Measurements made from micro-CT of the intact arterial trees revealed that vascular remodeling and pulmonary hypertension as evident in the perfusion studies was present in all hypoxia exposed rats. Right ventricular free wall versus left ventricle plus septum weight determination was performed on Sprague-Dawley rats after 21-day exposure to normoxic or hypoxic (10% O2) conditions allowing for evaluation of functional vascular mechanics in addition to anatomical structure. This work quantifies changes in the mechanical properties of the pulmonary arteries after exposure to normobaric hypoxia determined by perfusion conditions and provides new insights into the structural basis of chronic hypoxia-induced pulmonary hypertension.

**Figure 1**: Intravascular pressure vs. arterial diameter plotted for 5 vessel segments, randomly chosen, measured in a normoxia adapted, control rat lung. Data for each vessel segment was fit to a linear pressure vs. diameter relationship proposed by Yen et al.\(D(P) = D(0) + \alpha P\), where \(D(0)\) is the unstressed vessel diameter and \(\alpha\) is a distensibility coefficient.

**Figure 2**: Intravascular pressure vs. arterial diameter (linear fit to average Young’s modulus).  Distensibility of the Pulmonary Arteries of Normoxia and Hypoxia Adapted Rats

**Figure 3**: Tissue micro-angiographic and image computed tomography, microangiography. Shown in the picture are digital scans of the computer platforms are used for reconstruction, rendering, and morphometric analysis. Adapted vascular models are used for further experimentation on small scale studies of modified pulmonary arterial architecture resulting from vascular remodeling. As an alternative, x-ray microangiography can be used to produce reconstructions of arterial vasculature that are used for providing shape information for morphometric analysis. The extant literature on the morphometry of the pulmonary arterial tree comes almost exclusively from histological measurements performed on plastic corrosion casts. This laborious method of histological data collection has discouraged even small scale studies of modified pulmonary arterial architecture resulting from vascular remodeling. Due to the absence of vascular remodeling and pulmonary hypertension in normoxic control group, the data is comprised of all the resolvable vessels with their correct spatial orientation and connectivity, and that the data can be collected on the same lung under different experimental conditions. Computer tomography can also be used for morphometric analysis in addition to anatomical structure. In particular, digital images of microangiographic preparations of lungs obtained using x-ray microangiography and electron microscopy can be obtained using micro-CT. The diameter, \(D\), vs. pressure, \(P\), relationship was measured and the values were fit to a linear relationship proposed by Yen et al. \(D(P) = D(0) + \alpha P\), where \(D(0)\) is the unstressed vessel diameter and \(\alpha\) is a distensibility coefficient.

**Table 1**: Results for individual hypoxia (N = 6) and normoxia (N = 6) adapted rats. a) Pulmonary arterial distensibility, \(\alpha\, D(P) = D(0) + \alpha P\), where \(D(0)\) is the unstressed vessel diameter and \(\alpha\) is a distensibility coefficient; b) Hematocrit, \(Ht\); c) Body weight, \(Wt\); d) Right ventricular hypertrophy, \(RVH\).