Figure S1

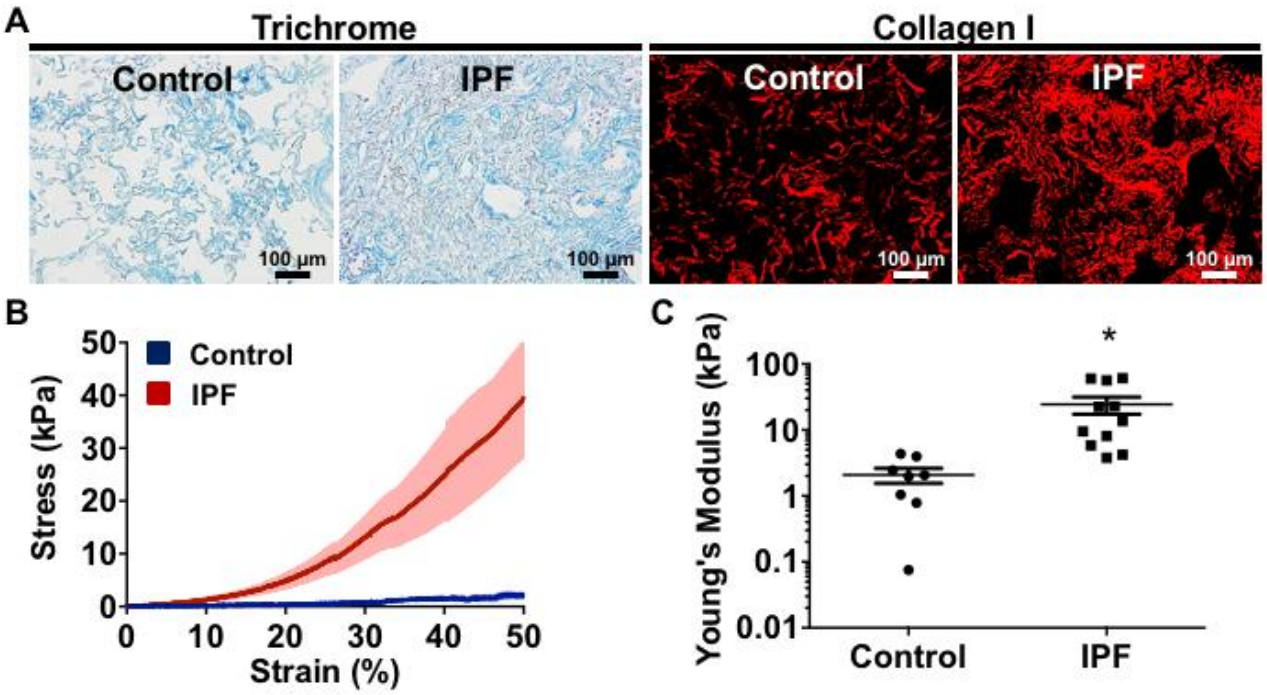

Figure 1. Decellularized IPF lungs display decreased elasticity. (**A**) Human lung samples were decellularized and Masson's Trichrome and picrosirius red images are shown for control and IPF matrix. (**B**) Mechanical properties of decellularized lung were measured using an Instron5848 with a 10N load by cross-head displacement and stress - strain plots are generated with (**C**) the Young's Moduli calculated at 20% strain. (individual points plotted with mean ± SEM, * $p<0.05$ compared to control lung ECM, N=8-9).

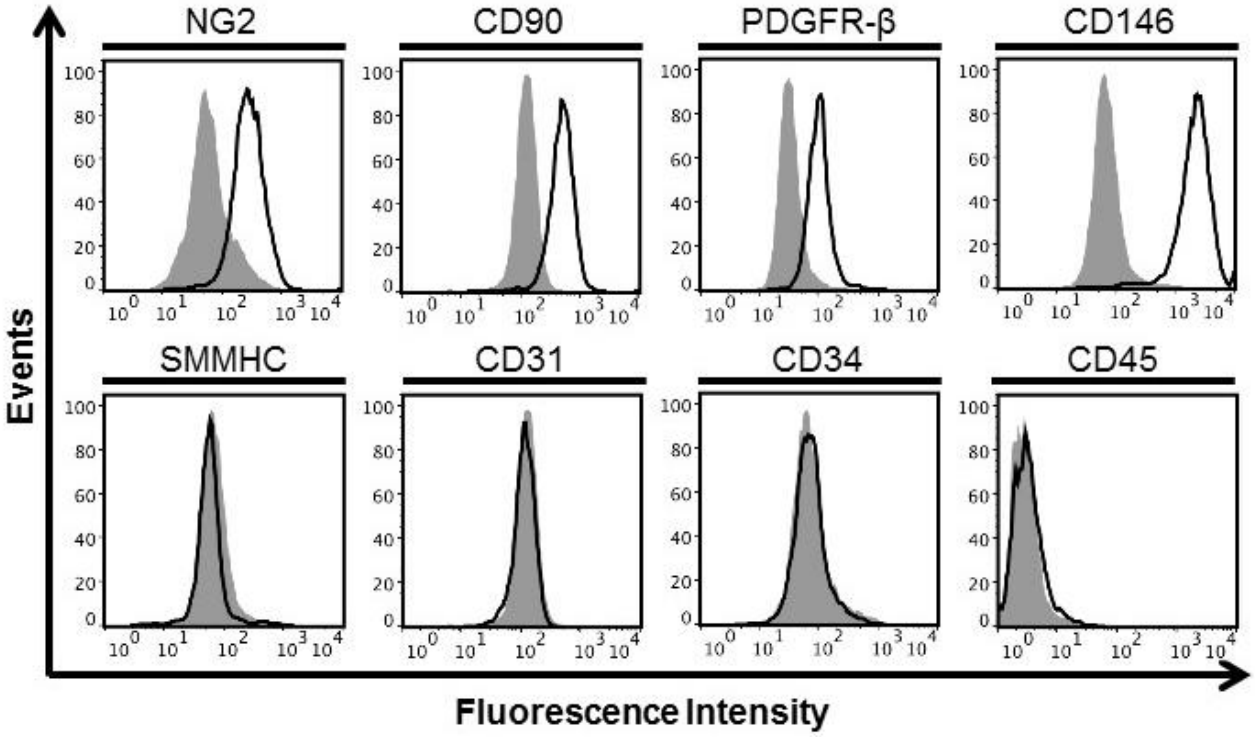

Figure 2. Flow cytometry characterization of cultured PC isolated from human placental microvessels. Flow cytometry plots demonstrating that PC express the cell surface molecules NG2, CD90, PDGFR-β, and CD146. PC do not express the intracellular proteins SMMHC, a marker expressed by smooth muscle cells, CD31 or CD34, markers expressed by endothelial cells, or CD45, a marker expressed by leukocytes. Specific staining is shown by the bolded black line whereas isotype control is shown in grey. Representative plots are shown for pericyte isolations from N > 5 individual human donors. (N=5)

Figure S3

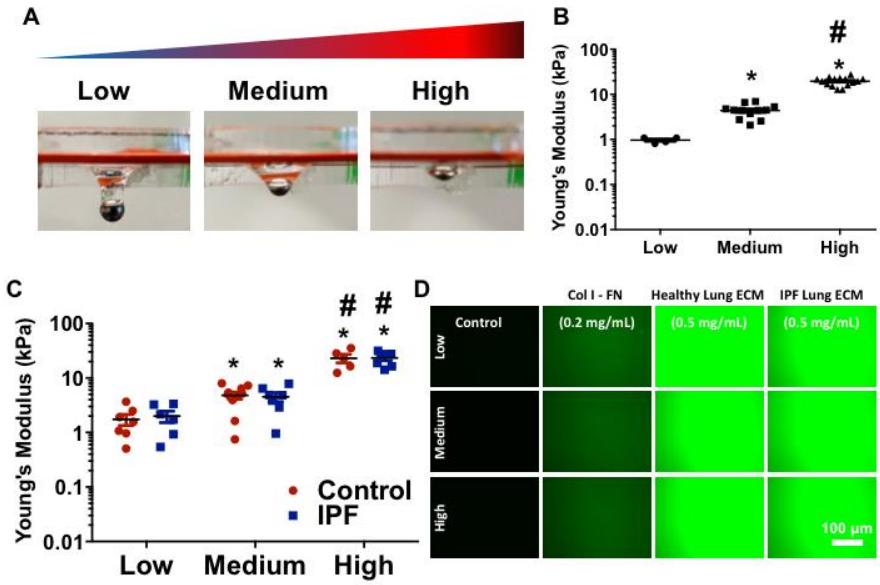

Figure 3. Polyacrylamide hydrogel evaluation. Polyacrylamide substrates of varying stiffness were made by altering the relative concentration of crosslinker. (**A**) Representative images of the low, medium and high stiffness hydrogels are shown on a custom made apparatus with a 15mg sphere placed on the center. (**B**) Young's Modulus of low, medium, and high stiffness hydrogels were measured using a modified model of the Hertz equation (* $p<0.05$ compared to low stiffness hydrogel, # $p<0.05$ compared to medium stiffness hydrogel, $N>4$). (**C**) Healthy and IPF lung matrices were solubilized and conjugated to the polyacrylamide hydrogels and the Young's Moduli were calculated at 20% strain using an Instron 5848 with a 10N load cell by cross-head displacement (* $p<0.05$ compared to low stiffness hydrogel of the same ECM, # $p<0.05$ compared to medium stiffness hydrogel of the same ECM, $N>5$). (**D**) To confirm conjugation of ECM to the polyacrylamide hydrogels, the ECM was tagged with NHS-FITC, dialyzed, and conjugated to the polyacrylamide hydrogel. The excess ECM-FITC was removed by rinsing and fluorescent images were taken for control, 0.2 mg/mL (collagen I and fibronectin), and 0.5 mg/mL of both the healthy and IPF lung ECM.

Figure S4

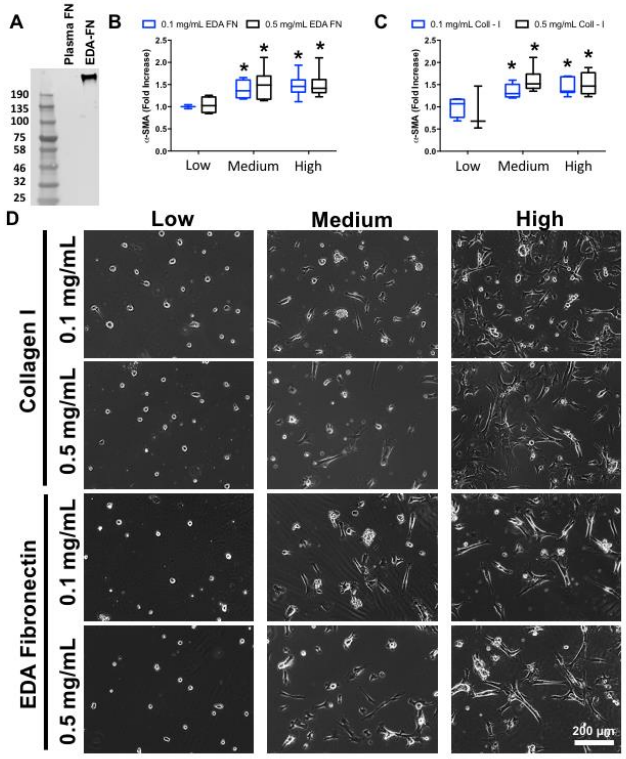

Figure 4. Varying matrix content does not alter PC to expression of α-SMA. (**A**) Human fibronectin containing the EDA fragment was isolated from pericyte culture condition media using gelatin affinity chromatography. Immunoblotting using an EDA-FN specific antibody (IST-9) confirmed the presence of EDA-FN, but did not bind to plasma fibronectin. (**B-C**) Two concentrations of EDA-FN and collagen I (0.1mg/mL and 0.5mg/mL) were conjugated to hydrogels of low, medium, and high stiffness. PC were cultured on the hydrogels for 7 days and α-SMA expression was quantified using flow cytometry analysis for hydrogels conjugated to EDA-FN and collagen I (* $p<0.05$ compared to low stiffness hydrogel conjugated to 0.1mg/mL of the corresponding protein, N=3). (**D**) No significant difference was seen between ECM concentrations. Images of PC on the hydrogels at 7 days are shown. PC were cultured on hydrogels of low, medium, and high stiffness functionalized with a 1:1 ratio of fibronectin and collagen I. (* $p<0.05$ versus low stiffness hydrogel, # $p<0.05$ versus medium stiffness hydrogel, N=4).