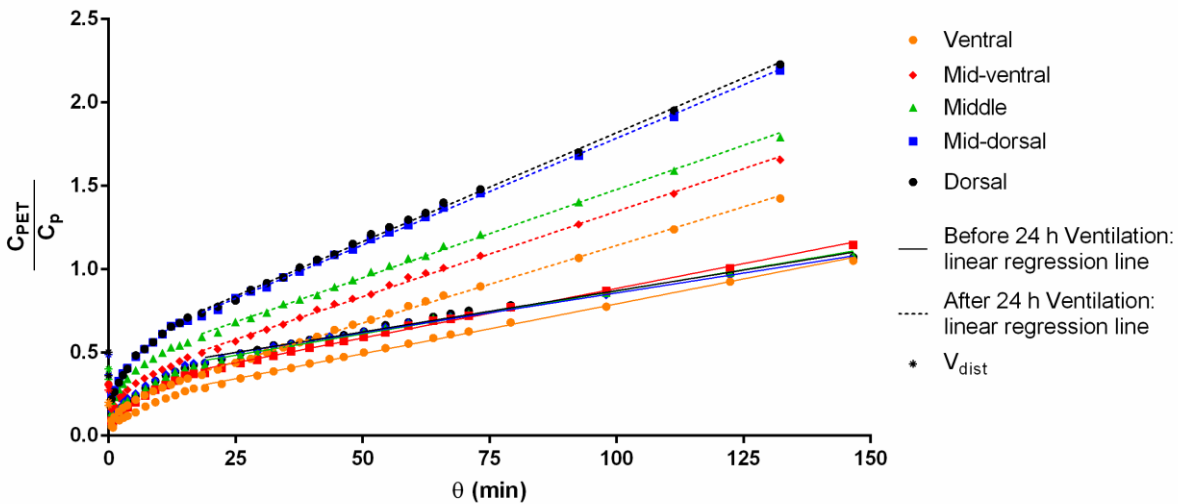
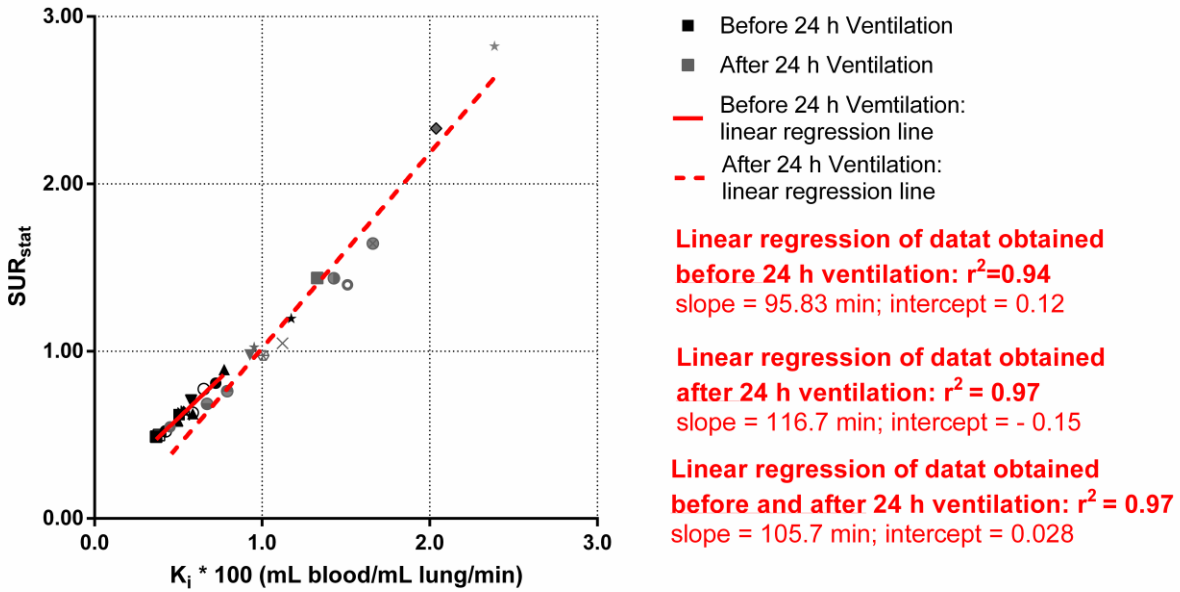


## Supplemental Digital Content

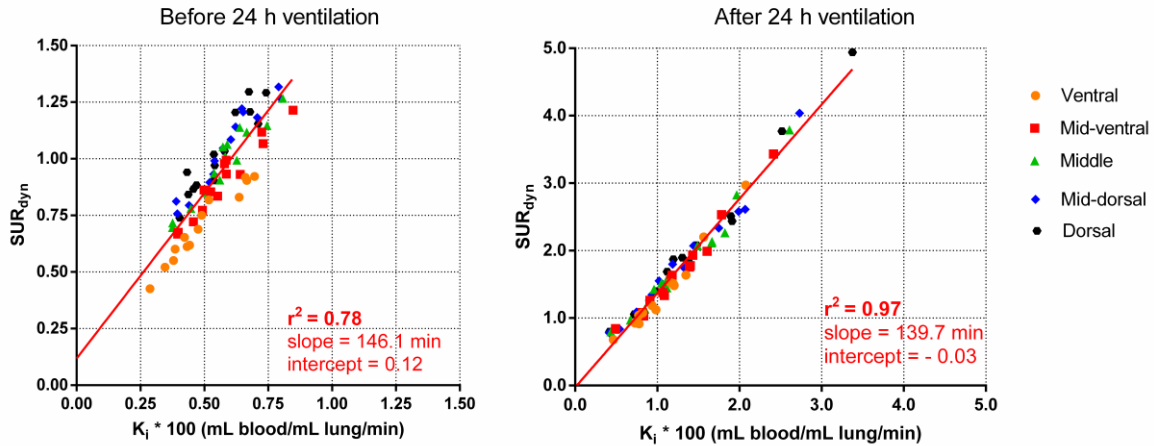


**Supplemental Figure 1:** Patlak plot of imaging data obtained from one representative animal before and after 24 h of mechanical ventilation and divided in 5 iso-gravimetric ventro-dorsal lung regions.

Ventral (gravitational non-dependent), mid-ventral, middle, mid-dorsal, and dorsal (gravitational dependent) subregions are shown in orange, red, green, blue, and black, respectively. The solid and dashed lines represent the linear regression lines of the data obtained before and after 24 h of mechanical ventilation, respectively. Linear regression was performed for data obtained  $\geq 10$  min after injection of  $^{18}\text{F}$ -FDG (frame 14 to 32). The slope of the linear regression line represents the  $^{18}\text{F}$ -FDG net uptake rate ( $K_i$ ) while the ordinate-intercept of the prolonged linear regression line corresponds to the apparent distribution volume ( $V_{dist}$ ).



**Supplemental Figure 2:** Linear correlation between  $K_i$  and  $SUR_{stat}$  obtained from PET/CT imaging data of 14 animals acquired before (black markers) and after 24 h mechanical ventilation (gray markers) and averaged over the whole field of view (15 cm cranio-caudal field of view).  $SUR_{stat}$  were obtained from the static PET/CT scans and analysis of the same 15 cm cranio-caudal field of view as used for the Patlak analysis. The red solid and dashed lines represent the linear regression lines of the data obtained before and after 24 h of mechanical ventilation, respectively.



**Supplemental Figure 3:** Linear correlation between  $K_i$  and  $SUR_{dyn}$  obtained from PET/CT imaging data of 14 animals acquired before (left) and after 24 h mechanical ventilation (right) and divided in 5 iso-gravimetric ventro-dorsal regions. Pulmonary uptake rates of  $^{18}F$ -FDG ( $K_i$ ) were derived by dynamic PET scanning followed by Patlak analysis.  $SUR_{dyn}$  data were obtained from the dynamic PET scan and analysis of frame 29 – 32 acquired 40 min to 75 min post injection of  $^{18}F$ -FDG and analysis of the same 15 cm cranio-caudal field of view as used for the Patlak analysis. Ventral (gravitational non-dependent), mid-ventral, middle, mid-dorsal, and dorsal (gravitational dependent) subregions are shown in orange, red, green, blue, and black, respectively. The red lines represent the linear regression lines. Note the differing axis scales.

**Supplemental Table 1:** Hemodynamics, gas exchange and lung mechanics data.

	Group	BL 1	Injury	BL 2	Time 1	Time 2	Time 3	Time 4	Group Effect	Time*Group Effect
<b>Hemodynamics</b>										
<b>CO (l/min)</b>	nVCV	3.9±0.8	6.7±1.9	4.4±0.3	6.3±2.3	6.8±2.0	6.9±1.9	6.74±1.70	n.s.	n.s.
	VCV	3.4±0.6	5.6±2.3	4.7±1.5	5.5±2.1	5.3±0.5	6.4±1.6	5.90±0.76		
			n.s.					n.s.		
<b>HF (min<sup>-1</sup>)</b>	nVCV	105±18	113±27	100±13	107±20	109±12	113±8	107±12	n.s.	n.s.
	VCV	97±13	107±34	107±22	106±14	100±14	111±9	108±12		
			n.s.					n.s.		
<b>MAP (mmHg)</b>	nVCV	64.7±6.4	81.0±8.7	77.6±9.7	70.3±10.3	70.4±7.4	71.6±9.5	71.1±6.9	n.s.	n.s.
	VCV	73.9±14.5	80.1±9.5	77.9±13.3	72.3±16.4	67.4±9.4	68.9±8.2	71.4±8.6		
			n.s.					n.s.		
<b>MPAP (mmHg)</b>	nVCV	18.1±3.6	31.7±4.2	27.1±3.6	26.6±2.1	26.4±4.9	26.4±3.5	24.7±4.2	n.s.	n.s.
	VCV	18.9±2.7	31.4±4.5	31.7±7.0	28.3±5.2	28.7±4.4	28.0±2.0	27.3±3.2		
			n.s.					n.s.		
<b>Hct</b>	nVCV	0.27±0.02	0.29±0.05	0.29±0.02	0.26±0.03	0.25±0.03	0.25±0.04	0.25±0.04	n.s.	n.s.
	VCV	0.26±0.03	0.27±0.04	0.28±0.04	0.26±0.04	0.24±0.03	0.24±0.02	0.24±0.03		
			n.s.					n.s.		
<b>Gas Exchange</b>										
<b>PaO<sub>2</sub></b>	nVCV	600.6±61.6	69.14±16.22	86.86±13.06	83.57±17.82	82.29±16.12	83.29±14.04	87.86±18.28	n.s.	n.s.
	VCV	599.7±60.2	64.43±14.79	80.86±6.26	75.71±11.09	74.00±9.83	77.57±10.75	74.57±8.98		
			n.s.					n.s.		
<b>PaCO<sub>2</sub></b>	nVCV	47.7±6.4	89.17±10.42	87.71±18.03	83.91±11.24	81.63±7.64	91.54±10.41	95.74±15.55	n.s.	n.s.
	VCV	50.9±5.8	88.49±27.48	88.99±19.89	80.41±15.14	80.41±15.62	86.73±19.34	84.20±10.36		
			n.s.					n.s.		
<b>PaO<sub>2</sub>/FiO<sub>2</sub></b>	nVCV	600.6±61.6	69.1±16.2	202.6±81.7	214.2±79.4	220.0±	222.6±74.4	228.3±85.6	n.s.	n.s.
	VCV	599.7±60.2	64.4±14.8	158.2±42.0	167.6±32.5	189.4±	198.4±47.7	190.4±41.8		
			n.s.					n.s.		
<b>pH</b>	nVCV	7.4±0.0	7.23±0.06	7.26±0.08	7.30±0.06	7.33±0.06	7.32±0.06	7.30±0.07	n.s.	n.s.
	VCV	7.4±0.0	7.25±0.11	7.22±0.08	7.30±0.05	7.32±0.04	7.34±0.05	7.35±0.05		
			n.s.					n.s.		
<b>Temperature</b>	nVCV	37.8±0.9	37.99±0.68	38.63±1.19	38.89±0.62	38.23±0.56	38.66±0.34	38.81±0.40	n.s.	n.s.
	VCV	37.6±0.6	37.71±0.83	38.13±1.02	38.39±0.82	37.93±0.45	38.43±0.37	38.41±0.34		
			n.s.					n.s.		

	Group	BL 1	Injury	BL 2	Time 1	Time 2	Time 3	Time 4	Group effect	Time* Group effect
<b>Lung Mechanics</b>										
<b>V<sub>T</sub> (mL/kg)</b>	nVCV	6.4±0.1	6.4±0.1	6.5±0.0	6.2±0.5	6.2±0.5	6.1±0.6	6.0±0.5	n.s.	n.s.
	VCV	6.5±0.2	6.6±0.2	6.8±0.9	6.4±0.4	6.4±0.5	6.5±0.4	6.6±0.2		
			n.s.					p=0.009		
<b>RR (min<sup>-1</sup>)</b>	nVCV	33.6±2.5	33.6±2.5	35.1 0.1	28.3±7.2	27.5±8.1	25.3±8.6	26.0±9.3	n.s.	n.s.
	VCV	33.6±2.5	33.6±2.5	35.1 0.0	32.9±2.7	29.3±6.1	27.9±5.7	26.4±5.6		
			n.s.					n.s.		
<b>MV (l/min)</b>	nVCV	7.9±0.6	7.9±0.6	8.3 0.7	6.2±1.4	6.0±1.6	5.4±1.5	5.5±1.5	n.s.	n.s.
	VCV	7.6±0.7	7.6±0.6	8.2 0.9	7.3±0.6	6.4±0.8	6.1±1.4	5.8±1.5		
			n.s.					n.s.		
<b>R<sub>RS</sub> (cmH<sub>2</sub>O l<sup>-1</sup>/s)</b>	nVCV	7.3±0.6	10.7±2.0	7.4 0.3	8.2±0.6	9.1±1.1	9.8±2.1	10.7±4.2	n.s.	n.s.
	VCV	7.6±1.1	10.0±1.6	8.5±1.9	7.9±0.6	8.4±2.1	9.4±2.2	9.6±2.4		
			n.s.					n.s.		
<b>E<sub>RS</sub> (cmH<sub>2</sub>O l<sup>-1</sup>)</b>	nVCV	24.1±2.7	81.2±7.0	69.2 12.4	74.6±21.6	74.1±23.7	71.3±22.6	70.1±23.2	n.s.	n.s.
	VCV	23.6±4.3	67.7 9.8	69.1±8.8	79.3±13.5	78.0±14.4	74.6±11.1	71.0±10.2		
			p=0.018					p=0.805		
<b>P<sub>max</sub> (cmH<sub>2</sub>O)</b>	nVCV	21.0±0.7	34.4±2.4	27.6±4.2	27.1±5.2	27.6±6	26.8±5	27.2±4.7	n.s.	n.s.
	VCV	20.9±0.7	31.1±2.6	30.5±3.6	29.1±3.9	28.1±2.3	28±2.5	26.6±2.4		
			p=0.048					n.s.		
<b>P<sub>mean</sub> (cmH<sub>2</sub>O)</b>	nVCV	14.0±0.2	19.2±0.8	15.5±3.2	14.2±2.7	14.4±3.5	13.8±3.1	14.0±3.2	n.s.	n.s.
	VCV	14.0±0.3	17.9±0.9	17.6±3.1	15.9±2.8	15.3±2.2	15.2±2.1	13.9±1.7		
			p=0.026					n.s.		
<b>P<sub>plat</sub> (cmH<sub>2</sub>O)</b>	nVCV	17,4 0.7	30.8 2.3	25.6 4.3	24.6 5.2	24.7 7.0	23.5 6.1	23.4 6.2	n.s.	n.s.
	VCV	17,3 0.6	27.0 2.3	27.8 4.8	27.1 4.2	25.7 3.4	25.2 3.1	23.6 3.0		
			p=0.018					n.s.		
<b>PEEP (cmH<sub>2</sub>O)</b>	nVCV	10.0±0.0	9.8±0.2	7.7±2.9	6.2±1.5	6.3±6.2	5.8±1.9	6.2±2.0	n.s.	n.s.
	VCV	10.0±0.0	9.8±0.2	9.7±2.8	7.6±2.0	6.9±1.9	6.7±1.9	5.6 1.5		
			n.s.					n.s.		

Values are given as mean and standard deviation. Differences between and within groups were tested with general linear model statistics with BL 2 as covariate. Differences between groups at time point Injury and Time 4, respectively, were tested with Mann-Whitney-U tests and are specified in the respective columns. Statistical significance was accepted at p<0.05. BL1/2, Baseline 1/2; nVCV, volume controlled ventilation with variable tidal volumes; VCV, volume controlled ventilation with non-variable tidal volume; CO, cardiac output; HR, heart rate; MAP, mean arterial blood pressure; MPAP, mean pulmonary arterial blood pressure; Hct, hematocrit; PaO<sub>2</sub>, arterial partial pressure of oxygen; FiO<sub>2</sub>, fraction of inspired oxygen; PaCO<sub>2</sub>, arterial partial pressure of carbon dioxide; V<sub>T</sub>, tidal volume; RR, respiratory rate; MV, minute ventilation; R<sub>RS</sub>, resistance of the respiratory system; P<sub>max</sub>, maximal airway pressure; P<sub>mean</sub>, mean airway pressure; PEEP, positive end-expiratory pressure; n.s., no significance.