degree of right ventricular hypertrophy (RVH) assessed and lung histology analysed for evidence of vascular remodelling. The lungs were stained with α-smooth muscle actin and the degree of distal  

muscularisation in vessels <80 mm in diameter assessed. Results were analysed with appropriate statistical tests.

**Results**  
There was a significant difference in the RVSP between groups (control 37.09 mm Hg > 5.09 vs drug 20.59 mm Hg >3.19; p=0.0025). There was less RVH (control 0.38 vs drug 0.28; p=0.003) in the drug treated group (see Abstract S68 figure 1) and the total RV weights were also less (control 147 mg vs drug 109 mg; p=0.018).

There was no difference in haemacrit between groups. There was less pulmonary vascular remodelling as indicated by a reduction of fully muscularised and an increase in non-muscularised vessels observed in the drug treated group (p<0.001).

**Conclusion**  
We have shown in a chronic hypoxic model of PH that by inhibiting the p38 MAPK pathway in vivo the development of pulmonary hypertension can be prevented. This suggests that the p38 MAPK pathway could be a potential therapeutic target for PH. Further studies are warranted, in particular to see if inhibition can reverse established disease.

**S69 SERUM OSTEOPROTEGERIN PREDICTS MORTALITY IN A PROSPECTIVE STUDY ON INCIDENT CASES OF PULMONARY ARTERIAL HYPERTENSION**

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**Background and Objectives**  
Despite improvements in the overall management of Pulmonary Arterial Hypertension (PAH) the disorder still causes significant morbidity and mortality. Current treatments fail to reverse the disease, and clinical assessment does not always differentiate between, or reflect, the local pathogenesis within the heart or pulmonary circulation. Current proposed biomarkers, for example, brain natriuretic peptide (BNP and NT-proBNP), largely fail to reverse the disease, and clinical assessment does not always differentiate between, or reflect, the local pathogenesis within the heart or pulmonary circulation. Current proposed biomarkers, for example, brain natriuretic peptide (BNP and NT-proBNP), largely reflect myocardial rather than pulmonary vascular remodelling. Subsequently, there has been increasing interest in identifying a biomarker for PAH that can track with lung pathology, and treatment. Through our desire to understand disease pathogenesis, our studies in vitro and in animal models have identified osteoprotegerin (OPG) as a candidate biomarker. We have previously reported that OPG was elevated in a prevalent cohort of patients with IPAH. The aim of this study was to verify the utility of OPG as a biomarker for PAH in a second cohort of incident cases and assess the effect of treatment at follow-up visits.

**Methods**  
Serum samples were obtained from 35 patients with IPAH, 26 patients with CTD-PAH and 65 age-matched controls. Serum OPG concentrations were measured by ELISA, correlations with pulmonary haemodynamics, routine clinical biochemistry and prognostic significance were then assessed.

**Results**  
OPG concentrations were significantly elevated in IPAH (mean 4485 pg/ml) and CTD-PAH (3224 pg/ml) compared to controls (1749 pg/ml). Concentrations of OPG correlated positively with pulmonary vascular resistance (PVR) and WHO functional class and negatively with the incremental shuttle walk test (ISWT). An OPG concentration above 4744 pg/ml predicted poorer survival. OPG was significantly lower in patients at follow-up after the commencement of targeted PAH therapies.

**Conclusion**  
PAH is characterised by elevated serum OPG and this correlates with functional class and PVR. Perhaps most importantly high serum levels of OPG predict a poor outcome. Further longitudinal work is required, and is currently underway to further validate these findings.

**S70 DIAGNOSTIC UTILITY AND PROGNOSTIC VALUE OF QUANTITATIVE CARDIAC MR INDICES IN PATIENTS WITH SUSPECTED PULMONARY HYPERTENSION**

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**Introduction and Objectives**  
The aim of this study was to assess the clinical utility of quantitative MR indices of cardiac morphology and function in a large cohort of patients with pulmonary hypertension (PH).

**Methods**  
We retrospectively studied 253 consecutive patients with suspected PH who underwent cardiac MRI and right heart catheterisation (RHC) within 48 h. Four chamber and short axis (SA) CINE images were acquired using cardiac gated multi-slice imaging with a steady state free precession sequence at 1.5T. The diagnostic and prognostic significance of quantitative measurements of right ventricular morphology and function were assessed.

**Results**  
Right ventricular end-diastolic mass index was the measurement with the strongest correlation with mPAP (r= -0.74) and the highest diagnostic accuracy for the detection of PH (area under the receiver operator curve of 0.91). During the mean follow-up of 18 months (0–36 months), 36 patients with PH died. Right ventricular ejection fraction (p=0.003), right ventricular stroke volume index (p=0.03) and IVC size (p=0.01) were the MR predictors of mortality across the subgroups of PH. MR measurements of right ventricular ejection fraction (p=0.004), right ventricular stroke volume index (p=0.02), and left ventricular diastolic eccentricity index (p=0.005), all predicted mortality in patients with pulmonary arterial hypertension. Abstract S70 figure 1 below shows the Kaplan–Meier plots the MR predictors of mortality in PAH. IVC size (p=0.018) was an independent predictor of mortality in the full cohort of patients with PH, and diastolic eccentricity index (p=0.037) was an independent predictor of adverse outcome in patients with PAH.

**Abstract S70 Figure 1**  
Kaplan–Meier plots showing the survival curves for patients with PAH above and below the median value of MR derived right ventricular stroke volume index (RVSVI), right ventricular ejection fraction (RVEF) and diastolic eccentricity index (dEI).

**Conclusion**  
Cardiac MRI provides a comprehensive assessment of right ventricular morphology and function in patients with PH. This study confirms the diagnostic and prognostic applicability of MRI in unselected patients with PH of varied aetiologies in a practical clinical setting.

**S71 INFLUENCE OF AGE ON CLINICAL PHENOTYPES OF INCIDENT IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION. RESULTS FROM THE PULMONARY HYPERTENSION REGISTRY OF THE UK AND IRELAND**

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Introduction and Objectives The age of patients with idiopathic pulmonary arterial hypertension (IPAH) has increased since the NIH registry. It is postulated that older IPAH patients may have a different disease phenotype compared to their younger counterparts.

Methods Retrospective observational study of all consecutive incident cases of IPAH, heritable and anorexigen-associated pulmonary arterial hypertension diagnosed in all eight pulmonary hypertension centres in the UK and Ireland between 1st January 2001 and 31st December 2009. Patients were divided into younger and older subgroups by the median age (57 years).

Results Of 646 incident cases (mean age 54 years), 22% were over the age of 70 and 3% over age 80. Younger patients had higher % female (71% vs 56%), shorter duration of symptoms (median 15 months vs 21 months), better functional class (18% in functional class I/II vs 10%), exercise capacity (6-minute walk distance 525 m vs 217 m) and higher % predicted DLCO (65% vs 47%) compared to older patients. Older patients were more likely to present with peripheral oedema (41% vs 28%) whereas younger patients were more likely to complain of syncope (30% vs 10%), presyncope (14% vs 7%) and fatigue (15% vs 9%) at the time of diagnosis. Younger patients had higher mean pulmonary artery pressure (56 mm Hg vs 49 mm Hg) and pulmonary vascular resistance index (24 WU.m\(^2\) vs 21 WU.m\(^2\)) but lower wedge pressure (9 mm Hg vs 10 mm Hg) compared to older patients. Patients in the highest age quartile had the worst survival [Abstract S71 figure 1].

Conclusion Older incident IPAH patients appear to have a different disease phenotype compared to younger patients. IPAH is no longer a disease that affects predominantly young female only.

Abstract S71 Figure 1 Survival of incident idiopathic, heritable and anorexigen-associated pulmonary arterial hypertension by age quartiles.

Abstract S72 Figure 1 Observed vs predicted survival using the NIH, French, PHC and REVEAL equations.

Conclusion Survival equations derived from other mixed incident and prevalent pulmonary hypertension populations may not accurately predict survival of incident pulmonary arterial hypertension from the UK and Ireland. Differences in baseline characteristics, treatment practice and time period between our patients and survival equations derivation populations need to be taken into account when applying these equations in daily clinical practice.

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