

2021

## Evaluation of respiratory function using blood gas parameters in Yucatan minipigs following Spinal Cord Injury

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### Recommended Citation

Gallagher, Jackson; Morgan, Monique; Knibbe, Chase; Gibson, Destiny; and Boakye, Maxwell (2021)

"Evaluation of respiratory function using blood gas parameters in Yucatan minipigs following Spinal Cord Injury," *The Cardinal Edge*: Vol. 1, Article 5.

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### Cover Page Footnote

1. Jain NB, Ayers GD, Peterson EN, et al. Traumatic spinal cord injury in the United States, 1993-2012. JAMA. 2015;313(22):2236-2243. 2. Zimmer, M Beth et al. "Effect of spinal cord injury on the respiratory system: basic research and current clinical treatment options." The journal of spinal cord medicine vol. 30,4 (2007): 319-30. doi:10.1080/10790268.2007.11753947 3. Lee, D.-H. and J.K. Lee, Animal models of axon regeneration after spinal cord injury. Neuroscience bulletin, 2013. 29(4): p. 436-444.

# Evaluations of respiratory function using blood gas parameters in Yucatan minipigs following Spinal Cord Injury

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## ABSTRACT

There are approximately 17,810 new spinal cord injuries (SCI) in the U.S. each year [1]. Physical damage to the spinal cord has the potential to interfere with normal motor, sensory, and/or autonomic function, such as impairment of the respiratory system. In fact, respiratory insufficiency is the number one cause of mortality and morbidity after SCI. The more rostral the injury, the more likely there will be disruption to normal ventilation (generally rostral to T6) [2]. To conduct relevant preclinical research, it has been shown that large animal models, such as the Yucatan minipig, have a better success rate of translating to the clinical setting when compared to rodent or other small animal models [3]. While trying to optimize this animal model to specifically target deficits in mobility, it was important to narrow the injury site, which would isolate mobility and not affect the respiratory system. In this study, 18 Yucatan minipigs were randomized into groups of 6 and received either a mild, moderate, or severe level of a T9/T10 SCI. Blood gases PO<sub>2</sub>, PCO<sub>2</sub>, HCO<sub>3</sub>, and pH were recorded hourly prior to, during, and immediately post injury to evaluate stability of the animal during anesthesia, as well as closely monitor respiratory function following SCI. Parameters were monitored one hour prior to anesthetic induction and up to 4 hours post anesthesia recovery. None of the groups showed significant deficits in respiratory function post-injury. It was concluded that a T9/T10 injury could be used to isolate motor function independent of respiratory deficits.

## REFERENCES

1. Jain NB, Ayers GD, Peterson EN, et al. Traumatic spinal cord injury in the United States, 1993-2012. *JAMA*. 2015;313(22):2236-2243.
2. Zimmer, M Beth et al. "Effect of spinal cord injury on the respiratory system: basic research and current clinical treatment options." *The journal of spinal cord medicine* vol. 30,4 (2007): 319-30. doi:10.1080/10790268.2007.11753947
3. Lee, D.-H. and J.K. Lee, *Animal models of axon regeneration after spinal cord injury*. *Neuroscience bulletin*, 2013. 29(4): p. 436-444.