output or stroke work. Interestingly, ANGII significantly lowered LV contractile state (Powermax) in response to ANGII in TG compared to WT mice.

In summary chronic AngII infusion did not increase blood pressure in mice overexpressing Glrx, but lowered pre-load with subsequent lower stroke volume and cardiac contractility. Future studies will investigate which redox sensitive proteins undergo reversal oxPTM to elicit these functional changes.

13 REDOX REGULATION OF JAGGED1 MODULATES CELL CYCLE, ADHESION AND ECM PATHWAYS IN ENDOTHELIAL CELLS

Jagged1 (Jag1) has essential roles in angiogenesis and development. Altered function of this transmembrane protein results in congenital birth defects and cancer progression. Redox signalling regulates cardiovascular physiology through Endothelial cells (EC). Proteins sense redox signals through cysteine thiols.