19. **Maziere F**, Birolleau S, Medimagh S, *et al.* Comparison of troponin I and N-terminal-pro B-type natriuretic peptide for risk stratification in patients with pulmonary embolism. *Eur J Emerg Med* 2007;**14**:207–11.
20. **Kostrubiec M**, Pruszczyk P, Kaczynska A, *et al.* Persistent NT-proBNP elevation in acute pulmonary embolism predicts early death. *Clin Chim Acta* 2007;**382**:124–8.
21. **Pieralli F**, Olivetto I, Vanni S, *et al.* Usefulness of bedside testing for brain natriuretic peptide to identify right ventricular dysfunction and outcome in normotensive patients with acute pulmonary embolism. *Am J Cardiol* 2006;**97**:1386–90.
22. **Binder L**, Pieske B, Olschewski M, *et al.* N-terminal pro-brain natriuretic peptide or troponin testing followed by echocardiography for risk stratification of acute pulmonary embolism. *Circulation* 2005;**112**:1573–9.
23. **Pascu A**, Radoi M, Coculescu M. Plasma brain natriuretic peptide (BNP) increase is associated with acute right ventricular dysfunction in pulmonary embolism. *Acta Endocrinol* 2005;**1**:393–410.
24. **Kucher N**, Printzen G, Goldhaber SZ. Prognostic role of brain natriuretic peptide in acute pulmonary embolism. *Circulation* 2003;**107**:2545–7.
25. **Yardan T**, Altintop L, Baydin A, *et al.* B-type natriuretic peptide as an indicator of right ventricular dysfunction in acute pulmonary embolism. *Int J Clin Pract* 2008;**62**:1177–82.
26. **Lankeit M**, Kempf T, Dellas C, *et al.* Growth differentiation factor-15 for prognostic assessment of patients with acute pulmonary embolism. *Am J Respir Crit Care Med* 2008;**177**:1018–25.
27. **Burazor I**, Zivkovic M, Djordjevic J, *et al.* Brain natriuretic peptide in patients with acute pulmonary embolism. European Respiratory Society 15th Annual Conference, Copenhagen, 2005, abstract #1818 (on CD-ROM).
28. **Logeart D**, Lecuyer L, Thabut G, *et al.* Biomarker-based strategy for screening right ventricular dysfunction in patients with non-massive pulmonary embolism. *Intensive Care Med* 2007;**33**:286–92.
29. **Meyer B**, Huelsmann M, Wexberg P, *et al.* N-terminal pro-B-type natriuretic peptide is an independent predictor of outcome in an unselected cohort of critically ill patients. *Crit Care Med* 2007;**35**:2268–73.
30. **Kiely DG**, Kennedy NS, Pirzada O, *et al.* Elevated levels of natriuretic peptides in patients with pulmonary thromboembolism. *Respir Med* 2005;**99**:1286–91.
31. **Yetkin O**, Aksoy Y, Turhan H, *et al.* [Value of plasma BNP levels as a prognostic marker in lung and heart disorders]. *Tuberk Toraks* 2007;**55**:225–30.
32. **Sanchez O**, Ricard G, Wermert D, *et al.* Prognostic value of echocardiography, BNP and cardiac troponin in normotensive patients with pulmonary embolism. European Respiratory Society 15th Annual Conference, Copenhagen, 2005, abstract #1828 (on CD-ROM).
33. **Tulevski II**, ten Wolde M, van Veldhuisen DJ, *et al.* Combined utility of brain natriuretic peptide and cardiac troponin T may improve rapid triage and risk stratification in normotensive patients with pulmonary embolism. *Int J Cardiol* 2007;**116**:161–6.
34. **Ray P**, Maziere F, Medimagh S, *et al.* Evaluation of B-type natriuretic peptide to predict complicated pulmonary embolism in patients aged 65 years and older: brief report. *Am J Emerg Med* 2006;**24**:603–7.
35. **Kostrubiec M**, Pruszczyk P, Bochowicz A, *et al.* Biomarker-based risk assessment model in acute pulmonary embolism. *Eur Heart J* 2005;**26**:2166–72.
36. **Kucher N**, Printzen G, Doernhoefer T, *et al.* Low pro-brain natriuretic peptide levels predict benign clinical outcome in acute pulmonary embolism. *Circulation* 2003;**107**:1576–8.
37. **Ewald B**, Ewald D, Thakkinstant A, *et al.* Meta-analysis of B type natriuretic peptide and N-terminal pro B natriuretic peptide in the diagnosis of clinical heart failure and population screening for left ventricular systolic dysfunction. *Intern Med J* 2008;**38**:101–13.
38. **Sanchez O**, Trinquart L, Colombet I, *et al.* Prognostic value of right ventricular dysfunction in patients with haemodynamically stable pulmonary embolism: a systematic review. *Eur Heart J* 2008;**29**:1569–77.
39. **Klok FA**, Mos IC, Huisman MV. BNP levels in the prediction of adverse outcome in patients with pulmonary embolism: a meta-analysis. *Am J Respir Crit Care Med* 2008;**178**:425–30.
40. **Cavallazzi R**, Nair A, Vasu T, *et al.* Natriuretic peptides in acute pulmonary embolism: a systematic review. *Intensive Care Med* 2008;**34**:2147–56.
41. **Coutance G**, Le Page O, Lo T, *et al.* Prognostic value of brain natriuretic peptide in acute pulmonary embolism. *Crit Care* 2008;**12**:R109.
42. **Pruszczyk P**, Kostrubiec M, Bochowicz A, *et al.* N-terminal pro-brain natriuretic peptide in patients with acute pulmonary embolism. *Eur Respir J* 2003;**22**:649–53.
43. **Puls M**, Dellas C, Lankeit M, *et al.* Heart-type fatty acid-binding protein permits early risk stratification of pulmonary embolism. *Eur Heart J* 2007;**28**:224–9.
44. **Tulevski II**, Hirsch A, Sanson BJ, *et al.* Increased brain natriuretic peptide as a marker for right ventricular dysfunction in acute pulmonary embolism. *Thromb Haemost* 2001;**86**:1193–6.
45. **Davies CW**, Wimperis J, Green ES, *et al.* Early discharge of patients with pulmonary embolism: a two-phase observational study. *Eur Respir J* 2007;**30**:708–14.

Lung alert

WISP-1, a novel target for treatment of pulmonary fibrosis

Idiopathic pulmonary fibrosis (IPF) is characterised by formation of fibroblast foci and deposition of extracellular matrix (ECM) in the lung interstitium. This results in distorted lung architecture, impaired gas exchange and reduced respiratory function. Impaired crosstalk between alveolar type 11 (AT11) cells and subepithelial fibroblasts has previously been shown to contribute to ECM deposition in IPF.

This study investigated the gene regulatory networks behind AT11 cell dysfunction in IPF. Genetic analyses highlighted WNT-inducible signalling protein-1 (WISP-1) as a key mediator of AT11 cells. WISP-1 was highly upregulated in AT11 cells in a mouse model of fibrosis and also in human lung tissue from patients with IPF.

The investigators treated murine primary AT11 cells with recombinant WISP-1 and induced epithelial-mesenchymal transition (EMT). EMT is recognised as a possible mechanism underlying the formation of fibroblast foci that occurs in IPF.

Recombinant WISP-1 treatment of lung fibroblasts in vitro led to increased ECM deposition. Furthermore, WISP-1 neutralisation resulted in attenuation of lung fibrosis in mouse models as evidenced by decreased lung ECM deposition. A marked reduction in expression of genes associated with fibrosis and reversal of EMT gene expression was noted. Interestingly, this was shown to partially restore normal lung function and significantly improve survival.

Currently available treatment options for IPF are limited. This study puts forward WISP-1 as a novel potential therapeutic target in IPF. Whether or not the findings in mouse models will translate to humans remains to be seen.

- Konigshoff M, Kramer M, Balsara N, *et al.* WNT1-inducible signaling protein-1 mediates pulmonary fibrosis in mice and is upregulated in humans with idiopathic pulmonary fibrosis. *J Clin Invest* 2009;**119**:772–87.

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